



Risk and protective factors associated with problem behavior outcomes of children with histories of long-term out-of-home care

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Abstract

Background and aims. Children in out-of-home care have usually experienced significant adversity in their lives, which may negatively affect their behavioral development. Problem behavior among children in out-of-home care are of particular concern given children's history of adverse caregiving as well as trauma resulting from maltreatment and system involvement, presenting increased risk of maladjusted problem behavior trajectories. Interventions have been developed to address this problem, but systematic reviews of the evidence find that understanding of interventions that work best for different subgroups of children is currently limited. Despite difficulties, some children in out-of-home care still make positive behavioral adjustment. Research suggests that understanding the processes underlying problem behavior development and identifying risk and protective factors that may benefit particular subgroups is needed (Shpiegel, 2016). This thesis speaks to this gap in the literature by investigating behavioral risk and protective factors for children in out-of-home care.

Methods. This thesis comprises two studies. First, a systematic literature review (Study 1) of risk and protective factors for the longitudinal development of problem behavior for children in out-of-home care was conducted. It aimed to identify variables that have been examined in existing literature and provides evidence of risk or protective effects that may be targeted in behavioral interventions. The second study analyzed longitudinal secondary data, the National Child and Adolescent Well-Being (NSCAW) I, on the problem behavior outcomes of 513 children who have been in long-term out-of-home care in the United States (Study 2). Specifically, the study used multiple-group latent growth curve models to explore whether there were any risk or protective correlates and factors for problem behavior development. Moderated mediation path analyses were then carried out to understand the specific relationship between severity of recent incident of abuse, caregiver involvement, responsibility skills, post-traumatic stress symptoms, and problem behavior outcomes 36 months later.

Findings. Study 1 identified and synthesized 146 studies, which indicated that children's longitudinal behavior development is associated with a wide range of factors (individual characteristics, interpersonal relations, interventions, etc.). Challenges related to synthesis of heterogeneous methodologies, contexts, and findings were also highlighted. Findings from Study 1 also informed the statistical approach of Study 2, by identifying variables that are key in the child welfare literature, as well as identifying gaps in the research that require further investigation. In Study 2, analyses identified several variables to be statistically associated with behavior problems. The identified variables were: type of caregiver (permanent/non-permanent), age at initial placement, daily living skills, school engagement, neighborhood community environment, trauma symptoms, caregiver involvement, socioemotional skills, and severity of recent abuse

incident. Path analyses revealed that caregiver involvement and responsibility skills were not affected by recent incident of abuse, but significantly decreased later problem behavior outcomes, suggesting a protective relationship that buffers against the adverse effects of maltreatment experience.

Conclusion. This thesis presents evidence that several individual and contextual characteristics may be risk and protective variables for children who have been in long-term out-of-home care, and that these variables vary according to children's age. Such findings suggest the need for future research and practice to consider children's ages to efficiently carry out research and provide services. Findings also highlighted the significant gap in the child welfare literature, suggesting that socioemotional skills are not well understood for children with long-term out-of-home care histories, and sheds light on how these variables can be studied further in the future. These findings may also inform future interventions to promote positive behavioral adjustment of children in out-of-home care, by identifying variables that correlate with positive or negative change over time.

To Kay, B.Y., and Changhee

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Chapter 1. Introduction

1.1 Defining the focus of the study

The main focus of this thesis is to examine trends and relationships associated with behavior problems among children in out-of-home care. In this thesis, problem behavior is defined as "any repeated pattern of behavior [...] that interferes with or is at risk of interfering with optimal learning or engagement in prosocial interactions with peers and adults" (Kaiser, 2007, p.115). This term is not used to suggest that the child is the problem. Rather, the use of the term has been chosen based on its utilization as a common term in the research literature (e.g., Ary, Duncan, Biglan, Metzler, Noell, & Smolkowski, 1999; Aunola & Nurmi, 2005; Sieh, Meijer, Oort, Visser-Meily, & Van der Leij, 2010), and is used as an overarching description of certain behaviors that require adjustment.

Problem behavior is often conceptualized as internalizing and externalizing symptoms. Although existing research indicates that externalizing and internalizing problems frequently co-occur, most behavior-related dysfunctions are categorized as one of these two types of symptoms (Edwards & Hans, 2015; Lee & Stone, 2012). Internalizing behaviors include disengagement, anxiety, and apprehension (Groh, Roisman, van Ijzendoorn, Bakermans-Kranenburg, & Fearon, 2012), and are related to psychopathological outcomes such as depression, impaired social problem-solving skills, and suicidal behavior (Reijntjes, Kamphuis, Prinzie, & Telch, 2010; Zahn-Waxler, Klimes-Dougan, Slattery, 2000). On the other hand, externalizing behaviors are characterized by aggression, impulsivity, hyperactivity, and disobedience (Cheung, Goodman, Leckie, & Jenkins, 2011), and are related to mental health outcomes such as peer victimization, low social competence, and higher risk for later juvenile justice involvement and adult crime (Bornstein, Hahn, & Haynes, 2010; Langberg et al., 2010).

An important aspect of this thesis is the focus on the identification of potential risk or protective factors that may change long-term behavioral outcomes. In this study, variables that have been previously studied in the child welfare and social care literature and have yielded inconsistent findings, as well as those

that have not yet been examined are investigated. In doing so, it aims to facilitate examination of relationships that have previously yielded inconsistent or inconclusive results and, in turn, understand risk and protective factors within a well-defined and small population of children. An understanding of typical and atypical behavior trajectories, as well as identification of factors linked to positive or negative trajectories are expected to help maintain, improve, and create social care policy and programs.

This thesis utilizes information from a nationally representative US dataset of children who have been in contact with Child Protective Services for alleged abuse and/or neglect (see Chapter 5, Section 5.1 for a full description of the dataset). Since this thesis utilizes a US dataset, one important consideration is with regards to the implications of utilizing a US dataset and the generalizability of the findings internationally. As part of an international comparison, del Valle & Bravo (2013) examine the child protection systems in the US and UK. This comparison finds that systems in both countries are strongly focused on the detection of child abuse, child protection, and family support. The models in both countries focus on achieving permanency and avoiding long stays in out-of-home care. Thus, both systems promote the utilization of adoption as a stable, lasting resolution for children who have a low expectation to reunify with their biological family. Moreover, both are also grounded in the premise that children should experience the benefits of a family environment to ensure that necessary developmental needs are satisfied, reflected in the tendency to have decreased placement of children in residential care in favor of family-based care. While differences exist between different national child welfare regimes and national policies regarding children in out-of-home care, cross-country analyses have shown that child welfare systems across the US and some European countries have largely converged functionally over the last two decades (Gilbert, 2012). Policy orientations have shifted from an emphasis on child protection to family support, and towards a more comprehensive child development model, inspired by the United Nations Convention on the Rights of the Child (Gilbert, 2012; HM Government, 2018). This transition has allowed cross-country comparisons between outcomes in out-of-home care to be more meaningful, increasing the generalizability of research results to a wider population. More specifically, Chapter 7, Section 7.5

discusses the question of what findings are achieved and the conclusions that may be drawn from them, given that there are differences in practices within the UK and the US.

After a review of such systemic similarities, the two countries have been rendered comparable in the various ways children experience out-of-home care and develop behavioral difficulties and competencies (Bellonci, Holmes, & Whittaker, 2019; Fernandez & Barth, 2010; Gilbert, Parton, & Skivenes, 2011; Thoburn & Ainsworth, 2015). One thing to note, however, are the differences in terminology, which will be acknowledged throughout the thesis where it is necessary. In addition, comparisons of the populations and types of placements are included later in this chapter (see Section 1.3.2 and Section 1.3.3). For clarity, the term ‘child welfare worker’ will be used to cover child protection services in the US context and social workers/family support workers in the UK context. Additionally, the term ‘children’ will be used to refer to all young people under the age of 18. Findings from this thesis ultimately aim to contribute to the promotion of behavioral adjustment among children in out-of-home care across the US, UK, as well as other comparable child welfare systems by strengthening the existing research evidence base. The focus of the literature review and evidence presented in this thesis is mainly on child welfare systems in westernized high-income societies. Emerging and developing economies use child welfare services very differently (i.e., orphanages) and are therefore out of scope for this thesis (Frimpong-Manso, 2014; Thabet & Thabet, 2007).

1.2 Positionality of the researcher

I have a deep-rooted commitment to understanding children’s behavioral development and adjustment. My time as a teacher spent in preschool and primary school classrooms set this interest in motion, as I observed children that were reaping the most benefits out of their contexts were those that behaved in prosocial and age-appropriate ways. To illustrate, well-behaved children received positive attention from their teachers and engaged in cordial interactions with peers. Alternatively, teachers were less keen to adhere to the needs of children who frequently displayed aggressive and disruptive behavior.

My interest for children in vulnerable contexts emerged as I began working in low-income school districts in the US. I began to notice common characteristics of children that seemed to be associated with better behavioral adjustment and fewer behavior problems, and became aware of the importance of socioemotional competence. One of the most vulnerable contexts for children is involvement in the out-of-home care system and the circumstances leading up to it. This thesis is derived from these experiences and interests, and ultimately aims to support children so that they may stay on a path of positive adjustment.

In order to accomplish this aim, I first conducted a systematic review to examine the existing quantitative evidence on the longitudinal development of behavioral problems among children in out-of-home care (see Chapter 3). This is the first of the two studies that comprise this thesis, and has been used as groundwork to inform the secondary analyses portion of the thesis. The findings of the systematic review then informed the second study of the thesis, the statistical analyses of the secondary dataset, the National Survey of Child and Adolescent Well-Being (NSCAW) I. In the decision-making process of identifying an appropriate secondary dataset, I first searched for an existing dataset that adequately met the following requirements: 1) the dataset had to focus on or include an adequate number of children in out-of-home care, 2) the dataset had to be longitudinal in order to allow inspection of behavioral development over multiple time points, and 3) it had to include variables related to behavior and socioemotional competence. Many existing datasets, including administrative data in the UK, Finland, Australia, and the US were explored but were concluded to be inadequate due to small sample size and lack of information on behavioral development or reasons for out-of-home care entry. Consultations with US colleagues [in-person meeting with Dr. Fred Wulczyn at University of Chicago Chapin Hall, and email correspondences with Dr. Joe Ryan at the University of Michigan, Professor Bethany Lee at the University of Maryland, and Director Jennifer Rolls-Reutz at California Evidence-Based Clearinghouse (CEBC)] opened possibilities of the NSCAW dataset. Subsequent exploration of the published literature which used the NSCAW and further examination of the data descriptions, indicated the dataset to be the best option to answer the research questions of this thesis. Access to the data was granted following a formal application process, and I am the first non-US-

based researcher to use the NSCAW. The findings of this thesis will be a novel contribution to the existing research that has been carried out with the NSCAW dataset.

1.3 Who are children in out-of-home care?

1.3.1 Definition

In Section 1.1 of this chapter, similarities between the child welfare system in the UK and US have been outlined. This section begins with an introduction of the differences between the US and UK systems. The historical roots of child welfare services in the US are found in the child saving movement that aimed to identify and protect maltreated children during the Progressive Era (1890-1920) (Takanishi, 1978). Compared to the US, the UK has a tradition of a more direct public child welfare system (Fernandez & Barth, 2010). In England and Wales, the Children Act (1989) has significantly impacted the services provided to children and their families by bringing together the previously inconsistent law regarding child welfare under one piece of legislation. The act is based on the consensus that children generally develop best within a family environment, with the full involvement of both parents, and without availing to legal proceedings. This consensus is emulated in the local authorities' responsibilities to support and guarantee contact between the children and their families whenever possible (Selwyn & Briheim-Crookall, 2017).

In the UK, children in out-of-home care are young people up to the age of 21 who are 'looked after' by their local authority, placed in an alternative accommodation, and are given support through services provided by government agencies, private organizations, or charities (Department of Health, 2001). These children are placed in an alternative accommodation following a Care Order (section 31) or with the agreement of their parents (section 20) (Children Act, 1989). Children in out-of-home care are those where a decision has been made for state intervention on the basis that a child can no longer live with their family¹.

¹ In England, and also in some states in the US, a child in out-of-home care can still live with their parents, but it is court mandated (Broadhurst, 2017). These children live with their parents but with child welfare oversight. This is not a preferred placement choice, but is a major practice issue in England where family courts make a decision for the child to remain living with their parents. In this thesis, out-of-home care will refer to the definition as set out in Section 1.3.1 where children are not living with their biological family.

In high-income countries, neglect and/or abuse, witness or experience of domestic violence, becoming orphaned, or parental absence are the main reasons most children enter out-of-home care (Department of Education, 2017). Some children, mainly adolescents, enter out-of-home care due to behavioral issues that their parents are unable to manage (Gonzalez-Garcia, Bravo, Arruabarrena, Martin, Santos, & Del Valle, 2017). The context and legislation to represent the status of these children vary between different countries. For example, the term out-of-home care is used in the US, Canada, and Australia, whereas the term ‘Looked after Children’ is used in the UK (Courtney & Dworsky, 2006; Monson, Moeller-Saxone, Humphreys, Harvey, & Herrman, 2020). Although the term ‘Looked after Child’ is used in the legislation (i.e., the Children Act), there has been a recent move in the child welfare sector in the UK to use ‘children in care’ rather than ‘looked after’ (Courtney, Flynn, & Beaupre, 2013; Hillen, Gafson, Drage, & Conlan, 2012; Melkman, 2020; Stein, 2021). For the purposes of this thesis, the term ‘children in out-of-home care,’ utilized in much of the international literature, will be used as a broad umbrella term to describe these children and their legal status. The breadth of literature drawn on for this introduction chapter is mainly quantitative research from the United States and the United Kingdom, of which a higher proportion came from the US. Although the presented evidence focuses on quantitative studies, the views and experiences of children in out-of-home care are also considered in Section 1.7 of this chapter.

1.3.2 Size of the population

Due to variations in definitions of legal status and the way statistics are collected across different countries, the size of the population is difficult to compare for children in out-of-home care. It should also be noted that children’s placement statuses are subject to change, with children in out-of-home care reported to have experienced on average two or more placements over a one-year period (Office of the Children’s Commissioner, 2018). Despite these complexities, national data in England shows that out of the 12 million children living in England, around 75,000 children (1.6%) were in out-of-home care as of March 31, 2018

(Murray, Lacey, Maughan, & Sacker, 2020). Among these children, 55% were in non-kinship foster care, 18% in kinship foster care, and the remaining in secure units, children's homes, or semi-independent living arrangements (Department for Education, 2019). In the United States, an estimated 426,749 children were in out-of-home care on September 30, 2019, of which 46% were in non-kinship foster care, 31% in kinship foster care, and the remaining in institution or group care, pre-adoptive homes, and supervised independent living (Williams, 2020). A summary of the number of children in out-of-home care across countries is presented in Table 1 below.

Table 1. Summary of the total number of children in out-of-home care

Country	Number of children in out-of-home care
USA ^a	426,749
United Kingdom ^b	105,217
Belgium ^b	19,964
Bulgaria ^b	10,067
Czechia ^b	28,413
Denmark ^b	11,399
Finland ^b	12,119
France ^b	158,124
Germany ^b	147,700
Hungary ^b	20,463
Italy ^b	27,111
Lithuania ^b	10,308
Netherlands ^b	29,365
Poland ^b	121,225
Portugal ^b	5,952
Spain ^b	40,828
Sweden ^b	19,014

Note: The data presented in this table are the most recent information available, and have been collected from multiple sources.

^a(Williams, 2020); ^b(The DataCare project, *in press*)

1.3.3 Placements

A core component of the care system is the accommodation provided to children, generally referred to as a placement in the child welfare literature. The overall purpose of out-of-home care is to provide children who have been maltreated or whose parents are unable to care for them a temporary home, and thus avoid further harm and neglect (Lockwood, Friedman, & Christian, 2015). As set out above, the most common placement types include non-kinship and kinship foster care. Non-kinship foster care involves the placement of a child with a family other than their own, whereas in kinship care, children live with a family member other than their parents (e.g., a grandparent or aunt or uncle), who have been approved by the relevant authorities. Informal kinship care is not included in the child welfare statistics, and sits outside the focus of this thesis, but constitutes a large number of children (Farmer, Selwyn, & Meakings, 2013). Children can also be placed in group or residential homes, which differ in size and purpose. These children live with peers and are usually supported by several workers. To note, most workers in residential care are not qualified social workers, although this varies across different countries (Crimmens, 1998). The distribution of placement types also varies by country (Thoburn & Ainsworth, 2015).

In both the US and UK, permanence is a priority aim, and all children in out-of-home care are expected to have a permanency plan (Schofield, Beek, & Ward, 2012). Permanence is the effort to reduce the amount of time children spend in temporary care, and is achieved by reunification with their biological family, or by adoption or long-term out-of-home care when reunification is not feasible (Lopez, del Valle, Montserrat, & Bravo, 2013). Placements vary in length and structure, ranging from short-term emergency placements to the provision of an alternative long-term home for children, depending on the placement objective (Pabustan-Claar, 2007; Rushton, 2004). Secure residential care is utilized for children at risk of juvenile delinquency and persistent aggressive behavior problems, while inpatient psychiatric care is favored for children who exhibit psychotic or suicidal behavior (Leloux-Opmeer, Kuiper, Swaab, & Scholte, 2016). The option of long-term out-of-home care or adoption is arranged to provide legal permanence when reunification is not feasible (Schofield et al., 2012). In most high-income countries, the majority of children are in short-term out-of-home care and reunify with their birth parents or family members in the near future

(Farmer & Wijedasa, 2013). In some countries, children can also be adopted from a placement (Selwyn & Quinton, 2004). Placement aims are subject to change over time, tend not to be straightforward, and fluctuate depending on the individual child and their context. Some children enter and exit the care system multiple times, while others do not leave the system entirely but experience multiple placement homes (Schofield et al., 2012). These experiences, which are characterized by placement types, length, and moves, are called a placement pathway (Dregan & Guilliford, 2012). Placement pathways are heterogeneous, and children who experience particular placement pathways have specific service needs according to their well-being profiles (McBeath et al., 2018).

There is a broad consensus across high-income countries that living with a family should be the preferred option for children in out-of-home care, with many countries transitioning towards a system in which the majority of children are accommodated this way and not in residential group homes (Freundlich, Avery, Gerstenzang, & Munson, 2006). However, in some countries like Japan, Israel, and Portugal, and to some extent Italy, the majority of children in out-of-home care live in residential care (Attar-Schwartz, 2011; del Valle, Canali, Bravo, & Vecchiato, 2013; Kadonaga & Fraser, 2014; Rodrigues, Barbosa-Ducharne, & del Valle, 2013). Such differences in placement types are often explained by the socio-cultural and historical contexts of different countries or states.

1.3.4 Leaving care

In some jurisdictions, children may continue to have rights afforded to them by welfare providers after they are discharged from out-of-home care. In England, for example, children who have been in out-of-home care for 13 weeks or more after their 14th birthday and were in out-of-home care on or after their 16th birthday receive support until their 21st birthday (25th birthday if the child is still in higher education) (Children Act, 1989; Department of Health, 2001). Such support may include assistance with accommodation, finance, and access to education, health, and other services. In the US, the Independent Living Initiative in 1986 mandates states to provide services for children to support them in leaving out-of-home care (Jones, 2014).

1.4 Outcomes of children in out-of-home care

Research documents many similarities across high-income countries in terms of children's outcomes. When children become 18 years old, they age out from the out-of-home care system and are expected to live as independent young adults. These young adults experience extremely high rates of unemployment and homelessness (Fowler, Marcal, Zhang, Day, & Landsverk, 2017). An analysis of Washington state administrative data in the US found that 28% of young adults encounter homelessness within one year of aging out of out-of-home care (Shah et al., 2016). In another study, more than 37.1% of young adults who had aged out of out-of-home care did not hold a high school degree or a general equivalency degree (GED) (Courtney & Dworsky, 2006). Their low levels of educational attainment led to limited employment, which in turn resulted in high levels of economic hardship.

Poor outcomes are not limited to those whose care experience extends to adulthood (Buchanan & Ten Brinke, 1997; Buchanan, 1999). To illustrate, a study following the lives of children who have been involved in out-of-home care showed lower life satisfaction at age 16 and higher rates of depression at age 33 (Buchanan, 1999). There is also research showing poor long-term outcomes for those who were in out-of-home care at a younger age compared to the general population, in terms of poorer physical and mental health, higher unemployment rates, and increased criminality (Pecora et al., 2006; Zetlin, Weinberg, & Kimm, 2004). Mental health, social, educational difficulties, and other concerns such as poverty, incarceration, and early pregnancy appear among children who have experienced out-of-home care throughout childhood (Reilly, 2003; Zlotnick, Tam, & Soman, 2012).

There is also some evidence demonstrating that children placed in out-of-home care have similar or better outcomes in comparison to those in the general population with analogous family characteristics (see for example Leslie, Hurlburt, James, Landsverk, Slymen, & Zhang, 2005; Maclean, Taylor, & O'Donnell, 2018). Some studies indicate that children who are placed in out-of-home care demonstrate improved behavioral and emotional adjustment, physical health, and academic achievement following the years after placement (Barnow, Buck, O'Brien, Pecora, Ellis, & Steiner, 2015; White, O'Brien, White, Pecora, &

Phillips, 2008). Additionally, although research generally focuses on the negative repercussions of maltreatment, the resilience of children who have experienced the same adversities are frequently established as well (Dubowitz et al., 2016; Gilligan, 2007). Further, some studies show that care can be a protective factor, and that outcomes are better for children in care than for those who remain at home (Conn, Szilagyi, Jee, Blumkin, & Szilagyi, 2015; Sinclair, Luke, & Berridge, 2019).

However, it would be an oversimplification to conclude that negative outcomes are directly caused by out-of-home care, rather than the repercussions of adverse cumulative circumstances that many who enter the child welfare system experience. Involvement with the child welfare system is paradoxical in nature in that, while placement with a new family is intended to protect children from a vulnerable context of development, separation from a primary caregiver may add to the child's preexisting load of trauma and previous adverse experiences. Many studies suggest, compared to children from underprivileged and ethnic minority families, those in out-of-home care are at increased risk for criminal activity involvement, persistent and serious mental disorders, and higher rates of homelessness and unemployment (Baldwin, Biehal, Cusworth, Wade, Allgar, & Vostanis, 2019; Kaariala & Hiilamo, 2017; Shah et al., 2016).

1.5 The behavioral outcomes of children in out-of-home care

Nationally representative surveys of the general population in both the UK and US indicate that the growth of behavior problems seem to be rising over time in small but steady increments (NHS, 2018; Paula, Ribeiro, Fombonne, & Mercadante, 2011; Russell, Rodgers, Ukoumunne, & Ford, 2014; Sheldrick, Merchant, & Perrin, 2011; Thomas, Mitchell, & Bastra, 2013). Recent numbers of mental health problems in the UK and US also indicate a substantial rate of prevalence (Cree et al., 2018; Danielson, Bitsko, Ghandour, Holbrook, Kogan, & Blumberg, 2018; Ghandour et al., 2018; NHS Digital, 2018; NHS Digital, 2019). To illustrate, national statistics report that 1 in 6 children in the US between the ages of 2-8 are diagnosed with a mental disorder (Cree et al., 2018), while one in eight (12.8%) children in the UK between the ages of 5 and 19 are diagnosed with a mental disorder (NHS Digital, 2018). While the different age

range and diagnostic measures limit the ability to make direct comparisons, it is nevertheless important to address such behaviors.

Due to histories of trauma, adverse environmental circumstances, and inadequate support for their mental health needs, children in out-of-home care represent a vulnerable population (Jee, Conn, Szilagyi, Blumkin, Baldwin, & Szilagyi, 2010). Many experience physical and emotional maltreatment, neglect, impaired parenting, and exposure to or witness of violence and sexual abuse. Such experiences arouse numerous long-term negative behavioral outcomes, including developmental delays, aggression, anxiety, hyperactivity, trauma, hypervigilance of adults, and low social competence (Gypen, Vanderfaeillie, De Maeyer, Belenger, & Van Holen, 2017; Hambrick, Oppenheim-Weller, N'zi, & Taussig, 2016; Horn, Roos, Beauchamp, Flannery & Fisher, 2018; Szilagyi, Rosen, Rubin, & Zlotnik, 2015). Additionally, many children who enter the out-of-home care system have complex attachment representations, including excessive self-reliance, intrusive anger, preoccupation with fear of danger, poor expectations of adults, and negative views about themselves (Kungl, Gabler, Bovenschen, Lang, Zimmerman, & Spangler, 2019; Samuels & Pryce, 2008). Formation of secure attachments is especially difficult for these children, as negative encounters with adults have led to distrust in their intentions (Dallos, Morgan-West, & Denman, 2015).

The existing evidence demonstrates children in out-of-home care fare worse in displaying problematic behavior compared to their peers (Ford, Vostanis, Meltzer, & Goodman, 2007; Meltzer, Corbin, Gatward, Goodman, & Ford, 2003). One study shows children in out-of-home care consistently have higher levels of internalizing and externalizing symptoms compared to children in the general population (Sawyer, Carbone, Searle, & Robinson, 2007). In this study, the out-of-home care sample consistently scored worse in externalizing symptoms, depression levels, and suicidal behavior compared to children in the general population (Sawyer et al., 2007). Studies have also found higher rates of substance abuse, psychopathology,

and developmental delays among children in out-of-home care in comparison to non-maltreated children (Fisher, Gunnar, Dozier, Bruce, & Pears, 2006).

1.6 Factors of change

Given the important role behavior plays both as an outcome in itself and as a substantial influence on other outcomes and life chances, it is crucial that researchers identify ways to improve behavior for children in out-of-home care. Fortunately, existing research suggests a number of factors that might explain differences in behavioral outcomes (Novak & Benedini, 2020; Price & Landsverk, 1998; Rubin, O'Reilly, Luan, & Localio, 2007). In order to plan and implement effective interventions that prevent negative behavioral trajectories, it is important for social welfare researchers, practitioners, and intervention designers to understand factors that may change behavioral outcomes. This thesis refers to such variables as 'factors of change.' Examining factors of change contribute to the understanding of the underlying mechanisms that lead to positive behavioral trajectories, and helps inform the creation and evaluation of interventions that target behavior that is difficult to manage.

1.6.1 The impact of being in out-of-home care

The child welfare research remains inconsistent on the relationship between out-of-home care and problem behavior outcomes. Many studies find that placement in out-of-home care is associated on average with a higher level of internalizing, anxiety, and depressive symptoms (Fernandez, 2008a; Yoon, 2017), aggressive behavior (Fernandez, 2008b), substance use (Yampolskaya, Chuang, & Walker, 2019), later Psychiatric Residential Treatment Facility (PRTF) admission (Lanier & Rose, 2017), and interpersonal problems (Symanzik et al., 2019). On the other hand, other studies have associated involvement in out-of-home care with improvement in later behavior and mental health (McCrae, Lee, Barth, & Rauktis, 2010; Conn et al., 2015).

As demonstrated, definitive conclusions about the impact of out-of-home care are difficult to draw because of selection bias as well as its multifaceted nature and complex interplay of placement

characteristics such as placement type, stability, length, and relationship with caregivers. The placement of children at an alternate accommodation may protect children in adverse contexts and reduce the likelihood of maladjustment as adults. At the same time, placement in residential provision or with an alternate caregiver, separate from their biological parents, is also argued to be traumatic and may lead to worse adult outcomes. One study investigated children at the margin of placement and found that those in out-of-home care experienced almost threefold higher arrest, conviction, and imprisonment rates compared to those who remained at home (Doyle, 2008). Such findings suggest that children at the margin of placement are likely to experience better outcomes when they remain at home, shedding light on the negative effects of separation from their families and multiple placement changes, which contributes to heightened stress and instability (Bell, Romano, & Flynn, 2015).

One of the main concerns regarding out-of-home care has to do with placement instability. Children sometimes experience a placement change without any prior consultation or knowledge. Research has shown a strong association between multiple placements and poor outcomes (Barber & Delfabbro, 2003; Lawrence, Carlson, & Egeland, 2006; Rubin et al., 2007). Frequent placement/school moves contribute negatively to peer relationships and academic progress (Almas, Papp, Woodbury, Nelson, Zeanah, & Fox, 2018). Instability also occurs in the form of changes in social workers, posing the problem of children having to tell their stories all over again, and establish new relationships. Many children have histories of serious hardship in their family context before entering out-of-home care, and it is stressful for them to reacquaint themselves with new child welfare workers and families when what they must recall may be traumatic and triggering (Riebschleger, Day, & Damashek, 2015; Unrau, Seita, & Putney, 2008). Stability is thus an important component that either supports children to begin improving on a path of security, or an augmentation of their existing confusion and insecurity (Office of the Children's Commissioner, 2018). Placement instability has been associated with significant increases in negative behavioral outcomes including psychiatric symptomatology (Hussey & Guo, 2005), aggression (Eltink, Hoeve, Jongh, Van der Helm, Wissink, & Stams, 2018; Pears, Kim, & Leve, 2012b), internalizing and externalizing problems (Lee

& Thompson, 2009; Newton, Litrownik, & Landsverk, 2000; Proctor, Skriner, Roesch, & Litrownik, 2010), behavior problems (Barber & Delfabbro, 2003; Hiller & St. Clair, 2018; Rubin et al., 2007), juvenile justice involvement and delinquency (Ryan, Hong, Herz, & Hernandez, 2010; Yampolskaya & Chuang, 2012), and sex-trade activities (Hebert & Lanctot, 2016). Cross-lagged relationships are also found between behavior problems and placement instability, in that behavior problems have been found to be consistently associated with placement change, and placement changes with subsequent behavior problems (Aarons, James, Monn, Raghavan, Wells, & Leslie, 2010).

Within the care system, placement type is another heavily researched topic. In line with the United Nations Guidelines for the Alternative Care of Children, family-based care is the most preferred type of placement when out-of-home care is required (United Nations, 2009 December 18). Family-based care is considered to be the best option to meet the needs of the child. However, approximately one-fifth to one-half of foster children experience serious placement disruptions in the US (Konijn et al., 2019). Existing evidence demonstrates that such placement disruptions have negative effects on children's developmental functioning and well-being (Patterson, Day, Vanderwill, Willis, Resko, Henneman, & Cohick, 2018; Clemens, Klopfenstein, Lalonde, & Tis, 2018). Placement disruptions not only heighten the risk of emotional and behavioral difficulties, but are also associated with increased rates of subsequent placement breakdowns (Strijker, Knorth, & Knot-Dickscheit, 2008).

Children's behavior problems are found to be one of the main reasons for placement breakdowns in family-based care (Barber & Delfabbro, 2002). Therefore, for such children with serious or clinical levels of behavior problems, experts recommend that it may be better for these children to be placed in a more restricted setting such as residential care where their needs can be met through appropriate and specific treatment (Barber, Delfabbro, & Cooper, 2001; De Swart, Van den Broek, Stams, Asscher, Van der Laan, Holsbrink-Engels, & Van der Helm, 2012). Likewise, the UN guidelines advise that residential care should be chosen "for cases where such a setting is specifically appropriate, necessary and constructive for the

individual child concerned and in his/her best interests” (United Nations 2009, December 18, p. 5). These guidelines imply that individual and circumstantial characteristics at the time of admission will inform the type of care children are placed in and the continuum of child welfare services that are most appropriate for them. A comparison of children in family-based care and residential care found that, children in residential care tend to experience more delinquency and juvenile charges compared to children in family-based care (Preyde, Adams, Cameron, & Frensch, 2009). Likewise, another study found that, family-based care, compared to residential care, is significantly associated with improved internalizing problems among children (Leloux-Opmeer, Kuiper, Swaab, & Scholte, 2018).

Some studies identify residential care to be associated with improved behavioral outcomes over time. These studies found that a longer stay in residential care is linked to improved mental health (Holstead, Dalton, Horne, & Lamond, 2010; Hussey & Guo, 2005; Lyons, Terry, Martinovich, Peterson, & Bouska, 2001; Nofhle, Cook, Leschied, Pierre, Steward, & Johnson, 2011; Preyde, Frensch, Cameron, White, Penny, & Lazure, 2011), reduced depressive symptoms (Stoner, Leon, & Fuller, 2015), improved externalizing and overall problem behaviors (Nijhof, Otten, & Vermaes, 2013; Scholte & van der Ploeg, 2006), and reduced risk of being charged with a crime (Pullman, 2011). Moreover, improvement of outcomes achieved through treatment are also shown to be maintained over time (Nofhle et al., 2011; Preyde et al., 2011), although evidence shows symptom reductions occur most drastically in the beginning stages of treatment (Nofhle et al., 2011) and that treatment effects are more effective for children with more severe symptoms at intake (Lyons, Woltman, Martinovich, & Hancock, 2009).

Within family-based care, placement in kinship care is found to be associated with decreased levels of behavior problems (Blakely, Leon, Fuller, & Bai, 2017; James, 2004) and involvement with deviant peers (Pears, Kim, & Fisher, 2016). Existing evidence, however, is inconsistent depending on the placement context and outcome domain (Cutuli et al., 2016; Hindt, Bai, Huguenel, Fuller, & Leon, 2019; Garcia, O'Reilly, Matone, Kim, Long, & Rubin, 2015; Vis, Handegard, Holtan, Fossum, & Thornblad, 2016; Wu,

White, & Coleman, 2015). For instance, some studies find behavioral outcomes to heavily depend on age group and contextual characteristics, more so than the type of care (Cutuli et al., 2016; Wu et al., 2015). Additionally, greater improved levels in internalizing and externalizing scores are found among children in kinship care compared to non-kinship care, but these improvements are shown to be heavily confounded by other factors such as caregiver's state of mental health (Garcia et al., 2015).

Although there is a large body of research on what the best placement type is for a child- with an emphasis on family-based environments (Barth, Wildfire, & Green, 2006; Chor, McClelland, Weiner, Jordan, & Lyons, 2015; Gabrielli, Jackson, & Brown, 2015; Kolivoski, Shook, Kim, & Goodkind, 2017), many argue that the quality of care and the relationship that the child and caregiver establish is more important than the type of placement (Andersen & Fallesen, 2015; Xu & Bright, 2018). While most out-of-home caregivers provide basic needs for the children that they take responsibility for, individuals have both biological *and* psychological needs (Maslow, 1943), and there is a distinction between being provided with basic needs and being cared for. Research indicates that many children feel lonely at the start of a placement, and it is critical for out-of-home caregivers to act as a secure base to help children cope with their trauma and initiate positive turning points (Steenbakkers, Van Der Steen, & Grietens, 2018). A caring and supportive relationship between the child and out-of-home care family is considered to be an essential need of children. These relationships will preferably be characterized by feelings of dependency, secure attachments, and reciprocated trust. In order for this relationship to be cultivated, children need to be provided with a dependable, safe, and loving home environment, which can be created by out-of-home caregivers' availability, support with behavioral and emotional management, strengthening their self-esteem, and helping them to feel like they belong to the family.

1.6.2 Intervening to improve behavioral outcomes

With the mission of promoting child safety, permanency, and well-being, child welfare workers have provided various services and interventions to children in out-of-home care and their families. Although many studies in the child welfare literature define an out-of-home care placement as an intervention in itself

(Lawrence et al., 2006), this thesis conceptualizes interventions as additional elements to a placement (e.g., an external program that is delivered), or a specialist placement (e.g., therapy or treatment targeting mental health problems).

A systematic review evaluated ten potentially effective interventions for children in out-of-home care between the ages of 0 and 12 (Hambrick et al., 2016). The ten interventions that were reviewed were: Attachment and Bio-behavioral Catchup (ABC), Child-Parent Psychotherapy (CPP), Fostering Healthy Futures (FHF), Incredible Years (IY), Keeping Foster Parents Trained and Supported (KEEP), Kids in Transition to School (KITS), Parent-Child Interaction Therapy (PCIT), Short Enhanced Cognitive-Behavioral Parent Training (CEBPT), Trauma-Focused Cognitive Behavioral Therapy (TF-CBT), and Treatment Foster Care Oregon for Preschoolers (TFCO-P). Six of these interventions have been designed for the out-of-home care population, while the remaining four had been adapted to the out-of-home care population although designed for the general population. Intervention characteristics and theoretical frameworks were diverse, with some being exclusively for the child, some for the caregiver only, and some for both the child and caregiver. The length of many interventions was short-termed, such as the PCIT adaptation, which was a one-day workshop. Contrarily, some interventions were longer, covering the school year (FHF) or lasting approximately one year (CPP). A wide range of theoretical frameworks and program delivery locations were utilized among the intervention programs as well. This diverse range in intervention length, theoretical framework, and delivery locations suggest that the child's preference can be considered in areas where several of these interventions are accessible. The aims of each intervention were also diverse, targeting behavioral, emotional, developmental, and physiological domains. Many interventions aimed to improve the same outcomes; some targeted improvement of behavior problems while others targeted parenting skills of caregivers. This suggests that research should next address which interventions are most effective for different symptoms targeted for improvement, as well as subgroups of children and families. Such research will not only be efficient in reducing problems, but will be cost-effective to identify which intervention is most suitable for a child and ultimately save time and resources. Knowledge of the most

effective intervention for a particular target domain may also be beneficial for the relationship between families and service providers, building trust and increasing willingness to participate (Weisz, Kuppens, Eckshtain, Ugueto, Hawley, & Jensen-Doss, 2013). Ultimately, this thesis aims to contribute to the knowledge base used to inform the design and implementation of interventions, by examining variables that could potentially be targeted for change by intervention.

1.7 Evidence about the views and experiences of problem behavior development of children in out-of-home care

This thesis, as well as most of the evidence and literature presented so far, is composed of quantitative research. Although there are advantages and disadvantages to both quantitative and qualitative research, the framing of this thesis is more heavily focused on representativeness and generalizability, rather than attributing to the experiences, voices, and individual differences of children in out-of-home care. Although qualitative studies are rich sources of experiential evidence, they tend to be cross-sectional (Grossoehme & Lipstein, 2016). A range of data collection methods, such as focus groups and interviews, are employed for qualitative studies, and the analyses are often focused on understanding the experiences and recollections of a specific time and place. There also exists some longitudinal qualitative studies in the field of child welfare, but they are small in number, short-term, and experience difficulties in retention and participant engagement (Taylor, 2009). Typically, however, individuals' behavior and experiences within the child welfare system occur over time. Therefore, a prospective and longitudinal understanding of their experiences may be more advantageous in providing guidance and insight which differs from that of cross-sectional data. That is not to say that children and their caregivers do not have important perceptions on what alleviates and deteriorates behavioral difficulties. There is a large field of qualitative research asking these questions. These studies offer greater nuance and detail into the lives of children involved in out-of-home care, and include the insight of children, caregivers, and child welfare workers.

Generally, this body of research indicates that children encounter strong feelings of distress about their out-of-home care experiences (Whiting & Lee, 2003). Many children express confusion about why

they are in out-of-home care and what the immediate and long-term future may look like. Children also express anger, of which many direct their emotions towards other children or authority figures such as caregivers and child welfare workers. These findings may imply that children internalize remorseful emotions and externalize these feelings into aggressive behavior. On the other hand, there is also a bulk of research that identifies some positive experiences for children in out-of-home care (Wood & Selwyn, 2017; Selwyn, Magnus, & Stuijzand, 2018). Such research endeavors to identify good experiences and promote the practices that made these experiences possible. The focus of this research is on subjective well-being (SWB), which emphasizes the feelings, thoughts, and the different ways that individuals experience their lives (Kahneman & Krueger, 2006). Such research stems from the notion that well-being cannot be defined by just one measure. Under the framework of subjective well-being, adult and child well-being is holistically viewed and understood across multiple domains of life (Zhang & Selwyn, 2019).

Out-of-home caregivers also cite parenting children with serious behavioral and emotional difficulties as the most frequently experienced stressor (experienced by 63.6% of families) (Buehler, Cox, & Cuddeback, 2003). Many foster parents expressed difficulties in parenting children who had hard-to-manage behavior, saying that “[...] I need to understand how to handle the behavior. You cannot hit them, you cannot punish them, so how do you handle someone that scream[s] and howl[s] if you just touch them and say do this?” (Spielfogel, Leathers, Christian, & McMeel, 2011, p. 2369). The stress linked to parenting children with severe behavior problems accentuates the need for additional training on skills that can be targeted for parents looking after children with specific behavioral problems. Since out-of-home caregivers’ frustration heightens the risk of placement change (Aarons et al., 2010) or may hinder the formation of a positive relationship with the child, children with difficult behaviors may get caught up in a negative cycle of behavior problems and behavior-related placement disruptions. Indeed, there is evidence to demonstrate a strong relationship between placement instability and level of behavioral difficulties, with children experiencing more placement changes displaying decreased possibility of reunification, higher levels of behavior problems, and longer time in care (James, 2004). Overall, the balance of research indicates that

children in out-of-home care experience high levels of behavioral difficulties that lead to a myriad of negative implications, posing higher risk for maladjusted life outcomes.

1.8 Theoretical perspectives

1.8.1 Existing theories regarding problem behavior development

This section introduces the various theoretical perspectives within the early childhood literature commonly utilized to examine behavior problems. An in-depth review of the conceptual and theoretical underpinnings specifically for this thesis is discussed later in Chapter 2. Efforts to examine maladaptive patterns and trajectories of behavior has evolved over the last three decades to converge on an integrative understanding of adjustment and developmental psychopathology in children through various theoretical lenses such as the temperament theory and models of ‘goodness-of-fit’ between parents and children (Thomas, Chess, & Birch, 1968), transactional systems (Sameroff & Chandler, 1975), and attachment theory (Ainsworth, 1973; Bowlby, 1982). Such theoretical advancements act as important functions for identifying emerging early problem behaviors to encourage positive outcomes and inform the design and practice of interventions (Dunlap & Fox, 2011). In the context of this thesis, Bronfenbrenner’s ecological framework (see Chapter 2, Section 2.1.5), the attachment theory, and concepts of developmental psychopathology are used to approach the understanding of children’s behavior development.

Developmental theories have advanced over the last 30 years to become a refined and integrative understanding of developmental psychopathology (Campbell, Shaw, & Gilliom, 2000). During the 1970s, behavior problems amongst children were believed to be a part of typical development, with negligible significance for future adjustment (Campbell et al., 2000). Consequently, such a lack of focus on early childhood behavior problems were reflected in the theoretical gaps concerned with the developmental psychopathology of young children (Campbell et al., 2000). Intervention efforts only began among school-age children when the problem behavior grew in frequency and severity. These earliest efforts of intervention attributed problem behaviors to individual and biological characteristics (Cooper, Smith, & Upton, 1994). Over time, research on infant temperament indicated that a difficult temperamental

disposition, characterized by high levels of irritation and inconsolable distress, may indicate emerging behavior problems. Such theoretical advances were further refined by research on the link between temperament and behavior problems, and parent-child goodness-of-fit (Thomas et al., 1968). From this point, the importance of parental support and relationship quality for positive development was further emphasized through research on transactional models (Sameroff & Chandler, 1975) and attachment theory (Ainsworth & Bell, 1970; Bowlby, 1982). Theoretical development on infant temperament, quality of parent-child relationships, and security of attachment initiated the advancement of more complex models. These models incorporated multiple interactive factors to understand ways to shape children's paths of behavioral development.

The biopsychosocial perspective then emerged, which asserts that genetic predispositions, environmental circumstances, and social experiences are in dynamic, complex, and constant interaction to shape behavioral development. A core component of this perspective recognizes the significant relationship between biological systems and environmental factors such as nutrition, poverty, parenting characteristics, and social influences (Cooper, Bilton, & Kakos, 2013). The current understanding of the environmental, biological, and social effects on behavior not only reflects theoretical advancements over time, but also strengthens the capacities to understand the multi-sphered needs of children and families.

1.8.2 Theories related to children in out-of-home care

Many theories and models have been applied to study problem behavior development among children in out-of-home care. These include (but are not limited to) social information processing models (Price & Landsverk, 1998), social learning theory (Bandura, 1991), attachment theory (Ainsworth & Bell, 1970), ecological theory (Bronfenbrenner, 1979), and developmental psychopathology (Sroufe & Rutter, 1984). According to the social information processing model, maltreated children may experience trouble interpreting social cues, which may lead to poor social competence and aggressive behavior (Dodge, 1986). Social learning theory suggests that children who experience early adversity, such as physical abuse or exposure to domestic violence, will model the same behavior through a process of observation and imitation

to later exhibit aggressive and destructive behavior (Bandura, 1991). Attachment theory attributes problem behavior among children in out-of-home care to the insecure attachment formed between birth parents and children due to the absence of sensitive and affectionate care (Bowlby, 1982).

Acknowledging the limitations of these one-dimensional theories in understanding the complex nature of out-of-home care, theoretical advancements that incorporated bio-ecological (Bronfenbrenner, 1979, Bronfenbrenner & Morris, 2006) and developmental (Sroufe & Rutter, 1984) perspectives began to emerge. The bio-ecological model integrated broader social-contextual characteristics with individual and biological characteristics to collectively understand the effects of biological, environmental, and temporal aspects of behavioral development (Bronfenbrenner & Morris, 2006). Many studies have and continue to utilize this theory as a theoretical framework to guide research for children's social care (Mattingly, Stuart, & VanderVen, 2002).

Developmental psychopathology is a perspective that is focused on the interaction between psychological, biological, and social-contextual factors that contribute to various paths of development (Sroufe & Rutter, 1984). This perspective is defined as "the study of the origins and course of individual patterns of behavioral maladaptation" (Sroufe & Rutter, 1984, p.18). This framework explains the way developmental outcomes are affected by early and subsequent experiences (Sroufe & Rutter, 1984). This perspective stresses the idea of developmental pathways, which asserts that a diverse range of circumstances and environments contribute to divergent developmental paths and outcomes (Sroufe & Rutter, 1984). According to the developmental psychopathology perspective, inability to acquire essential developmental skills during the early childhood years interferes with later developmental progress (Sroufe & Rutter, 1984). It is assumed that on-track attainment of age- and stage-appropriate developmental objectives are crucial for children's adjustment over time, as one developmental stage sets the foundation for successive stages (Sroufe & Rutter, 1984). From this perspective, early adversity that occurs to the child, such as maltreatment, may heighten the risk for maladjustment in developmental outcomes over time. For example, children who

experience maltreatment during the periods of infancy or toddlerhood may face difficulties in achieving developmentally crucial goals such as secure attachment formation or socioemotional competence. These difficulties may then hinder the achievement of more advanced developmental milestones that follow subsequently in the future.

Developmental psychopathology explains developmental outcomes as a result of an individual's history of experiences in order to understand the path of maladjustment, emphasizing the importance of longitudinal research (Sroufe & Rutter, 1984). However, existing research of behavior problems among children in out-of-home care is mainly cross-sectional (e.g., Alink, Cicchetti, Kim, & Rogosch, 2009; Evans, Simons, & Simons, 2012; Tremblay, Hebert, & Piche, 1999). Longitudinal data is better suited to understand the mechanisms that lead to maladjustive behavioral outcomes.

The developmental psychopathology perspective also emphasizes heterogeneity in developmental pathways (Sroufe & Rutter, 1984). One principal concept of developmental psychopathology is multifinality, which asserts that similar environmental circumstances result in divergent paths and outcomes (Sroufe & Rutter, 1984). According to this concept, children in out-of-home care may experience different behavioral outcomes despite similar adverse experiences. For instance, many children in out-of-home care exhibit resilience and positive behavioral outcomes, as demonstrated by longitudinal studies that found children in out-of-home care who displayed distinctly different patterns of behavioral adjustment (Bell et al., 2015; Yoon, 2017). The developmental psychopathology perspective indicates that the timing, environmental context, and nature of life events all contribute to developmental paths and outcomes. However, further research is needed to understand such complexities in the developmental processes of children in out-of-home care. The developmental psychopathology perspective emphasizes that developmental outcomes occur as a product of continuous interactions between individual and contextual factors (Sroufe & Rutter, 1984). This implies that identifying risk and protective factors that contribute to different developmental outcomes is important for guiding evidence-based interventions (Cicchetti &

Garmezy, 1993). As demonstrated, the developmental psychopathology perspective is a helpful framework for understanding the antecedents, correlates, and factors of change that contribute to pathways characterized by either adjustment or maladjustment (Masten, 2011).

1.9 Rationale and contribution of the study

As demonstrated by the evidence presented so far, behavior problems are a prevalent and growing source of concern for children in out-of-home care. As behavior is shown to substantially affect the development and well-being of children in multiple other domains, it is important that evidence-based research is used to inform future practice and social policy for children in out-of-home care. In order to design and deliver effective interventions that prevent negative behavioral trajectories and promote positive outcomes, it is important for social welfare researchers, practitioners, and intervention designers to understand factors of change. An understanding of risk and protective factors that are associated with well-defined subgroups is important for reaching this goal (Shpiegel, 2016).

To evaluate the existing research on the risk and protective variables associated with problem behavior development, a systematic review (Study 1) has first been conducted, and the findings of this study then informed the development of a secondary data analysis (Study 2). Results of the systematic review revealed that children's behavior development is associated with a wide variety of individual and contextual factors. The findings also indicated an inconsistency in the research on different risk and protective variables and problem behavior development. Further, the findings of this review highlight gaps in the literature, such as the dearth of research on socioemotional skills which may be an important quality that moderates or mediates the relationship between risk experiences associated with out-of-home care involvement and later problem behavior outcomes. Among children in the general population, interventions targeting socioemotional skills have been shown to significantly improve behavioral outcomes, suggesting that children with improved socioemotional capacities experience higher abilities to manage their anger, exhibit social and cognitive adjustment, and lower levels of behavior problems (Conduct Problems Prevention Research Group, 2014; Darling-Churchill & Lippman, 2016; McLeod, Sutherland, Martinez,

Conroy, Snyder, & Southam-Gerow, 2017). To build on the findings from Study 1, Study 2 aimed to find risk and protective variables of problem behavior among children who had been in long-term out-of-home care, with a particular focus on socioemotional skills.

To ensure the novel contribution of this study to the existing research with the NSCAW dataset, the archive of all publications using the NSCAW data since 1999 (including theses, journal articles, and conference papers) have been searched. This initial search found that no research had been published to examine the relationship between socioemotional skills and problem behavior trajectories of children who have been in long-term out-of-home care.

Overall, this thesis includes two components: a systematic review (Study 1) and a secondary data analysis (Study 2) which both aim to answer the following research questions as presented below. Study 1 aims to answer research questions 1 and 2, and Study 2 aims to answer all three of the research questions. Research question 3 has been derived from the results of research question 2, to further understand the explicit relationship between the variables identified from the results of research question 2. The three research questions are as follows:

1. What do the longitudinal trajectories of problem behavior for children in out-of-home care look like?
2. How do different variables affect the onset and change of problem behavior trajectories?
3. Is there a protective variable that mediates the relationship between the severity of recent abuse incident and future behavior problems?

1.10 Summary of the chapter

This chapter begins by describing children in out-of-home care: how they are defined in different countries' legislations, the size of the population, types of placements, difficulties in leaving care, and the academic, financial, and mental health outcomes of children in out-of-home care. The chapter then goes on to compare the behavioral outcomes of children in out-of-home care to their peers in the general population, and the impact of being in out-of-home care. Next, existing interventions that target behavioral

improvement are identified and reviewed. This section discusses that many existing interventions for children in the child welfare system have been found to yield significant improvements in behavioral functioning. Intervention characteristics and theoretical frameworks are diverse, with programs targeting both children and caregivers. This diverse range in intervention length, theoretical framework, and delivery locations suggests that children's characteristics can be considered in locations where several of these interventions are accessible. The chapter wraps up by presenting the rationale and contribution of the thesis. This section asserts how children in out-of-home care represent a vulnerable population and how there is a need for researchers to identify ways to improve behavior for these children. It also identifies gaps and inconsistencies in the literature, and how the thesis will be a novel contribution and application of the NSCAW data.

Chapter 2. Conceptual and theoretical framework

This chapter presents the conceptual and theoretical framework of the thesis and situates the concepts of risk and protective factors within an overarching conceptual and theoretical framework. First, the conceptual framework for the thesis is introduced, which draws on resilience, epidemiology, and criminology research for definitions of risk and protective factors. Then, the launch model of development and Bronfenbrenner's (1979) ecological theory, which is used to inform the modeling of the statistical analyses in Study 2, is discussed. Lastly, the epistemological framework for the thesis is presented.

2.1 Thesis conceptual framework: Risk and protective factors within an ecological framework

One of the main goals of this thesis is to identify risk and protective factors for the problem behavior outcomes of children in out-of-home care. In addition to the risks that children are vulnerable to due to their time in care, it is highly likely that children have faced a number of additional difficult experiences leading up to their time in care. Such difficulties are also found to disrupt their chances for positive behavioral adjustment. On the other hand, there may also be factors that can mitigate these risks and help children overcome prior adversity and improve positive life chances. This thesis aims to identify and understand risk and protective factors and how they correlate with the trajectories of problem behavior for children in out-of-home care. To do this, this thesis is situated within a variable-focused model of the resilience framework and draws on the literature of epidemiology and criminology for further definitions (Masten, 2011). I also introduce the literature on the launch model of development (Skinner, Zimmer-Gembeck, Connell, Eccles, & Wellborn, 1998), which provides the framework for how individual differences in development is conceptualized for this thesis. Finally, Bronfenbrenner's (1979) ecological theory is used to identify individual and contextual factors that are relevant for understanding the development of resiliency in children as stressed by developmental psychopathologists.

2.1.1 Resilience research

Over the past several decades, the construct of resilience has received a large amount of attention, especially in the field of developmental psychology. Broadly, resilience is defined as positive adaptation despite exposure to severe adversity or significant threats (Luthar, 2006; Luthar, Cicchetti, & Becker, 2000). Interest for the framework began when researchers like Garmezy and Rutter (1983) examined why, despite significant adversity, some children of schizophrenics seemed to be adjusting well to their lives (Gutman & Flouri, 2011). This type of approach, which focuses on the given resources and builds upon that, is referred to as the resilience model. Such research began a flurry of subsequent investigations which aimed to “uncover pathways to psychopathology and processes that lead to normal development” (Gutman & Flouri, 2011, p. 616). Similar to ‘strength-based’ approaches in the field of social work which appeared later, resilience research questions the deficit model, which predominantly focuses on the factors that place children at greater risk of atypical development and adversity (Rawana & Brownlee, 2009). Rather, this framework turns away from negative assumptions of the deficit-focused models and concentrate more on assets that help individuals overcome adversities (Fergus & Zimmerman, 2005; Shpiegel, 2016; Walsh, 2016). Researchers who support this framework argue that it helps establish priorities. Intervention strategies that build off of research conducted using a resilience framework are ‘asset-building interventions’ which focus on strengthening positive assets to compensate for negative risk factors (Luthar, Crossman, & Small, 2015; Masten, 2001; Masten, Cutuli, Herbers, & Reed, 2009).

Various approaches and definitions to understand resilience across different disciplines and literatures exist, however. For instance, some researchers use the terms ‘resilience factors’ and ‘protective factors’ interchangeably, implying that resilience is a quality of an individual’s environment or the individual himself that predicts positive outcomes (Hoge, Austin, & Pollack, 2007; Schofield, Biggart, Ward, Scaife, Dodsworth, & Larsson, 2014). However, very few scholars support this belief, and there is a general agreement that resilience is an interactive concept, rather than a directly measurable characteristic (Liebenberg, 2020). Resilience is therefore viewed to be a dynamic process shaped by changing strengths and vulnerabilities, rather than a permanent or fixed phenomenon (Luthar, 2006; Luthar, Sawyer, & Brown,

2006). Furthermore, resilience is often specific to time and domain of development; for example, children may exhibit resilience in one domain of development (e.g., behavioral resilience), but not in another (i.e., physical health or academic achievement), and such states are subject to change as individuals age (Luthar & Cicchetti, 2000). Research by Ungar (2008) has also demonstrated that resilience is context-dependent and that positive adaptation and stress are culturally specific.

While ‘true’ exposure to adversity is challenging to delineate and assess, in this study, it is assumed that children in out-of-home care have at least some level of adversity in comparison to the general population. Research clearly shows that closer temporal proximity to the stressful event is related to more distress (Khan, Chiumento, Dherani, Bristow, Sikander, & Rahman, 2015; Warren, Lee, & Saunders, 2003). Research also clearly demonstrates that perceived distress from an event also depends on other external factors and individual differences, such as the cognitive awareness of the individual (Hart, Sherer, Whyte, Polansky, & Novack, 2004), the supportive behavior of other people (Lowery & Stokes, 2005), previous trauma experiences (Day & Wadey, 2016), cultural beliefs (Bryant-Davis, 2019), and the current context (Litz, 2007). In addition, the ‘same’ experience is perceived differently by individuals, and many other processes enter into the process of exposure and response (Masten, 2011). Child welfare-involved children have all been exposed to significant adversity, generally in the form of neglect and maltreatment. A range of other related risk factors, such as chaotic home environment, substance abuse, placement instability, exposure to intimate partner violence, and harsh parenting styles, place children in out-of-home care at risk for poor developmental outcomes and difficulties in adjustment (Raviv, Taussig, Culhane, & Garrido, 2010; Sarkola, Kahila, Gissler, & Halmesmaki, 2007; Yampolskaya, Armstrong, & McNeish, 2011). Luthar argues that “the central objective of resilience research is to identify vulnerability and protective factors that might modify the negative effects of life circumstances and having accomplished this to identify mechanisms or processes that might underlie these associations” (2006, p. 743). This approach has been applied to this thesis to identify risk and protective factors of problem behavior development for children who have experienced long-term out-of-home care.

A frequently cited limitation of the resilience framework is the absence of a congruent conceptual framework across disciplines (Luthar et al., 2000). Therefore, it is important to delineate and define key concepts and terms for analysis to facilitate the framework to become operational for this thesis. First, two common analytic strategies are outlined. Then, I present the definitions for key terminology used within the framework and in this thesis.

Resilience researchers choose to use varying analytical methods to examine processes of interest. The operational definition and analysis of resilience can be approached from two complementary perspectives, each with a long tradition in the study of individual differences and psychopathology (Masten, Hubbard, Gest, Tellegen, Garmezy, & Ramirez, 1999). For instance, some researchers adapt person-based data approaches, which compares the characteristics of low and high functioning individuals who have been exposed to adversity (see for example Hauser & Allen, 2007; Herbers, Cutuli, Keane, & Leonard, 2020; Vaughn et al., 2011). Another analytic method to resilience research is the variable-based approach which focuses on main or interaction effect models (see for example Brown & Shilington, 2017; Garaigordobil, Bernaras, Jaureguizar, & Machimbarrena, 2017; Jeon, Buettner, & Grant, 2018). These analyses draw on the statistical power of the full sample, allow for statistical controls to inspect covariance, and provide a sensitive strategy for detecting specific linkages among particular domains of outcomes and predictors, including interaction effects (Masten et al., 1999). The analysis of this thesis uses the second method.

The key concepts of resilience research include protective factors, risk factors, and positive adaptation. Protective factors are variables that are associated with a positive outcome in the presence of risk (Luthar et al., 2000). Some scholars also perceive protective factors differently depending on the way they interact with risk factors (Luthar et al., 2000). For example, there are ‘protective stabilizing factors,’ which are variables that contribute to children’s stability despite presence of increasing risk. There is also the ‘protective enhancing factor,’ which is a variable that predicts improvement in outcomes for children at higher risk compared to those at lower risk.

Risk factors are defined as adverse life circumstances or experiences that are related to difficulties in positive adjustment. Positive adaptation is defined as “behaviorally manifested social competence, or success at meeting stage-salient developmental tasks” (Luthar & Cicchetti, 2000, p. 858). Assets, or protective factors such as social support, self-efficacy, and coping skills are variables that have been identified to be associated with a high likelihood of positive adaptation (Fergus & Zimmerman, 2005; Zimmerman, Stoddard, Eisman, Caldwell, Aiyer, & Miller, 2013). What has not yet been made clear by resilience research in these definitions is the aspect of time between the three variables: protective, risk, and positive/negative adaptation. To answer this question, the field of research looks for guidance from the literature of epidemiology (e.g., Kraemer, Kazdin, Offord, Kessler, Jensen, & Kupfer, 1997; Kraemer, Lowe, & Kupfer, 2005).

Temporal clarity between variables is critical for the methodologies used in this thesis. For example, a variable must precede and correlate with the outcome to be identified as a risk or protective factor, because only variables that temporally come before the outcome have the potential to cause the outcome. The next section will introduce the literature on epidemiology, which defines risk factors in the context of the definitions provided above and gives a further explanation of temporal relationships (Murray, Farrington, & Eisner, 2009). Following the literature on epidemiological research, definitions of protective factors, which have been adapted from the criminology literature, are presented. Then, the launch model of development, which explains how this thesis will be viewing individual differences in development is introduced (Skinner et al., 1998). In the final section, Bronfenbrenner’s ecological framework (1979) will be presented.

2.1.2 Defining risk within the epidemiological literature

This thesis draws on the epidemiological literature because it provides a clear framework for defining risk by distinguishing between correlates, factors, and causal factors, as well as between fixed and modifiable factors. These distinctions are important in order to understand the processes which produce a

particular outcome, and adequately inform interventions. These definitions are adopted and used to adapt definitions of promotive and protective factors for the purpose of this thesis (see Section 2.1.3).

Epidemiology is the study of health-related events and states. It examines factors that predict the distribution of disease, and how this disease is distributed (Gordis, 2014). Central to epidemiology is identifying which factors contribute to the onset, progression, and cessation of the disease. In this thesis, the ‘disease’ is conceptualized as behavior problems, our main outcome of interest. As such, an epidemiological approach to understanding and preventing behavior problems among children and adolescents has been adopted as a framework (Teyhan, Wijedasa, & Macleod, 2018; Warner-Rogers, Taylor, Taylor, & Sandberg, 2000). Specifically, the epidemiological approach uses risk and protective factors to identify target populations and sensitive periods of human development (Cordova et al., 2014). The epidemiological approach also uses an ecological framework to understand, prevent, and compare specific times of risk for targeted populations. In the context of this thesis, the epidemiological approach is utilized to understand the risk and protective factors of children in long-term out-of-home care within Bronfenbrenner’s ecological framework in order to identify and prevent behavior problems for subgroups of children at particular developmental ages and stages with particular experiences (see Section 2.1.5).

The term ‘risk factor’ has originally been derived from the Framingham Heart Study, which is a long-term research project that originated in 1948 and is still ongoing to this day (Framingham Heart Study, 2014). This study has advanced the knowledge and understanding we have today on the risk factors associated with heart disease (e.g., effects of exercise, diet, and common medications). Moreover, the study has provided many fields of science including medicine, intervention, psychology, and child welfare research a conceptual understanding of risk factors (e.g., Hambrick, Brawner, & Perry, 2019; Hambrick, Brawner, Perry, Brandt, Hofmeister, & Collins, 2019; Maniam, Antoniadis, & Morris, 2014).

In the field of epidemiology, a risk factor increases the chance that an unfavorable outcome will occur, and is defined as “a measurable characteristic of each subject in a specified population that precedes

the outcome of interest” (Jaffee, Strait, & Odgers, 2012; Kraemer et al., 1997, p. 338). In practice, risk is characterized by factors that produce a negative outcome. For children in out-of-home care, risk factors may include life events or experiences that precede entry into out-of-home care, such as maltreatment, impoverishment, lack of social support, and unstable and chaotic home lives (Bruskas, 2008).

In an attempt to unify epidemiological research under a consistent set of definitions, the following classification of risk has been proposed (Kraemer et al., 1997):

- ‘Risk correlates’ refer to variables that have a statistical association with a particular negative outcome;
- ‘Risk factors’ refer to variables that correlate and precede a particular negative outcome;
- ‘Causal risk factors’ refer to risk factors that are modifiable and change the probability of a particular negative outcome from occurring. However, this does not mean that causal risk factors are necessarily the cause of a given problem.

The framework also makes a distinction between malleable or modifiable factors (which means in theory the value can be changed), such as behavior problems, for example, and fixed factors (that do not change with time), such as gender (Kraemer et al., 2005). By definition, fixed risk variables are not causal because their values cannot be changed over time within an individual (Kraemer et al., 2005). Others disagree with this view, based on possible mechanisms linking fixed characteristics and behavior (Rutter, 2003). The solution to this controversy can be found in philosophical matters beyond the scope of this thesis. However, even if fixed risk factors can be causal, their very nature of being fixed inhibits empirical experiments of whether changing them causes changes in outcomes. Therefore, fixed factors cannot be proven to be causal, nor can it be targeted in interventions for practical purposes.

These frameworks and the strong foundation they come from provides guidance for statistical analyses and methodology. However, the limitation of this framework is that it ignores the role of potential protective factors (Kraemer et al., 2005). As such, it is often cited as a deficit model (Fraser et al., 2009).

By only focusing on risk, this framework overlooks the study of resilience and the important protective factors which have been identified by past research (Luthar et al., 2000).

Although these terms originally came from the medical sciences, they have been supported by developmental scientists who research resilience (see for example Wright, Masten, & Narayan, 2013) and have indeed been applied to research in many fields of social sciences as well. It is possible to understand how social problems develop by examining risk factors, which can also contribute to implications for interventions (Jaffee et al., 2012; Murray et al., 2009).

2.1.3 Risk and protective factors in criminology

The risk and protective factors approach began gaining increased attention in the field of criminology during the 1990s. Criminology refers to the “systematic study of the nature, extent, cause, and control of law-breaking behavior” (Lanier, 2008, p.4). The criminology literature has been utilized widely among researchers to uncover factors that may put children at risk for criminal behavior, such as delinquency, substance abuse, risky sexual behavior, and conduct problems (Brennan et al., 1997). Early behavior problems such as disruptiveness and aggression has consistently been demonstrated by research as risk factors for chronic and persistent patterns of delinquent and violent behavior later in life (Kassing, Godwin, Lochman, Coie, & Conduct Problems Prevention Research Group, 2019). In addition, child maltreatment and out-of-home care placement have been associated consistently with later delinquency and juvenile justice involvement, and there is substantial crossover between children in the child welfare and juvenile justice system (Taussig, Dmitrieva, Garrido, Cooley, & Crites, 2021). Work to identify factors that heightened and lowered risk of offending prospered and contributed to the enhancement of interventions that target offending behavior (Farrington, Loeber, Joliffe, & Pardini, 2008). The literature also differentiates between promotive and protective factors:

- ‘Promotive factors’ refer to variables that are associated with a positive outcome, regardless of exposure to risk (Farrington, Ttofi, & Piquero, 2016; Sameroff & Gutman, 2004);

- ‘Protective factors’ refer to variables that are associated with a positive outcome in the presence of risk (Farrington et al., 2016; Rutter, 1985; Sameroff & Gutman, 2004).

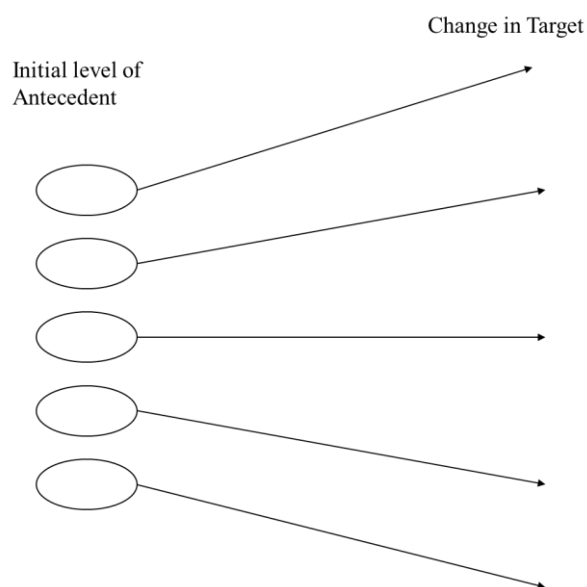
The terms promotive and protective factors are frequently used interchangeably, despite important distinctions between the two terms as demonstrated by the definitions above (Ttofi, Bowes, Farrington, & Losel, 2014). Promotive and protective factors are distinguished by their relationship with risk variables and outcomes. The same terminology for protective and promotive variables will be used for risk variables, for the sake of consistency. To explain, a promotive or protective variable is termed as a *correlate* when the temporal association between the independent and dependent variable is cross-sectional. On the other hand, a promotive or protective variable is identified as a *factor* when it occurs before the outcome in time. Lastly, the promotive or protective variable is termed a causal promotive or causal protective factor when causality can be demonstrated (a discussion of how the variables identified in this thesis is classified is made in Chapter 7, Section 7.4.1). I now turn to the literature on the launch model of development from which I discuss the framework of individual differences in trajectories being adapted to fit the purposes of this thesis.

2.1.4 Launch model of development

As discussed in Section 2.1.2, within developmental epidemiology, this thesis aims to identify factors that contribute to the onset and growth of behavior problems, risk and protective factors of this development, the methodology that may be optimal to highlight the trajectory of behavior problems, and whom to target at what developmental stage. In this light, the current section introduces the launch model of development (Skinner et al., 1998), which is a framework for understanding the factors that contribute to the onset as well as the nature of the ensuing trajectories that follow this onset. The launch model of development shown in Figure 1 below displays that individuals’ differences in the development of a target outcome are a function of individual differences in the initial level of an antecedent. This launch model is informed by individual differences theories, which suggest that individual differences tend to remain stable over time (Buss, 2009). Individual differences theories suggest that behavioral trajectories are established

by early experiences (e.g., parental child-rearing styles), and that these characteristics continue over time once they have been established during early childhood (Connell & Skinner, 1990). This model of individual differences in development is referred to as *a launch model* because children's initial starting levels on some other construct are hypothesized to induce or 'launch' their overall developmental trajectories over time. Past literature on early childhood research has also used the launch model as a framework to understand various trajectories such as depressive symptoms (Garber & Cole, 2010), antisocial behavior (Sullivan, 2013), anxiety symptoms (Zimmer-Gembeck, Webb, Farrell, & Waters, 2018) and prosocial behavior (Taylor, Merrilees, Baird, Goeke-Morey, Shirlow, & Cummings, 2019). The decision to utilize this framework arises, in part, from assumptions about the importance of early experiences, stability of social contexts, and continuity in development (Constantino, 2000; Kindermann & Skinner, 1992; Neckerman, 1996).

Figure 1. The launch model of development (Skinner et al. 1998)



In addition to the launch model, Skinner and colleagues (1998) introduce two other models for predicting individual differences in developmental change. The first alternative to the launch model is called the 'ambient-level model,' which asserts that the average level of support provided during the unfolding of the trajectory determines the nature of the trajectory. Ambient-level models may be particularly useful when

accounting for the effects of transitions in social contexts on individual development. These models insist, for example, that a positive and supportive early context is not adequate to support a continuously positive trajectory unless a minimal level of consistent support is provided by the environment.

A second alternative is the ‘change-to-change model,’ which asserts that shapes in developmental trajectories change as a function of changes in another developmental trajectory. According to this model, increases and decreases within the developmental trajectory of the target variable is influenced by not only the average level of another variable, but more so by how that variable changes over time.

Naturally, different models will be more applicable for different predictors of developmental change. For example, the launch model may provide the most appropriate perspective to examine the effects of early secure attachment on subsequent trajectories of behavior. Children who experience a secure attachment relationship during infancy may develop more positive adaptive trajectories of behavior over the years (Thompson, 2008). In framing Study 2 of this thesis, I apply the launch model of development to examine and understand the trajectories of behavior problems. In methodological and operational terms, this means that covariates are operationalized to be directly predictive of the growth factors (intercept and slope) of development, in order to look for ‘launchers’ of trajectories (see Chapter 5, Section 5.8.2 for further detail on growth factors). In other words, this model will be used to examine which variables ‘launch’ children onto a path of adaptive or maladaptive behavioral trajectory.

2.1.5 Bronfenbrenner’s ecological model of human development

This research also draws on Bronfenbrenner’s (1979) ecological model of human development, which asserts that children develop within the complex web of individual characteristics (e.g., temperament, physical attributes), the microsystem (e.g., school, family), the mesosystem (interactions between parts of the microsystem; e.g., the interplay between teachers and parents), the exosystem (e.g., local authority, neighborhood), and the macro-system (e.g., culture, society). For children in out-of-home care, these include their gender and temperamental attributes (individual characteristics), their biological parents, out-

of-home caregivers, teachers, friends, and child welfare workers (in the microsystem), social care services and the state government/local authority (in the exosystem), and wider cultural norms and societal attitudes (in the macrosystem) (Yoon, Tebben, & Lee, 2017). As illustrated, the ecological model places the development of the child within a network of evolving and interacting factors that affect a child's outcome altogether (Ayala-Nunes, Jimenez, Jesus, Nunes, & Hidalgo, 2018; Little & Kantor, 2002).

This thesis draws on Bronfenbrenner's ecological framework because it provides a flexible and evidence-based structure to explore various risk and protective factors underlying behavior problems of children within different layers of ecology (Luthar et al., 2000; Masten, 2007). Several studies exploring risk and protective factors have used this conceptual framework (Romano, Babchishin, Marquis, & Frechette, 2015; Slade & Wissow, 2007). Most notably, this framework has been chosen for its potential to identify variables associated with a particular outcome in multiple areas of a child's life, facilitating proactive and adaptable interventions.

2.1.6 Summary of the conceptual framework for the thesis

The conceptual framework for this thesis is mainly reliant on the resilience framework, with precise and clear definitions on risk and protective factors also being provided by the epidemiological and criminology literature. The launch model of development has also been introduced as a conceptual guide as to how risk and protective factors will be modeled methodologically. Lastly, this thesis also reflects concepts of the ecological framework, to understand the multiple layers of the environment that influence children's development, both individually and collectively. Specifically, risk and protective correlates and factors will be used as key terms to label variables according to the findings of Study 2 presented in Chapter 6. For example, in Chapter 6, higher levels of school engagement are identified as a 'protective factor' for problem behavior scores for children in the middle childhood group. Summarized below in Table 2 are the definitions that are used in the thesis to conceptualize and identify correlates and factors. As such, this labeling of school engagement as a protective factor indicates that stronger school engagement among children is associated with a greater likelihood of positive behavioral adjustment in the future.

Table 2. Definitions of risk and protective variables used for this thesis

	Risk	Protective
Correlate	Correlation with a greater likelihood of a negative outcome	Correlation with a greater likelihood of a positive outcome in an at-risk population
Factor	Same as above, but the risk variable predates the outcome temporally	Same as above, but the protective variable predates the outcome temporally
Causal factor	Variable that causes an increase in the greater likelihood of a negative outcome	Variable that causes an increase in the greater likelihood of a positive outcome in an at-risk population

As presented above in Table 2, correlates and factors are distinguished by their temporal aspects. Thus, correlates occur at the same time as the outcome, while factors correlate *and* precede the outcome. As such, in identifying risk and protective variables, if a variable has a statistically significant relationship with the intercept, it will be interpreted as a correlate, since all predictors are measured at Time 1 which is the same time point as the intercept. On the other hand, if a variable has a statistically significant relationship with the slope, it will be interpreted as a factor, because the slope indicates change over time. Although a definition of causal factors is presented in Table 2, the nature of the findings and conclusions that can be taken away from this study is considered correlative rather than causal. The specific issues related to causality will be presented in the discussions chapter.

2.2 Epistemology

By analyzing large quantitative datasets, one main goal of this thesis is to make important discoveries about behavioral maladjustment for children involved in long-term out-of-home care. Past studies have identified the advantages offered by large administrative datasets for the purposes of generating generalizable population-level data (Stone, 2007). As such, the goals of these types of research is to inform the design and implementation of interventions. Research of such nature and the latent assumptions about objectivity, bias, and generalizability, are supported by a positivist epistemological framework. Epistemology is the study of knowledge, how individuals come to know things, what can be

known, and who can be a knower (Horrigan, 2007; Ryan, 2006). However, I am not an advocate for many of the assumptions of positivism, and have therefore rejected it as a framework. Rather, I approach the research within a post-positivist framework.

Broadly, post-positivist research principles emphasize the formation of knowledge, and are concerned with supporting committed social movements that aim to contribute to social justice and make a change to the world. A critical post-positivist view asserts that an overall ‘truth’ is not a simple arrogation of data. This means that it recognizes the complexity of life and its entanglement of experiences (Ryan, 2006). It acknowledges that any data source or method has its flaws, and that it can only be partially objective (Crotty, 1998; Denzin & Lincoln, 2005). Post-positivism is also against the idea that researchers can remove themselves from their individual values, history, and context, or can be completely free of bias (Crotty, 1998). This belief is reflected by post-positivistic research which employs various methodological approaches (quantitative and qualitative) in order to check the validity of findings (Blaxter, Hughes, & Tight, 2010). Although this thesis does not conduct any qualitative analysis, I recognize the addition that qualitative research makes to the field of child welfare, development, and protection. Post-positivism is also interested with bias, objectivity, generalizability, and the scientific method.

However, post-positivism also comes with its limitations. For example, in this context, there is a challenge in measuring resilience in different contexts, discerning valid definitions of positive outcomes, and developing effective interventions which are congruent with the experiences of vulnerable populations. Although the literature on resilience documents a variety of individual and contextual factors that are associated with positive behavioral adjustment in children and families in out-of-home care, that body of information cannot predict which specific child at high-risk will experience developmental and behavioral difficulties, or which will exhibit age-salient positive adjustment. We only know that resilient children are characterized by certain qualities that are associated with resilience, leaving the framework exposed to criticisms. Such critiques would best be accommodated in a constructivist framework that interprets

resilience to be defined separately by individuals and their social reference group, rendering it multidimensional, contextually specific, and indefinite across populations (Ungar, 2004a). There may also be value in using a critical realist approach to analyze and critically examine the structures and institutions that children in out-of-home care navigate through and the role these play in supporting or hindering behavioral development. The decision to carry out research within a post-positivist framework has been influenced by the goals to devote to the advancement of evidence-based interventions for children with histories of long-term out-of-home care via statistical analysis of large datasets and secondary analysis. The findings are only one piece of the puzzle, but will lay the groundwork for future work in the field of social work and child welfare. I also position my findings and recommendations accordingly.

2.3 Summary of the chapter

This chapter presents the conceptual framework and epistemology which guides the thesis. This chapter begins with the conceptual framework of the thesis, which leans on the resilience literature on risk and protective factors, and in elements of epidemiology and criminology. In the second half of Chapter 2, the epistemological approach of the research is presented. This section also describes how this approach relates to the current thesis as well as the limitations of this approach. For the research of this thesis, the post-positivist approach has been taken.

Chapter 3. Study 1: Longitudinal trajectories of behavioral problems among children in out-of-home care: a systematic review

3.1 Introduction

The objective of this review (Lee & Holmes, 2021²) is to examine the existing quantitative evidence related to the longitudinal development of behavior problems among children placed in out-of-home care, and identify variables that are deemed to indicate improvement of maladjustive behavioral outcomes. In doing so, it seeks to identify factors that may change behavioral pathways towards a more positive direction. This review also puts forth implications for future research on developmental wellbeing and factors that may be used to identify and measure changes in outcomes for children in out-of-home care. Ultimately the findings have the potential to be used to inform the development of interventions for these children by contributing to the developing literature on specific measures that are associated with positive and negative outcomes of children in out-of-home care.

3.2 Objective of the review

This review aims to examine the factors related to longitudinal problem behavior development within different levels of environmental contexts (individual, social, system, etc.). Previous systematic reviews in this area have also attempted to highlight the importance of understanding the underlying processes of particular developmental outcomes. For example, O'Higgins, Sebba, and Gardner (2017) have conducted a systematic review investigating the risk and protective factors associated with educational achievement for children in out-of-home care. Hambrick and colleagues (2016) evaluated ten potentially effective interventions for children in foster care between the ages of 0 and 12, and found that the understanding around which interventions work best for different subgroups of children is currently limited. In this review, authors suggested that understanding the processes underlying problem behavior

² The data presented in this study was entirely the product of this thesis, and the analyses presented in the thesis has been done by myself.

development and identifying risk and protective factors that may benefit particular subgroups is needed. Understanding the interrelation between the child and his or her surrounding environment is important, because there are multiple levels of influence on developmental outcomes. While many theories and conceptual models have been applied to study problem behavior development among children in out-of-home care, this review examines characteristics within the context of broader social-contextual aspects to help understand the cumulative effects of environmental, spatial, and temporal aspects on behavioral development (Bronfenbrenner & Morris, 2006).

3.3 Methods

3.3.1 Description of the included studies

Terminologies to represent the status of children in out-of-home care vary between different countries. In line with the definitions of this thesis, this review defines children in out-of-home care as individuals up to the age of 18 who are looked after by their local authority, placed in an alternative accommodation, and are given support through services provided by government agencies, private organizations, or charities. Studies on children in foster care (both kinship and non-kinship), as well as in institutional settings such as group homes or residential treatment centers are included. It is recognized that many children will experience multiple placements, which over the course of their time in out-of-home care may include a mix of family or institutional-based care. Lastly, this review only considers care systems of countries where children mostly enter care due to neglect and/or abuse, witness or experience of domestic violence, becoming orphaned, or parent absence (Fernandez & Barth, 2010).

3.3.2 Inclusion and exclusion criteria

To identify all relevant research that examine factors of longitudinal problem behavior among children in out-of-home care, extensive and thorough electronic database searching has been undertaken. Inclusion and exclusion criteria of studies have been established at the outset and followed throughout the search process. With the aims of the study in mind, the following inclusion criteria have been used:

- (a) Population of the sample are children in out-of-home care (The entire sample did not have to be in out-of-home care. As long as a portion of the sample were in out-of-home care, the study was included in the review.)
- (b) Problem behavior outcomes are measured over at least two or more time points (A minimum length of time between the two time points at which behavior was measured is not imposed.)
- (c) The study is empirical research
- (d) Quantitative results are presented (mixed-method studies are included for their quantitative findings)
- (e) Study is in the English language.

All studies not satisfying the inclusion criteria have been excluded.

3.3.3 Search methods for identification of studies

This section outlines the specific search methods to identify studies including the electronic databases and search terms.

3.3.3.1 Electronic searches

The databases below were used to identify studies:

- Education Resources Information Center (ERIC)
- Applied Social Sciences Index and Abstracts (ASSIA)
- Social Care Online
- Cochrane Library
- British Education Index
- International Bibliography of Social Sciences
- Scopus
- Medline
- PsycINFO
- Social Services Abstracts

- Conference Proceedings Citation Index/Social Sciences Citation Index
- Campbell Library

The institutional and organizational websites below were used as well:

- British Association of Adoption and Fostering (BAAF)
- Centre for Excellence and Outcomes in Children and Young People's Services (C4EO)
- Casey Family Programs
- Chapin Hall, University of Chicago
- Department for Education (English government department with responsibility for child welfare)
- The Evidence for Policy and Practice Information and Coordinating (EPPI) Centre
- The Fostering Network (United Kingdom)
- Joanna Briggs Institute
- National Foundation for Educational Research (NFER)
- Social Care Institute for Excellence (SCIE)
- National Children's Bureau (NCB)
- National Society for the Prevention of Cruelty to Children (NSPCC)
- Office of Planning, Research, and Evaluation in Administration for Children and Families
- What Works Clearinghouse

3.3.3.2 Electronic searches

The search strings below were used:

(Population):

"foster care*" OR "foster parent*" OR "foster famil*" OR "foster placement*" OR "substitute famil*" OR "family foster home" OR "children's home*" OR "residential care" OR "residential unit" OR "out-of-home care" OR "out of home care" OR "looked after" OR "looked-after" OR "congregate

care" OR "group home" OR "alternative care" OR "kinship care*" OR "friends and family" OR "placement with parent*" OR "placed with parent*")

(Age group):

AND ("child*" OR "youth*" OR "adolescent*" OR "teenager*" OR "infant*" OR "preschool*" OR "kindergart*")

(Outcome):

AND ("challenging behaviour" OR "challenging behaviour" OR "behavior* problem*" OR "behaviour* problem*" OR "behavior* disorder*" OR "behaviour* disorder*" OR "problem* behaviour" OR "problem* behavior" OR "internalizing" OR "internalising" OR "conduct disorder*" OR "ADHD" OR "attention*deficit hyperactivity disorder*" OR "ODD" OR "oppositional defiant disorder" OR "mental disorder*" OR "psychiatric disorder*" OR "fear" OR "anxiety" OR "depression" OR "externalizing" OR "externalising" OR "aggression" OR "SDQ" OR "BERI" OR "DAWBA" OR "CBCL" OR "ACC" OR "RCADS" OR "IAPT" OR "CGAS" OR "checklist" OR "emotion* disorder*" OR "emotion* problem*" OR "attachment problem*" OR "attachment disorder*")

(Type of study):

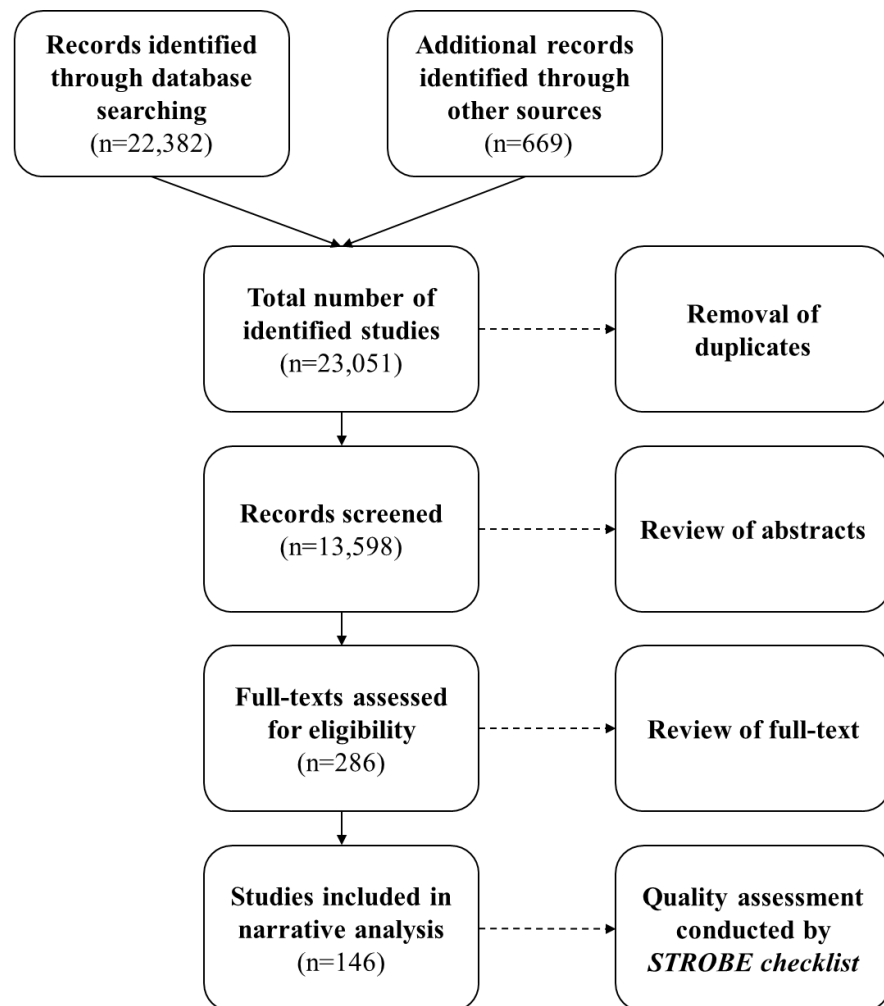
AND ("longitudinal" OR "long*term" OR "trajector*")

3.3.4 Screening & data extraction

The screening and data extraction process has been informed by *PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses)* (Moher, Liberati, Tetzlaff, Altman, & Group, 2009), an evidence-based guideline that presents the minimum set of items used for reporting in systematic reviews. A systematic process has been adopted to identify studies using electronic databases and search strings. Several criteria have been considered in determining which studies should be included in the study,

including demographic characteristics of participants, study type, variables of study, types of outcomes, and year of publication. Titles and abstracts have first been screened to determine whether the study was relevant for the aims of this review. The full text has been attained when the titles and abstracts were not sufficient to determine if the study should be included or excluded. After this initial process of exclusion, full texts were obtained for all preliminarily included studies to determine if it met the inclusion criteria. An overview of the search and selection process to obtain the final number of included studies is presented below in Figure 2.

Figure 2. Screening and selection process of the included studies³



³ Many of the articles were removed after reviewing the title. When the relevance of the articles was unclear from the titles, abstracts were then reviewed.

3.3.4.1 Variables of study

Variables have been included for examination if the study presented data on its association with the dependent variable. This has been done both when the study identified variables as independent variables of significant interest (commonly followed by hypotheses), as well as when they have been included as control variables. This approach is taken because published work, in particular journal articles, often do not include full descriptions that would allow distinctions to be made (constrained by article length). Including variables regardless of its explicit or implicit identification as independent variables would reduce the possibility of a biased selection of variables.

3.3.4.2 Types of outcomes

This review included studies that used at least one behavioral outcome measured over at least two different time points. Studies have been excluded if outcome measures were summarized without quantitative data to demonstrate behavioral changes.

The following outcomes have been accepted:

- Total problem behavior scores and subscales (e.g., Externalizing/internalizing symptoms, ADHD-related symptoms, emotional problems, anxiety/depression symptoms, risk behavior, peer problems, social problems, non-problematic behavior),
 - Delinquency/Juvenile justice related outcomes (e.g., Conduct problems, delinquent behavior, juvenile justice/criminal justice convictions or referrals, substance use, stealing, gang affiliation, legal problems, trouble with the law),
 - Placement related outcomes (e.g., Psychiatric Residential Treatment Facility admission, perceived mental health services need, placement in a juvenile training school, placement change due to behavioral reasons, negative discharge type from residential care, rehospitalization due to depression symptoms),
-

- Assessment scores that measured some aspect of behavioral or mental health functioning (e.g., CBCL, CAFAS, CFARS, CANS, CBCL, DSMD, CGAS⁴),
- Suicide related outcomes (e.g., Suicide ideation or gesture, self-mutilation behavior),
- Other measures that represent problem behavior (e.g., Property destruction, transiency, pseudomature behavior, etc.)

3.3.5 Quality appraisal

The *STROBE* (*Strengthening the Reporting of Observational Studies in Epidemiology*) checklist has been used to analyze the quality of the included 146 studies (von Elm, Altman, Egger, Pocock, Gøtzsche, & Vandenbroucke, 2008). The *STROBE* checklist is a tool used to assess the risk of bias and quality of each included study. The checklist provides a list of items that should be included in articles reporting observational research, aiming to establish the quality of an article. The *STROBE* checklist does not use a numeric scoring scheme. Although checklists with a numeric scoring scheme have been considered, the *STROBE* checklist has been chosen because it facilitates a holistic evaluation of quality, rather than a single criterion. In discussing the findings of each study in this review, details of the critical appraisal are highlighted where the evidence is particularly strong or weak. Additionally, a section on critical appraisal that includes a discussion on potential sources of bias is found in the discussion section.

After the *STROBE* checklist has been used for quality assessment (see *Appendix A* for the checklist), the findings including details of covariates, sample sizes, and *p*-values for estimates were extracted and analyzed for each study (see *Appendix B* for the data extraction table for the included studies). Findings related to the problem behavior outcomes of children in out-of-home care, along with the demographic characteristics and settings of the participants have been extracted as well. Although a meta-analysis of the findings has been considered, standardized effect sizes could not be computed because of

⁴ CBCL (Child Behavior Checklist), CAFAS (Child and Adolescent Functional Assessment Scale), CFARS (Children's Functional Assessment Rating Scale), CANS (Child Adolescent Needs and Strengths), CBCL (Child Behavior Checklist), DSMD (Devereux Scales of Mental Disorders), CGAS (Children's Global Assessment Scale)

the lack of consistency in the scales used for measuring problem behavior in the original studies. As a consequence, only a narrative review has been conducted of the studies.

3.4 Findings

The 146 included studies examine associations between 224 variables and longitudinal development of problem behavior of children in out-of-home care. Studies from the United States (n=102), Canada (n=10), Portugal (n=1), Australia (n=4), the Netherlands (n=9), Germany (n=3), Sweden (n=1), Croatia (n=1), United Kingdom (n=4), Norway (n=4), Romania (n=3), South Korea (n=1), Belgium (n=2), and Switzerland (n=1) have been included. The study with the smallest sample size had 23 participants (Ruff, Aguilar, & Clausen, 2016), and the study with the largest sample size had 99,602 participants (Barrett, Katsiyannis, Zhang, & Zhang, 2014). The review of the included studies indicated broad variability in the number (minimum of two time points, to a maximum of 467 time points (Pullman, 2011) and total follow-up length of time (minimum of 3 months (Eltink et al., 2018) to a maximum of 25 years (Dregan, Brown, & Armstrong, 2011)) at which behavior was measured. For each study, frequency and length between measurements were approximately equal. In this section, the findings on the longitudinal development of behavior problems among children placed in out-of-home care are first reviewed. Next, the findings are reviewed within various domains of the life of a child in out-of-home care. There is variability in the analytic methods employed by the studies. To illustrate, the main types of analyses utilized in the included studies are path analysis, cross-lag analysis, growth curve analysis, latent class analysis, *t*-tests, and various types of regression analyses. Other methods of statistical analyses (reliable change index, canonical discriminant analysis, ANOVA, etc.) are employed as well, but in very low frequency. While the conclusions that can be made in association with certain analytic methods vary, it is outside the scope of this paper to address all of these specificities. Nonetheless, the issues related to causality are covered later in this paper. In this section, findings related to children's longitudinal problem behavior development are first presented, then the subsequent sections present the results on characteristics that are related to particular patterns of behavioral development over time. A summary of each analyzed factor in relation to

future behavior adjustment is presented in Table 3-Table 6. Such summarizing tables are not comprehensive, but should be interpreted as highlights of the findings. Studies that reported contradicting results for different domains of problem behavior are excluded from the table for clarity and space.

3.4.1 Longitudinal development of behavior problems among children placed in out-of-home care

The included studies utilized various methods to analyze longitudinal development of behavior problems. Depending on the characteristics of the study sample, behavior sometimes improved (e.g. Barber & Delfabbro, 2003; Bulat, 2010; Chamberlain, Leve, & DeGarmo, 2007; Garcia et al., 2015) and other times deteriorated over time (e.g. Lau, Newton, & Litrownik, 2003; Lohaus et al., 2018). In some studies, distinct classes of trajectory patterns were found within the same sample depending on their past experiences (Munson & McMillen, 2010; Yampolskaya et al., 2019; Yoon, 2017; Yoon, 2018). For instance, Yoon (2017) found that there were three distinct groups of trajectory patterns for children's internalizing symptoms between the ages of 4 and 5 who have experienced past maltreatment: high-decreasing (9%), low-increasing (16%), and low-stable (75%). Other studies found that children's behavior was stable over time and did not experience major changes (Aarons et al., 2010; Barboza, Dominguez, & Pinder, 2017; Bender & Losel, 1997; Chow, Mettrick, Stephan, & von Waldner, 2014; Symanzik et al., 2019; Tarren-Sweeney et al. 2017). Among these studies, some found that most children displayed low and stable amounts of behavior problems over time (Bell et al., 2015), while others also found high and stable amounts of behavior problems over time (Bellamy, 2008).

Separate from studies that analyze behavioral changes within family-based out-of-home care, studies which examined children's behavior in residential treatment found that children's behavior generally improved over time (Ayotte, Lanctot, & Tourigny, 2016; D'Oosterlinck, Goethals, Boekaert, Schuyten, & de Maeyer, 2008; Lyons et al., 2001; Preyde et al., 2011), although the degree of improvement varied. For instance, findings from work by Cuthbert, St. Pierre, Steward, Cook, Johnson, and Leschied (2011) showed that children with serious emotional disorders displayed marginal benefits associated with residential treatment, but continued to show community conduct problems at the 2-year follow-up period.

Variability of these various trajectory patterns indicate that there are external factors that explain these differences. As such, research question 2 investigates where these differences come from, and what factors exacerbate or decrease the growth or decrease of problem behaviors over time.

3.4.2 Child welfare system involvement

This review included literature related to systemic issues within the child welfare system related to placing children in out-of-home care. This section will review these factors, and its association to problem behavior over time. Most of the included studies found that individual risk experience such as maltreatment (both pre- and during care), physical and sexual abuse, neglect, and exposure to intimate partner violence (IPV) had statistically significant relationships with various measures of problem behavior outcomes including increased risk behaviors, depressive symptoms, delinquency, substance abuse, and externalizing and internalizing behaviors. On the contrary, some studies found that neither maltreatment nor neglect had a statistically significant impact on future behavior problems. While there is a range of issues that may explain disparities between studies, one possible explanation is that parents of many children may have underreported maltreatment, which in turn may have contributed to predictive variance (Block et al., 2017). It is also highly likely that the sample of children in these different studies represent a distinct group of individuals within the child welfare population, and may thus react differently to certain experiences. Likewise, many studies attempted to distinguish between the effects of different types of maltreatment. Some of these studies have indicated that specific types of abuse are associated with more or less behavior problems. The existing research on maltreatment tends to distinguish four main types of abuse: physical abuse, sexual abuse, emotional abuse, and neglect (Jackson, Gabrielli, Fleming, Makanju, & Tunno, 2014). Although assigning a distinct cause to a distinct effect is compelling, most children who experience maltreatment are not necessarily exposed to one type of abuse in isolation (Jackson et al., 2014). That is, most research neglects to recognize that many children experience more than one type of abuse, either by neglecting to measure the possible overlap or disregarding the overlap for simplicity.

One study (Yoon, 2017) performed latent growth class analyses (LGCA) on a sample of children between the ages of 4 and 5 years old at baseline to examine which maltreatment characteristics (type of maltreatment, severity of the maltreatment, and age at which the maltreatment first occurred) were associated with distinct trajectories of internalizing behavior symptoms. This study demonstrated that children displayed heterogeneous trajectories of internalizing symptoms, of which, children with more severe levels of maltreatment were associated with patterns of behaviors problems which started high and decreased over time. These findings may suggest that severe levels of harm from maltreatment have strong associations with children's initial levels of internalizing symptoms, but the strength of these associations lessened over time. One possible explanation for this pattern may be that children experienced severe maltreatment at baseline, but were no longer maltreated in the following years. It may also be that these children were placed in out-of-home care after baseline, which prevented them from being maltreated, which in turn contributed to decreasing problems over time.

Following contact with child welfare services, children receive either in-home services or out-of-home care. The results pertaining to placement type, placement stability, and age at initial placement demonstrate that it is not the single factor of out-of-home care that determines children's behavior development, but more so the quality and characteristics of care and caregivers that the children experience. For instance, one study (Ryan et al., 2010) indicated that the relative risk of delinquency is significantly greater for African American and white male adolescents in kinship care. On the contrary, for Hispanic children, kinship care was associated with a decreased risk for delinquency. For African American and white females, kinship care did not have a statistically significant effect. Such results show that it is not the sole effect of kinship care, but the differences in other characteristics and experiences of the participants that explains these results. Other studies found children's behavioral symptoms improve or grow worse depending on caregiver mental health, age at initial placement, length in treatment, treatment site, and stability of the placement. Variations occurred within each care type (kinship care, residential care, non-

kinship care, etc.), making it difficult to draw conclusions which assume the effectiveness or non-effectiveness of out-of-home care.

Overall, results indicate that large percentages of the out-of-home care population experience complex and chronic maltreatment experiences, which are associated with higher risk of behavioral difficulties (Beyerlein & Block, 2014). In order to prevent these difficulties from carrying on unrecognized and uncared for, intervention programs should identify children by their maltreatment history in order to provide the appropriate level of therapy and help that is required. This can be achieved through routine screening of these children for trauma exposure, the provision of trauma-focused interventions and treatments, and services by experts who are professionals in the field of trauma assessment (Greenson et al., 2011). Overall, the included studies indicate that it is not necessarily the incident of out-of-home care, but the stability and quality of care, that influences children's long-term behavioral development. As such, rather than trying to avoid out-of-home care at all costs, it may be more important to direct effort to facilitating stable and high-quality care that involve nurturing and involved caregivers. However, policy recommendations should also be followed by a discussion of cost and feasibility, which is discussed in Section 7.6.2 of Chapter 7. A summary of the findings is presented below in Table 3.

Table 3. Summary of findings on child welfare system involvement

Factor	Main findings	N of studies	Studies
Risk experience	• Experience of maltreatment was associated with later risk behaviors (Pears, Kim, Fisher, & Yoerger, 2013). • Maltreatment experience both before and during care was associated with depressive symptoms (Salazar, Keller, & Courtney, 2011). • Compared with neglected youth, youth who were physically abused were more likely to engage in delinquent behaviors (Grogan-Kaylor, Ruffolo, Ortega, & Clarke, 2008). • Experience of sexual abuse was associated with more internalizing behavior problems (Bellamy, 2008). • Child neglect and exposure to intimate partner violence (IPV) were associated with higher levels of internalizing and externalizing behavior problems (Yoon, Yoon, Wang, Tebben, Lee, & Pei, 2017).	16	• Bellamy, Gopalan, & Traube, 2010 • Grogan-Kaylor et al., 2008 • Huang, Ryan, & Rhoden, 2016 • Jonson-Reid & Barth, 2000 • Munson & McMillen, 2009 • Narendorf, McMillen, & Oshima, 2016 • Pears et al., 2013 • Rubin et al., 2007 • Rufa & Fowler, 2016 • Salazar et al., 2011 • Taussig, 2002 • Williams-Butler, Ryan, McLoyd, Schulenberg, & Davis-Kean, 2018 • Wu, 2017 • Yampolskaya & Chuang, 2012 • Yampolskaya et al., 2019 • Yoon, 2017 • Yoon et al., 2017
Out-of-home placement	• Of children investigated for maltreatment, families who enter foster care have a heightened risk for psychiatric residential treatment facilities entry (Lanier & Rose, 2017). • Mental health outcomes improve following stable OOH placement, yet worsen when remaining in-home with parents (Conn et al., 2015). • Children placed in out-of-home care were associated with a significant decline in substance use over time (Yampolskaya et al., 2019).	12	• Bell et al., 2015 • Conn et al., 2015 • Fernandez, 2008a • Fernandez, 2008b • Grogan-Kaylor et al., 2008 • Hurlburt, Chamberlain, DeGarmo, Zhang, & Price, 2010 • James, 2004 • McCrae et al., 2010 • Symanzik et al., 2019 • Tarren-Sweeney et al., 2017 • Yampolskaya et al., 2019 • Yoon, 2017
Placement type	• Children in residential care had more trouble with the law and formal charges compared to those in family-based care (Preyde et al., 2009). • The relative risk of delinquency is significantly greater for African American and white	21	• Bellamy et al., 2010 • Blakely et al., 2017 • Eltink et al., 2018 • Garcia et al., 2015 • Holstead et al., 2010 • Hussey & Guo, 2005 • James, 2004 • Leloux-Opmeer et al., 2018

	- male adolescents in kinship care. For Hispanic males and females, kinship care was associated with a decreased risk of delinquency (Ryan et al., 2010). - Children in kinship care were associated with better behavioral outcomes compared to children in non-kinship care. However, these positive outcomes were observed mainly in families where caregivers demonstrated a reduction in depression symptoms over time or were never depressed (Garcia et al., 2015).		- Liddle et al., 2018 - Lyons et al., 2001 - Lyons et al., 2009 - Nijhof et al., 2013 - Noftle et al., 2011 - O'Brien, White, Wu, & Killian-Farrell, 2016 - Pears et al., 2016 - Preyde et al., 2011 - Pullman, 2011 - Rufa & Fowler, 2016 - Ryan et al., 2010 - Scholte & van der Ploeg, 2006 - Stoner et al., 2015
Placement instability	- The number of previous out-of-home placements was positively associated with increased levels of psychiatric symptomatology (Hussey & Guo, 2005). - Greater number of out-of-home placements experienced by children was associated with shorter time to involvement with the juvenile justice system (Yampolskaya & Chuang, 2012). - Girls who experienced placement instability were more likely to engage in sex-trade activities (Hebert & Lanctot, 2016). - With every additional placement change, the odds of belonging to the 'No emotional problems group' (compared to the Moderate-high, descending emotional problems group) decreased significantly by 75% (OR=.15).	25	- Aarons et al., 2010 - Barber & Delfabbro, 2003 - Bell et al., 2015 - Bellamy, 2008 - Bellamy et al., 2010 - Eltink et al., 2018 - Hebert & Lanctot, 2016 - Hiller & St. Clair, 2018 - Huang et al., 2016 - Hussey & Guo, 2005 - Hussey & Guo, 2002 - James, Roesch, & Zhang, 2012 - Lee & Thompson, 2009 - Linacres et al., 2010 - McWey, Cui, & Pazdera, 2010b - Newton et al., 2000 - Pears, Kim, & Fisher, 2012a - Proctor et al., 2010 - Rubin et al., 2007 - Rufa & Fowler, 2016 - Rosenthal & Villegas, 2010 - Ryan et al., 2010 - Vidal, Steeger, Caron, Lasher, & Connell, 2019 - Williams-Butler et al., 2018 - Yampolskaya & Chuang, 2012
Age at initial placement	Children older at initial out-of-home placement were more likely to exhibit resilient emotional functioning. Previous research investigating the impact of age at first placement has been mixed (Bell et al., 2015; Cutuli et al., 2016; Hiller & St. Clair, 2018).	7	- Bell et al., 2015 - Cuthbert et al., 2011 - Cutuli et al., 2016 - Hiller & St. Clair, 2018 - Huang et al., 2016 - Pullman et al., 2018 - Ryan et al., 2010

3.4.3 Static individual factors

Within the previous section, this paper focused on the systemic issues related to providing out-of-home care. Now the paper will turn to children's individual characteristics. The included studies examine a total of 92 individual child characteristics, which can be distinguished as either static or malleable. While most studies include basic demographic characteristics as confounding variables, this review only includes findings that examine each demographic factor as a main factor of interest. Thirty-one of the identified factors in the included studies are malleable individual characteristics. The variables presented in this section were selected based on the number of times they appeared in the included studies.

3.4.4 Demographic characteristics

This review identified that race and ethnicity, age, and gender are commonly examined demographic factors. Many of the included studies focused on a particular population group with a distinct demographic feature, but findings proved to be different depending on the type of out-of-home placement, the inclusion, and definition of the comparison group, outcome measure, and study design. A summary of the findings is presented below in Table 4.

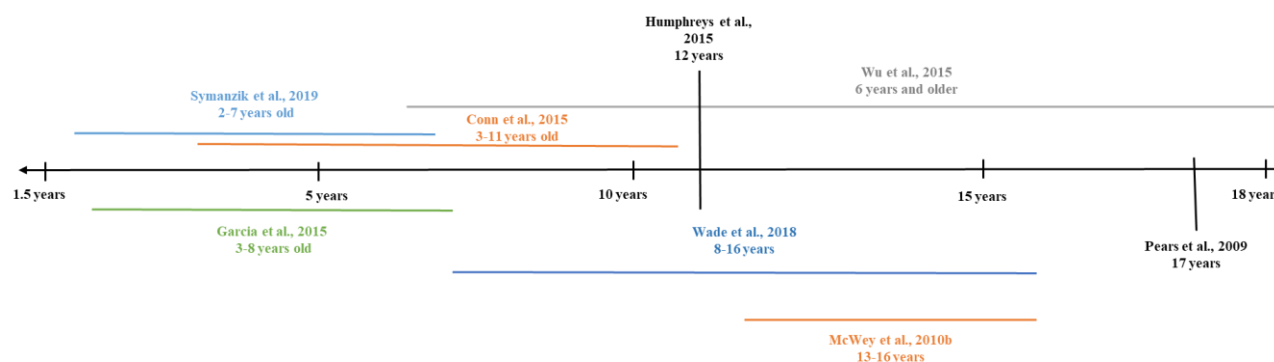
Table 4. Summary of findings on demographic characteristics

Factor	Main findings	N of studies	Studies
Age	After controlling for demographic characteristics, older children (6 years and older) in kinship care had less behavior problems compared to children in non-kinship care (Wu et al., 2015).	9	- Conn et al., 2015 - Garcia et al., 2015 - Humphreys et al., 2015 - McWey et al., 2010b - Munson & McMillen, 2009 - Pears et al., 2012b - Symanzik et al., 2019 - Wade, Fox, Zeanah, & Nelson, 2018 - Wu et al., 2015
Gender	Girls, compared to boys, showed higher levels of internalizing behavior problems.	7	- Chamberlain et al., 2007 - Habersaat et al., 2018 - Harold, Kerr, van Ryzin, DeGarmo, Rhoades, & Leve, 2013 - Hebert & Lanctot, 2016 - Kerr, DeGarmo, Leve, & Chamberlain, 2014 - Pears et al., 2012b - Poulton et al., 2014
Race and Ethnicity	White, Hispanic, and African American adolescents did not differ on rates of reported sexual behaviors, substance use, or total risk behaviors.	1	Taussig & Talmi, 2001

Figure 3 is a visual representation of the age ranges investigated within each of the included studies that exclusively examined age. As shown there was very little overlap in the age ranges, and none of the studies covered the full range of the childhood years (0-18 years). Each study's focus is different, however, with some studies that compare change of behavior between kinship and non-kinship care, whereas another compared children with biological parents verses foster parents. The diversity of subgroups and focus of different studies make it difficult to interpret the particular impact age has on behavioral development. On a similar note, the included studies hone in on examining a particular gender or ethnicity, but do not isolate the effects of each factor. Overall, none of the static individual characteristics are stand-alone factors for problem behavior development. However, a certain characteristic may be associated with certain environments or experiences of risk. For example, one study found that there are significant differences in exposure and vulnerability to childhood adversity by race, ethnicity, and gender (Roxburgh & MacArthur,

2014). As such, it may be more efficient to target intervention programs toward specific, vulnerable groups according to race and ethnicity, gender, and age, in order to adhere to their specific needs.

Figure 3. Sample age range of studies that examined age



3.4.5 Malleable individual characteristics

In terms of individual malleable characteristics, the studies in this review included physical health, self-competence, school engagement, and baseline problem behavior as individual characteristics that may potentially change maladjustive behavioral pathways. Besides baseline problem behavior, the remaining individual characteristics (i.e., physical health, self-competence, school engagement) have only a handful of studies which focus on these measures and all need further research to understand the relationship of each factor with behavioral development within a smaller homogenous sample. To illustrate, three of the included studies examined the association between child's self-competence and future behavior problems, of which two yielded consistent results demonstrating a negative relationship between the two factors. Likewise, two studies investigated the effects of physical health. Both found that the association between physical health and behavioral outcomes did not reach statistical significance. For school engagement, the studies which indicated no association with later problem behavior both had the common dependent variable of delinquent behavior (Grogan-Kaylor et al., 2008; Williams-Butler, 2018; Williams-Butler et al., 2018). This could mean that school engagement has a greater effect on improving other behavioral outcomes, but not delinquent behavior. Although it is difficult to ascertain the conclusions that are drawn

from just a handful of studies, these preliminary studies provide a starting ground for future research to conduct further investigations.

Lastly, many studies examined the statistical association between baseline problem behavior and later behavior problems. All of these studies yielded consistent results that higher initial levels of behavior problems were significantly associated with greater behavior problems in the future. This relationship held true for all groups of children who experienced out-of-home care, with different types of placement histories and within contextual settings. To illustrate, studies with a sample of African American children (mean age 9.67; Rufa & Fowler, 2016), a sample of children investigated for maltreatment (mean age 14.32; Yampolskaya et al., 2019), and a sample of children in residential treatment centers for complex mental health difficulties (mean age 12.06; Cuthbert et al., 2011) demonstrated increased levels of internalizing and externalizing behavior problems (Rufa & Fowler, 2016), substance use problems (Yampolskaya et al., 2019), and conduct problems (Cuthbert et al., 2010) for children with higher baseline level symptoms, respectively.

Additionally, the most prominent malleable individual factor among the included studies was school engagement (n=8 studies). In the general population, school engagement is an important factor for predicting later behavioral engagement (Mihalec-Adkins & Cooley, 2020). In the included studies, children who were transitioning out of residential centers for negative contact with the law (mean age 11.55 years; Cameron, Frensch, Preyde, & Quosai, 2011), children in out-of-home care with significant depressive symptoms (mean age 11.79 years; Stoner et al., 2015), and children in out-of-home care with a history of maltreatment (mean age 4.40 years; Pears et al., 2013) with higher levels of school functioning were associated with fewer trouble with the law (Cameron et al., 2011), depressive symptoms (Stoner et al., 2015), and risk behaviors (Pears et al., 2013), respectively. In terms of malleable individual factors, it is notable that there were large gaps in the literature concerning the effects of socioemotional competence on the development of later problem behavior. Since socioemotional competence is an important factor at the

center of focus for the general population, it may be useful to direct future research to filling this gap. Table 5 below presents a summary of the findings on malleable individual characteristics.

Table 5. Summary of findings on malleable individual characteristics

Factor	Main findings	N of studies	Studies
Physical Health	Physical health was not associated with changes in the level of delinquent behaviors (Grogan-Kaylor et al., 2008).	2	- Grogan-Kaylor et al., 2008 - Rubin et al., 2007
Self-competence	Children with higher self-esteem were less at risk for having depressive symptoms, delinquency, sexual behaviors, and total risk behaviors (Bulat, 2010; Taussig & Talmi, 2001).	2	- Bulat, 2010 - Taussig & Talmi, 2001
School engagement	- Cognitive engagement was associated with less engagement in risk behaviors (Pears et al., 2013). - Positive change in school engagement was associated with reduced risk of depression (Stoner et al., 2015). - Serious school problems were associated with future trouble with the law (Cameron et al., 2011).	8	- Cameron et al., 2011 - Grogan-Kaylor et al., 2008 - Pears et al., 2013 - Stiles & Gudino, 2018 - Stoner et al., 2015 - Strickler, Mihalo, Bundick, & Trunzo, 2016 - Williams-Butler, 2018 - Williams-Butler et al., 2018
Baseline problem behavior	- Greater baseline behavior problems were associated with increased externalizing and internalizing symptoms (Rufa & Fowler, 2016). - Baseline internalizing problems were associated with increased substance use over time (Yampolskaya et al., 2019). - Higher levels of baseline externalizing and substance use behaviors were associated with higher levels of conduct disorder scores (Cuthbert et al., 2011).	16	- Barboza et al., 2017 - Bender & Losel, 1997 - Cuthbert et al., 2011 - Goemans, van Geel, & Vedder, 2018 - Habersaat et al., 2018 - Hindt et al., 2019 - James et al., 2012 - Leon, Bai, & Fuller, 2016 - Rufa & Fowler, 2016 - Rosenthal & Villegas, 2010 - Rose & Lanier, 2017 - Stoner et al., 2015 - Taussig & Talmi, 2001 - Wu, 2017 - Yampolskaya & Chuang, 2012 - Yampolskaya et al., 2019

3.4.6 Interpersonal relations

In the preceding section, this paper focused on individual characteristics that may be associated with behavior problems. This section will expand from the individual child to the people and relationships

that are in the child's immediate surroundings, namely, interpersonal relations⁵. As shown in Table 3, various aspects of interpersonal relationships and the quality of these relationships in the children's immediate surroundings are identified as an important factor for the behavioral development of children involved with the child welfare system (in out-of-home care), as it provided the social support that many children had previously lacked. These relationships were predominantly either familial or peer. Both types of relationships had significant effects on the behavioral development of children in out-of-home care. However, the direction of these behavioral changes depends on the quality of these relationships. For instance, positive and satisfactory peer membership promoted a sense of belonging, which was associated with behavioral and psychological well-being over time (Bender & Losel, 1997). On the contrary, involvement with deviant peers resulted in higher levels of delinquency (Lee & Thompson, 2009; Robst, Armstrong, & Dollard, 2011). For example, children treated in residential facilities where peers exhibit greater delinquency were shown to have significantly higher rates of future delinquency (Robst et al., 2011). This may be explained through differential association theory, which posits that individuals learn the values, motives, and techniques for criminal behavior through interaction with peers (Fox, Nobles, & Akers, 2011). There may also be selection bias which comes into play here, because many children are placed in residential facilities for behavior problems that are difficult to manage (Gruber-Baldini, Boustani, Sloane, & Zimmerman, 2004; Mazzone, Nocentini, & Menesini, 2018; Sekol, 2013). Therefore, children in residential centers may be surrounded by peers with higher levels of behavior problems at the outset, which may mean that there could be less opportunities to engage in positive interactions with peers compared to children who are in less restricted environments such as the typical school setting (Barter, 2003). Delinquent behavior may be particularly difficult to resist in the context of peer-relationships, as certain behaviors may

⁵ Three studies (Barth, Lloyd, Green, James, Leslie, & Landsverk, 2007; Hiller & St. Clair, 2018; Perry & Price, 2017) examined the effects of living arrangements with siblings and relationships with foster siblings. Findings showed that children with emotional and behavioral difficulties who live with their biological siblings were less likely to experience a placement move (Barth et al., 2007), and that foster siblings' relational aggression predicted more behavioral aggression from children (Perry & Price, 2017).

be considered beneficial to gain acceptance (Sullivan, 2006). For example, adolescents may find it more worthwhile to spend time with friends to shoplift, rather than to stay at home with an unfamiliar caregiver in an unfamiliar placement.

Likewise, relationship formation, and attachment with a new out-of-home caregiver is influential for behavioral well-being. While studies demonstrated that insecurely attached children experience many difficulties in communicating their feelings and was associated with heightened internalizing and externalizing problems (Rushton, Mayes, Dance, & Qui, 2003; Yoon et al., 2017), formation of a secure attachment was related to reduced symptoms in depression (Stoner et al., 2015). In this paper, caregiver characteristics relate to out-of-home care caregivers (rather than birth parents). Characteristics associated with decreased problem behaviors included caregiver monitoring and supervision (Grogan-Kaylor et al., 2008; Stoner et al., 2015; Vis et al., 2016), while caregiver substance use and mental health problems were associated with increased problem behaviors (Seay & Kohl, 2015; Yoon et al., 2017). Interestingly, while it was hypothesized that caregiver resources and socioeconomic status would be an important factor for behavioral change, studies consistently found that caregiver resources did not make a significant difference to later delinquency, or that only extreme levels of financial differences resulted in statistically significant differences (e.g., family income exceeds 200% the poverty line compared to children whose family income fell under the poverty line) (Williams-Butler, 2018; Yoon, 2017).

Overall, the included studies indicate that high quality relationships with both peers and adults are likely to be protective for positive behavioral development. As such, training resources for parents to acquire proficiencies associated with placement stability and permanency may promote positive child outcomes. These resources should aim to enhance caregivers' abilities to create stability and promote wellbeing for children in their care. Preservice as well as in-service trainings can use these emerging factors as a framework from which to equip parents with the knowledge, skills, and abilities needed to achieve

proficiency in areas associated with placement stability and permanency. Table 6 presents a summary of the findings on interpersonal relations.

Table 6. Summary of findings on interpersonal relations

Factor	Main findings	N of studies	Studies
Peers or other adults in the young person's life	• Clique membership and satisfaction with social support was associated with behavioral continuity.	1	• Bender & Losel, 1997
Caregiver characteristics	• Mothers with substance dependence were associated with child behavior problems over time (Seay & Kohl, 2015). • Insecure caregiver-child attachment, and caregiver mental health problems were associated with higher initial levels of internalizing and externalizing behavior problems. Caregiver drug use predicted rates of change in behavior problems (Yoon et al., 2017). • Increases in caregiver monitoring and quality of relationship with caregivers were associated with decreased delinquent behaviors (Grogan-Kaylor et al., 2008; Stoner et al., 2015; Vis et al., 2016).	14	• Garcia et al., 2015 • Grogan-Kaylor et al., 2008 • Maltby, Callahan, Friedlander, & Shetgiri, 2018 • O'Brien et al., 2016 • Seay & Kohl, 2015 • Stoner et al., 2015 • Vanderfaeille, van Holen, Vanschoonlandt, Robberechts, & Stroobants, 2013 • Vis et al., 2016 • Williams-Butler, 2018 • Williams-Butler et al., 2018 • Wu, 2017 • Yampolskaya & Chuang, 2012 • Yoon, 2017 • Yoon et al., 2017
Deviant peer affiliation	• Stronger density of deviant peers was associated with youth's externalizing behavior trajectories (Lee & Thompson, 2009).	2	• Lee & Thompson, 2009 • Robst et al., 2011
Relational permanence	• Relational permanence was associated with improved rates of depressive symptomatology over time (Stoner et al., 2015). • Relational permanence was associated with higher psychological well-being over time (Williams-Butler et al., 2018).	3	• Stoner et al., 2015 • Williams-Butler, 2018 • Williams-Butler et al., 2018
Attachment to the new family	• Positive change in family attachment was associated with reduced depressive symptoms (Stoner et al., 2015). • Insecure caregiver-child attachment was associated with higher initial levels of internalizing and externalizing behavior problems (Rushton et al., 2003; Yoon et al., 2017).	3	• Rushton et al., 2003 • Stoner et al., 2015 • Yoon et al., 2017

3.5 Discussion

The aim of this systematic review was to examine the published, empirical literature on the individual and contextual correlates of problem behavior development among children in out-of-home care. The review employed a rigorous and systematic searching methodology and underwent a thorough quality appraisal, which resulted in the inclusion of 146 independent research articles. Overall, the findings indicated that children's development of problem behavior is associated with a wide variety of individual and contextual factors. In this study, I am more reliant on some of the studies than others, mostly because of the degree of information that was included in particular studies. A number of challenges were encountered in conducting the review. The most notable challenge was in synthesizing heterogeneous methodologies, measures, contexts, and findings, a common problem with such reviews.

Overall, several notable themes were found when examining the findings. Although each study has some element of commonality and merit in its own way, the findings are heterogeneous and inconsistent. For example, school engagement is found to significantly be associated with a milder degree of problem behavior such as externalizing symptoms (Pears et al., 2013), but not to a more severe type of outcome such as crime involvement (Williams-Butler, 2018). Heterogeneity arose from diversity of the population sample, operationalization of measures, locations, and research questions.

Although this review aimed to contribute to the understanding of the possible causes, determinants, and factors of behavioral maladjustment over time, heterogeneity of individual characteristics makes it difficult to make generalizing conclusions at the population level (Lesko, Buchanan, Westreich, Edwards, Hudgens, & Cole, 2017). Making such conclusions require background knowledge, theoretical assumptions, and a sound methodological approach. It is difficult to make generalizing statements about such a complex population with diverse needs and life histories, as direct and indirect processes may vary across participants due to different measured and unmeasured characteristics (Kim, Daniels, Li, Millbury, & Cohen, 2017). Heterogeneity in results may also arise from the data collection process. For example, temporal aspects of data collection are critical to detect the presence or absence of an effect in longitudinal

studies. If the time-frame is too short, an important lagged effect may not be detected, such as the negative effects of a placement change that emerge only after the child processes what has happened (Aarons et al., 2010). Likewise, the included studies in the review have a diverse range of timeframes, datasets, methodologies, and population groups, making it difficult to identify factors that may have a protective or risk relationship with behavioral development. Despite heterogeneous distinctions, baseline problem behavior and maltreatment experience consistently contributed to future maladjustment of behavior problems. This relationship held true in the context of various settings and care histories, indicating consistency and credibility of findings. These findings suggest that prevention and intervention strategies should target those children with pre-existing symptoms of internalizing and externalizing problems to prevent them from developing severe psychopathology later in life. Further, this review offers guidance for the variables that are more prevalent in the child welfare literature, and on which areas need further research.

The conclusions that can collectively be drawn from this review depend on each of the individual studies that are included. For future research, an emphasis on randomization and replication studies should be made, as inferring causation in nonexperimental or descriptive research is generally inappropriate. Even in experimental studies, it is difficult to ascertain whether extraneous conditions have truly been controlled for. Three fundamental and minimal requirements are agreed by researchers: (1) association (i.e., correlation) between two variables of interest, (2) isolation of the effect (i.e., controlling for confounding variables), and (3) temporal ordering (i.e., cause precedes the effect) (Oppewal, 2010). These requirements are not presented here to claim that they are sufficient to make causal claims about associations, but to discuss the extent of the conclusions which can be drawn from the included studies. In addition to these three requirements, researchers also rely on theories such as counterfactual analyses to analyze the possibility of drawing causal conclusions (see Barringer, Elisason, & Leahey, 2013; Bours, 2020; Dawid, 2000). Although it is beyond the scope of this article to elaborate on all of the conditions necessary to establish causality, a more in-depth analysis of causal inferences and the conclusions which can be drawn from the findings of this thesis is made in Chapter 7, Section 7.4.1. While the included studies employ

several advanced analytic methods to examine the development of problem behavior over time, no statistical procedure alone can ensure that the necessary conditions of association, isolation, and temporal ordering have been met. These requirements are difficult to attain and realistically unlikely that all three of these conditions will be met within the complexity of child welfare research. However, this does not mean we should consent to accepting their inaccessibility. Rather, researchers should practice epistemological conservatism and scientific reasoning to employ rigorous measures in assessing causality and drawing conclusions. All of the included studies satisfy one of the fundamental requirements for establishing causal conclusions: temporal ordering. In other words, all of the examined factors are measured earlier in time in relation to the dependent variable of behavior problems. (More specifically, the specified predictor had to have been measured before the second measure of behavior, and not necessarily before baseline behavior. In these situations, they would be predicting later behavior, rather than change in behavior.) Secondly, as established by the *STROBE checklist*, all of the studies also establish ‘association,’ by presenting the theoretical background of how the factors are correlated to behavior problems. Lastly, ‘isolation’ is attempted by the included studies as well, as all of them try to control for extraneous effects that may otherwise change behavior. Most studies controlled for basic demographic characteristics such as age and gender, as well as baseline behavior problems. A larger proportion of studies also controlled for prior maltreatment, placement stability, and placement type. A smaller portion of studies controlled for age at first out-of-home placement, out-of-home care family stressors and out-of-home caregiver mental health, time in out-of-home care, kinship involvement, and out-of-home caregiver characteristics. Less frequently, placement with a sibling, quality of the out-of-home placement, and trauma were controlled for. However, it is realistically difficult to control for all extraneous factors, particularly with observational studies⁶.

The *STROBE checklist* also indicated whether or not each study describes any effort to address potential sources of bias. According to an evaluation of the collection of answers, 42 out of 146 studies

⁶ The majority of the included studies analyzed nonexperimental data (n=126).

indicated an attempt to prevent bias while planning for the study. It is however very possible that authors have simply left these details out of the manuscript of their papers. Although not made explicit, some studies also employed multiple raters of behavior problems to avoid reporter bias (Cantos & Gries, 2010; Havnen, Breivik, & Jakobsen, 2014; Nijhof et al., 2013). To illustrate, Cantos and Gries (2010) incorporated therapist, out-of-home caregiver, and teacher ratings of risk behavior to understand children's behavioral changes over time. The *STROBE checklist* also reviews whether the study acknowledges any limitations of the study and makes interpretations and generalizations cautiously. A large number of studies reported limitations and ensured that generalizations were to be made carefully. For example, one study (Nijhof et al., 2013) highlighted the high rate of attrition and risk of selection bias in the sample when presenting the results. It should also be noted that, as stated in Section 3.3.2 of this chapter, this review only includes studies written in the English language. This may limit the generalizability of the findings, and it may be that some studies which examined the problem behavior development of children in out-of-home care were left out due to this restriction. Future research may consider participating in multi-country collaborations in order to enlarge the scope of research that the findings are drawn from.

3.6 Conclusion

The above themes produce important 'so what' questions for the academic field of child welfare (see Chapter 7, Section 7.6 for an expansion of the implications and recommendations). First, the inconsistent and heterogeneous results may mean that those of us interested in examining individual differences need other means for examining the structure, relations, and development of behavioral maladjustment. Much of the academic research in the field of child welfare emphasizes quantitative measures of summary statistics, such as means and standard estimates. However, such quantitative analysis may overlook important non-linear and qualitative distinctions that are found between and within individuals. Data analysis is essentially centered around the reduction of information, which aims to portray data in a concise yet accurate way that is suitable for interpretation.

To understand behavior fully, future research should consider environmental context, individual characteristics, intricate relationships, societal institutions, and the lived experiences that shape the development of behavior throughout time. Grasping this complexity calls for research designs and frameworks which mobilize information in a way that values diversity and divergence. There is an ongoing discussion of the value of research designs that combine both quantitative and qualitative methods. Such mixed-method research designs may generate findings that are not consistent, thus requiring additional examination. Further, mixed-method research can benefit from the advantages associated with each tradition: being able to quantify outcomes with numbers in addition to understanding the qualitative characteristics of the lived experiences and context of the participants. Academics suggest that this procedure may eventually contribute to more specific understanding around the key factors that influence associations of interest. It may also contribute to more defined conceptual frameworks that establish valuable practical or theoretical perceptions. As such, it is recommended that future research employ mixed-methods for disentangling complex characteristics and relationships of an intricate experience.

As more research is produced and findings replicated, there may also be opportunities to undertake a more focused systematic review and meta-analysis, by aiming attention, for example, on a single risk factor. For this to become feasible, future research needs to provide more detailed information about the population of children, demographic characteristics, placement histories, and contexts of the sample under study. Among the included studies, several studies examined a single shared factor. However, as indicated in the findings, the outcomes did not always match. This inconsistency may result from differences in design, sample, and confounding variables between the original and replication studies or from biases in how researchers decide on experimental design, data analysis, and publication (Swiatkowski & Dompnier, 2017). After analysis of data, studies with null or contradictory results may not get published, resulting in the ‘file drawer problem’ (Rosenthal, 1979). This may lead to the deficiency of replication studies.

The findings of this review highlight gaps in the literature, such as the dearth of research on individual characteristics of children in out-of-home care and their development of problem behavior over time. For instance, this review did not identify any studies which examined socioemotional development such as prosocial or self-regulation skills that may moderate or mediate the relationship between out-of-home care involvement and problem behavior outcomes. Such variables are shown to significantly improve behavioral outcomes among children in the general population. The literature on children in out-of-home care relies little on research on children in the general population. Yet, both fields of research may benefit from each other. For example, children in out-of-home care are more likely to come from poor or disadvantages backgrounds where substance abuse, domestic violence, and maltreatment occur. Further, a large literature exists on child maltreatment, but it is not always clear whether participants are, ever were, or how long they were involved in out-of-home care. There exists a rich literature on the link between maltreatment and behavioral outcomes, which is not limited to children in out-of-home care. Factors identified among children in the general population could be further studied to assess their relevance and importance for children in out-of-home care.

Children in out-of-home care represent a population group with some of the most complex needs. However, there remains room for more evidence on what kinds of services are needed for what kinds of children and for how long (Bellonci & Holmes, 2021). An important part of understanding ‘What works for whom?’ is to elucidate risk and protective factors associated with the wellbeing of this unique group (Bellonci & Holmes, 2021). While factors identified among children in other vulnerable groups may contribute to conversations about the potential factors that may be important, still there are factors that work differently for children in out-of-home care depending on their past experiences, age, and other characteristics, as demonstrated by the inconsistencies of the results. Ultimately, it sheds light on why it is essential to continue building evidence on this focused group of children, for informing intervention designs and targets, as well as evidence-based decision making in social care services.

3.7 Summary of the chapter

This chapter presents Study 1, a systematic review which aimed to identify, analyze, and evaluate the existing quantitative evidence on the factors associated with problem behavior development for children in out-of-home care. The review examines factors related to longitudinal problem behavior development, and organizes it within different levels of context (individual, social, system, etc.). In doing so, it aimed to understand the effects of broader social-contextual characteristics and individual characteristics on children's problem behavior development. The review resulted in the inclusion of 146 independent research articles. Findings related to the child welfare system are first presented, and the following sections present the results on variables in other domains of development (i.e., individual characteristics, interpersonal relations, interventions, etc.). Overall, the findings indicated that children's longitudinal problem behavior development is associated with a wide variety of individual and contextual factors.

Chapter 4. Literature review and rationale for Study Two

The findings from the systematic review in Study One of this thesis indicate that there are important gaps in the understanding of the problem behavior development of children in out-of-home care as well as of the different factors that may alter these behavioral pathways. Study Two addresses these implications of Study One by exploring the risk and protective factors of problem behavior outcomes within a specific population group. In this chapter, the relevant literature and rationale for Study Two is reviewed and presented. Since the systematic review in Study One already reviewed the existing literature on some of the potential factors of change which will be examined in Study Two in some detail, this chapter focuses exclusively on the literature on the other variables which have not been reviewed in Study One, but will be examined in Study Two (namely, socioemotional skills, daily living skills, neighborhood community environment, post-traumatic stress, and severity of maltreatment incident).

4.1 Introduction

Study One is an in-depth narrative systematic review of the literature on the behavior problems of children in out-of-home care. It identified 146 studies, which indicated that children's development of problem behavior is associated with a wide range of factors (individual characteristics, interpersonal relations, child welfare history, etc.). However, the review indicated that the evidence on risk and protective factors for well-defined subgroups of children in out-of-home care still remain limited and thus warrants further investigation.

In this thesis, and as discussed in Chapter 2, I adopt the framework of developmental epidemiology as a pathological process that may have psychological, social, and developmental dimensions. Developmental epidemiology is discussed as a specific type of epidemiology when dealing with child psychopathology. The reason is that a model which describes the development of the individual must be considered. Within this framework, developmental epidemiology is concerned with the developmental process of both the child (the organism) and behavior problems (the disease).

Child psychiatry has used the same static assumptions and terminology in understanding concepts of disease and health (e.g., risk factors, course, causality, outcome) as done for adult psychiatry (Costello & Angold, 2016). However, it is problematic to apply this approach to examine the distribution of disease in the community because children are not simply miniature adults. To understand this phenomenon, it seems reasonable to postulate that children develop in a qualitatively different way from adults.

Developmental epidemiology enables us to conceive of disease states in terms of the inability to accomplish important developmental goals, and it directs preventive attention to developmental processes or milestones which seem particularly critical at a specific phase of life (Costello & Angold, 2016). In order to prevent behavior problems, for example, the goal of positive behavior and the various systems (affect, cognition, and impulse) that are most involved with regulating behavior at different developmental stages must be defined (Costello, 2016). To determine whether major prevention efforts are required, this view of normality and abnormality necessitates considering both the (behavior) problem as well as which developmental stage the problem occurs (Costello & Angold, 2000). As such, this framework of striving for developmentally appropriate behavior provides a foundation to examine pathological patterns in the context of child development and developmental epidemiology (Costello, Foley, & Angold, 2006).

As evidence grows on the factors associated with behavior problems, longitudinal analyses are needed to explore how variables work together over time (Kuh, Ben-Shlomo, Lynch, Hallqvist, & Power, 2003). Study Two seeks to address these gaps in the literature by exploring whether child and context characteristics are risk or protective factors for the development of behavior problems of children with histories of long-term out-of-home care. The developmental epidemiology literature (Costello, 2016; Costello & Angold, 2000; Costello et al., 2006) asserts that the level of intensity and length of existence of a risk factor heavily affects the negative impact it may have on the individual. Psychodynamic models of development assert that among all of the aspects of risk, age at first exposure is most critical for child psychopathology (Graham-Bermann & Perkins, 2010; Kalkman, Peelen, Moons, Veenhuizen, Bruens,

Sinnema, & de Jong, 2009; Kovelman, Baker, & Petitto, 2008). In this light, I predominantly focus on the development and psychology literature to present the implications of some general developmental theories for the epidemiology of child behavior problems in this chapter.

I begin by briefly reviewing the findings on the factors that will be examined in Study Two which have not previously been examined in the systematic review of Study One. Specifically, I begin by presenting the research questions, rationale, and contribution of Study Two. I then review the definitions of each factor, then briefly present evidence on its association with behavioral outcomes which suggest how this relationship might work.

4.2 Research questions, rationale and contribution of the present study

The findings from Study 1 revealed that children's longitudinal behavior development is associated with a wide variety of individual and contextual factors. However, the findings also indicated an inconsistency in the research on different risk and protective variables and problem behavior development. Further, findings from Study 1 highlighted gaps in the child welfare literature, such as the dearth of research on socioemotional skills that may moderate or mediate the relationship between exposure to adverse experiences associated with out-of-home care involvement and later problem behavior outcomes. As such, Study 2 aimed to identify risk and protective variables of problem behavior among children who had been in long-term out-of-home care, with an added focus on socioemotional skills. This thesis aims to contribute to the emerging evidence by asking three focused questions. These are:

1. What do the longitudinal trajectories of problem behavior for children in out-of-home care look like?
2. How do different variables affect the onset and change of problem behavior trajectories?
3. Is there a protective variable that mediates the relationship between severity of recent abuse incident and future behavior problems?

This thesis aims to address these questions by undertaking secondary data analysis of a US dataset on children with histories of long-term out-of-home care. Children aged 0 to 14 years were selected into the sample at baseline (Wave 1) and followed over time for three years. The thesis focuses exclusively on children who had been in out-of-home care for approximately one year during the sampling period, as focusing the study on a more homogeneous group of children with respect to developmental stage and care history may lead to more robust and generalizable findings. The methodology is described in detail in the next chapter (Chapter 5), and the risk and protective factors approach is as described in Chapter 2 and is therefore not repeated here.

The remainder of the thesis is organized as follows: Chapter 5 outlines the methodology for Study Two, Chapter 6 presents the findings of Study Two, Chapter 7 discusses the findings in light of the literature and outlines their limitations, and finally, Chapter 8 sets out the conclusions. In the following sections, a brief literature review is presented for socioemotional skills, daily living skills, neighborhood community environment, post-traumatic stress, and severity of maltreatment incident. Although Study 2 examined the effects of age at initial out-of-home care placement, out-of-home care placement, school engagement, gender, and relationship with the caregiver in addition to these variables, these variables were not covered in the literature review of this chapter because they have already been examined in the systematic review. In searching for the research evidence concerned with the variables in this review, I examined both the child development and child welfare literature. For the measures of socioemotional skills and daily living skills, no existing studies examined these constructs within the child welfare literature in relation to behavior problems. Therefore, only the evidence base in the child development literature was used for these measures. Along similar lines, the measures of post-traumatic stress and maltreatment severity relied on only the child welfare literature for the same reasons. For each variable, I provide the definition of the construct, relevant theoretical literature, and the current evidence on how this variable may be affected in the context of child maltreatment and out-of-home placement. As for the measures of socioemotional skills and daily living

skills, which heavily consulted the child development literature, I also provide a typical/expected course of development as observed in the general population.

4.3 Socioemotional competence

Socioemotional skills are represented as a multidimensional construct consisting of emotional aspects (e.g., self-awareness and self-control), cognitive aspects (e.g., empathy), and behavioral aspects (e.g., perseverance, responsible decision making, and prosocial behavior) that foster healthy development throughout the lifecycle (Damasio, 2017). Due to its multidimensional nature, many domains of socioemotional skills are interrelated. For example, self-regulation skills require a degree of responsibility as well as cognitive abilities, in order to be able to facilitate pathways between being aware of one's own impulses as well as the consequences of these impulses, and then controlling these impulses in order to avoid certain consequences (Mergler & Shield, 2016). Self-regulatory and responsible behavior are then also related to emotional control, since individuals need to regulate their immediate emotional responses when making choices that are responsible. As such, an individual with high emotional intelligence may display more responsibility over one's decisions and behavior. Thus, responsibility encompasses an aspect of socioemotional competence that reflects both cognitive, emotional, and behavioral aspects. For the purposes of this thesis, socioemotional skills are defined as the ability to “form close and secure adult and peer relationships; experience, regulate, and express emotions in socially and culturally appropriate ways; and explore the environment and learn- all in the context of family, community, and culture” (Yates, Ostrosky, Cheatham, Fettig, Shaffer, & Santos, 2008, p. 2).

Researchers generally agree that children follow a moderately typical process of socioemotional development and acquisition throughout infancy and school entry (McClure-Tone, 2009). During the infant years (0-12 months), babies begin to express a range of emotions (e.g., sadness, happiness, fear, anxiety); participate in social interactions (e.g., responding to the sound of their name, smiling, babbling); and grasp the ability to be soothed and calmed down by adult caregivers and self-sooth (Dale, O'Hara, Keen, & Porges, 2011; Morales, Mundy, Crowson, Neal, & Delgado, 2005). During the toddler years (ages 1-2), children

become more skilled at focusing attention and playing by themselves independently; both verbally and non-verbally express a wider range of emotions (e.g., anger, frustration, disobedience); recognize how other people are feeling; recognize and interact with a variety of new people; and display assertion in social situations (e.g., direct and take charge in play with others) (Degotardi, 2014; Kannass, Oakes, & Shaddy, 2006). As children enter the preschool years (ages 3-4), they begin to develop friendships and emotional connections outside the family; recognize and articulate the feelings of their own and others; decipher between socially acceptable and unacceptable behavior; begin to solve some social problems without the help of an adult; display delay-of-gratification skills during exercises such as toy sharing and turn taking; enhance their capacity to manage strong emotions of their own in socially acceptable ways; carry through on tasks that are challenging for them without becoming overly frustrated; and pay attention for longer periods of time (Denham et al., 2002; Imuta, Hayne, & Scarf, 2014; Kerns, 2000). As illustrated, early childhood socioemotional development and meeting consecutive age-salient objectives are important for the successful development of ensuing developmental periods throughout the middle childhood, adolescent, and adulthood years (Keller, 2018). Socioemotional skills begin emerging at birth and the quality of early experiences is important in the way children understand themselves and the world around them. For example, infants whose needs are constantly met by their caregivers are able to develop secure attachments and relationships, regulate their emotions, and pay attention to their surroundings more (van der Voort, Juffer, & Bakermans-Kranenburg, 2014). Bowlby's (1982) attachment theory is an important source of reference for researchers investigating the socioemotional development of children. One of the core propositions of the attachment theory is that secure infant-parent attachment fosters the child's socioemotional development (van der Voort et al., 2014). Attachment theory proposes that an internal working model represents the security of the attachment between the child and parent, which consists of the expectations of the child regarding the responsiveness and availability of the parent (Bowlby, 1982). Supportive parental response to children's negative emotions facilitate later socioemotional development by providing assistance with regulating negative emotions (Lathren, Bluth, & Zvara, 2020). Emotional

regulation competencies increase during toddlerhood when emotional outbursts climax and caregivers are regularly needed to calm their children by helping to control and shift their emotions and behavior (Atkinson, Gennis, Racine, & Riddell, 2015). As children grow older, their self-regulatory competence increases as well, promoting fewer behavior problems (White, Jarrett, & Ollendick, 2013). However, children who are unable to acquire the skills for self-regulation during the preschool years exhibit developmental difficulties, such as poor social skills and externalizing problems (Trentacosta & Shaw, 2009).

The importance of healthy socioemotional development in children is well established. Research evidence demonstrates that children who develop socioemotional competency acquire the confidence to build relationships across multiple contexts, improve problem solving skills, and cope with challenges (Kwong, Lam, Li, Chung, Cheung, & Leung, 2018; Parhomenko, 2014). Indeed, socioemotional skills established during the early years are shown to lay an important foundation for sub-sequential developmental tasks across a wide range of outcomes. For example, a recent study found that kindergarten-age children who understand and articulate emotions, are cooperative and accommodating to others, and are able to resolve peer conflict, were more likely to develop to be well-adjusted adults and become positive members of society with positive outcomes in employment, education, criminal activity, substance use, and mental health needs (Jones, Greenberg, & Crowley, 2015; Lechner, Anger, & Rammstedt, 2019). Associations remained significant even after adjusting for individual, family, and contextual characteristics. In the general population, research on the relationship between children's socioemotional competence and developmental outcomes suggests that children with difficulties in their socioemotional capacity experience a spectrum of individual and social difficulties, including low anger management among preschool-age boys, poor school-age social and cognitive adjustment, and heightened levels of externalizing problems among children and adolescents (Darling-Churchill & Lippman, 2016). Low socioemotional competence is also linked to adolescent risk-taking behavior, demonstrated by a longitudinal study that showed self-regulation competence in early adolescence to be inversely related to levels of sexual risk-taking and misconduct during mid-adolescence (Conduct Problems Prevention Research Group, 2014). Collectively,

these findings indicate that children's development of socioemotional competencies should be supported by caregivers, educators, and policymakers during the early childhood years for the facilitation of long-term positive outcomes. In line with such prominence, child welfare workers and policymakers are espousing for the promotion of state and federal initiatives that can support positive socioemotional development for children (Thompson & Ontai, 2000). Such initiatives may include early childhood interventions, curriculum development, and professional training for educators to help facilitate children's foundations of socioemotional development.

In the context of out-of-home care, children experiencing neglect and maltreatment in the home are highly unlikely to have a stable source of care and experience sufficient amount of positive caregiver interaction (Finzi, Cohen, Sapir, & Weizman, 2000), making it difficult for children to receive the interactions and support needed to develop socioemotional competencies (Aber & Allen, 1987; Ellenbogen, Klein, & Wekerle, 2014). Similarly, children in institutions generally receive low levels of stimulation, have few one-to-one interactions, and often lack adequate attention and engagement (Smeekens, Riken-Walraven, & Van Bakel, 2009). Given the importance of sensitive and responsive caregiving for children's positive socioemotional development (Sroufe, 1996), it is unsurprising that empirical research has demonstrated that children in institutional care and children who have experienced severe abuse and neglect show decreased socioemotional functioning relative to their non-maltreated peers (Perry, DePasquale, Fisher, & Gunnar, 2019). Existing evidence establishes the link between disadvantageous family environments and difficulties in social functioning and development of emotional regulation. Children who experience maltreatment have greater difficulties with emotional regulation and behaving appropriately in social interactions, which is associated with greater risk for peer rejection and behavior problems (Luecken, Roubinov, & Tanaka, 2013). This is expected because children who are maltreated by their primary caregivers do not receive the appropriate parental guidance to develop socioemotional competence. Socioemotional competence is first developed in the context of parent-child relationships, as they learn about social interactions and the importance of labeling, discussing, and appropriately expressing emotions

(Mirabile, 2014). In a more positive light, one longitudinal study showed that higher levels of social competence partially mediated the relationship between child maltreatment and internalizing and externalizing symptoms (Kim & Cicchetti, 2004). Such evidence suggests that focusing on the development of socioemotional skills may contribute to the improvement of later behavior problems. Despite the wide acceptance of the importance of socioemotional competence on the well-being of children in the general population, the effects of socioemotional competence on the longitudinal outcomes of problem behavior among children in out-of-home care have not yet been examined at depth in the existing child welfare literature. However, early socioemotional competence may mitigate behavioral maladjustment over time, warranting for examination of the underlying mechanisms of this skill.

4.4 Daily living skills

Daily living skills describe an important area of adaptive behaviors, which are defined as behaviors required for independent and age-appropriate performance in communication, social, motor, and daily living domains of functioning (Smith, Maenner, & Seltzer, 2012). The existing research indicates that acquisition of age-appropriate daily living skills may be especially challenging for individuals with Autism Spectrum Disorder (ASD). There is very little evidence on the relationship between daily living skills and behavior problems, especially in the context of typically developing children without any disabilities. As such, the literature presented in this section is based on the research evidence that is currently available.

Cross-sectional studies also suggest that developmental differences in daily living skills tend to emerge early and persist over time (Hauser-Cram, Warfield, Shonkoff, & Krauss, 2001). Children with ASD often show accompanying symptoms that may affect their functioning and create circumstances that may be challenging for their families and themselves. Despite such challenges, many programs providing early intervention target deficits related to social communication and/or language acquisition. This may be because caregivers of children with ASD have been found to experience so many caregiving responsibilities that they find it easier to carry out the tasks themselves than to train and guide children to routinely and

independently completing the tasks. However, studies show that training children to perform everyday adaptive tasks such as toilet training or eating with a spoon reduces caregiving stress and potentially grants caregivers more energy and time to assist their child with healthy behavioral development and modification (Green & Carter, 2014). Such evidence is also relevant for out-of-home caregivers and parents who are involved with the out-of-home care population, as many studies confirm the high levels of caregiving-related stress that this group of individuals experience (Vanschoonlandt, Vanderfaeillie, Van Holen, De Maeyer, & Robberechts, 2013). Moreover, child behavior problems challenge caregivers to train their children daily living skills, again emphasizing the relationship between the two variables. Such evidence shows that increases in daily living skills may predict better behavioral development for children in out-of-home care as well, by lowering parenting stress and thereby facilitating children's behavioral development.

Further to the evidence on the relationship between parenting stress and behavior problems, parenting related factors such as practices and expectations during the early childhood years may be helpful for understanding developmental differences in daily living skills. For example, parent expectations with regards to taking responsibility and learning about areas of self care during the toddlerhood years (1-2 years) may provide the necessary encouragement and environment needed to develop further complex levels of self care. Parents who have greater knowledge and higher expectations about their children's development have been found to engage in parent-child interactions that optimize children's development in areas such as language acquisition (Hess, Kashiwagi, Azuma, Price, & Dickson, 1980) and cognition (Dichtelmiller, Meisels, Plunkett, Bozynski, Claflin, & Mangelsdorf, 1992). Parental expectations may be particularly salient for children in out-of-home care given that, compared to children from the general population, their caregivers have been shown to hold lower expectations for their development (Cheung, Lwin, & Jenkins, 2012). Some level of guidance is needed for children to acquire adaptive and daily living skills such as dressing, eating, and bathing. Therefore, the instruction style used by parents to interact with their children may be a particular parenting behavior that may promote or deter development in this domain of functioning. One important element of teaching is the extent to which parents provide explicit guidance of their

expectations, in contrast to making comments or asking questions that may place heavier problem-solving demands on the child. At very young ages, children at risk for developmental delays have been suggested to be best supported by highly directive styles of instruction. However, as children grow older (i.e., at preschool age), it has been found that children benefit more from completing goal directed tasks by themselves and taking social initiative, and that parents' highly directive styles of instruction may rather disrupt their development of independence. Experts infer that this occurs because continuation of such parenting does not enhance children's skills for more independent problem-solving but instead may stagnate children's development to continually look to their parents for what to do (Dieterich, Hebert, Landry, Swank, & Smith, 2004). In this light, high expectations that trust the ability of the child to perform these tasks are found to be important for the development of daily living skills. In turn, higher expectations for more capable levels of self-care may also affect children's behavior, in that caregivers who encourage and facilitate self-caring behaviors may also promote better behavior. It may also be that caregivers who encourage children to learn these skills are more likely to interact positively with children in order to encourage positive behavioral development (Trivette, Dunst, & Hamby, 2010).

Poor daily living skills have been strongly associated with other domains of development, such as academic development (Coohey, Renner, Hua, Zhang, & Whitney, 2011), but there is no research on its relationship with behavior problems thus far. Investigation of this potential protective factor may contribute knowledge in understanding further ways to facilitate the positive adaptation of children's behavior.

4.5 Neighborhood community environment

Considerable evidence indicates that neighborhood disadvantage is heavily associated with children's antisocial behavior (Burt, Klump, Gorman-Smith, & Neiderhiser, 2016; Singh & Ghandour, 2012). A number of studies have shown significant neighborhood influences on child behavioral outcomes, including mental health, youth violence, and behavioral problems (Aneshensel & Sucoff, 1996; Levanthal & Brooks-Gunn, 2000). For example, increase in intentions to engage in risky behaviors and commit

violence has been associated with exposure to violence in the neighborhood community environment (Fagan, Wright, & Pinchevsky, 2015). Living in disadvantaged neighborhoods has also been linked to risky sex behaviors and higher rates of teenage pregnancy (Wong, Twynstra, Gilliland, Cook, & Seabrook, 2020). Research indicates that certain features of the neighborhood environment, such as low collective efficacy, physical and social disorder, and exposure to violence, may increase adolescent engagement in risky behaviors and have adverse effects on their mental health (Byck, Bolland, Dick, Swann, Henry, & Mustanski, 2015).

Past research shows that the negative effects of neighborhood disadvantage on adult residents are reflected further through parenting behaviors and family functioning. Consequently, adolescents living in disadvantaged neighborhoods have been found to be more likely to experience higher levels of harsh parenting and lower levels of parental warmth, which in turn may increase their risk for externalizing and internalizing problems (Gonzales et al., 2011). Stressful and adverse life experiences, such as chronic stress due to neighborhood crime, instability, or poverty can reduce a caregiver's capacity to nurture and positively interact with the developing child (Palmer et al., 2013). Additionally, children living in lower-quality, high-crime neighborhoods are at greater risk of attending schools with deviant peers (Eamon, 2002). One study conducted in low-income, city-wide neighborhoods indicate that stressful life experiences, exposure to neighborhood violence, and pro-aggressive beliefs mediate the relationship between child aggressive behavior and economic disadvantage. Collectively, these findings indicate that the negative effects of neighborhood environments permeate to other domains of the children's lives and increases the risk of behavior problems.

It is important to analyze the influences of neighborhood environment because characteristics of the neighborhood reflects broader community and social contexts where individual variations in behavior occurs. Bronfenbrenner's (1979) ecological systems model recognizes this perspective, by providing a theoretical perspective which asserts that interactions between and within multiple levels of the context

determine developmental outcomes. Several theoretical frameworks for understanding the effects of the neighborhood on child antisocial behavior have been developed, all of which focus on social processes within the neighborhood. Jencks and Mayer (1990) highlight two such models: the ‘collective socialization model’ and the ‘epidemic (or contagion) model.’ The ‘collective socialization model’ proposes that the neighborhood influences children through community social organization and social control, including supervision and monitoring by adult neighbors. Social disorganization theorists contend that collective socialization is a fundamental mechanism whereby community context influences child antisocial behavior (Sampson, Raudenbush, & Earls, 1997). Traditionally, child development has been viewed by behavioral scientists as something that took place primarily within the family environment as parents interact with their children. On the other hand, collective socialization refers to the idea that adults in the neighborhood also have an important influence on young people who are not their children (Bursik, 1988; Coleman, 1990). Social networks that involve intergenerational interactions between adults and children are required for the effective socialization and social control of children. Parents who are involved in such social networks know not only other children and adults living in the neighborhood, but also their children’s friends and their friends’ parents. These parents know their children’s teachers and are involved in school-related activities. When such relationships are formed, it allows adults to talk about their children to each other, establish similar expectations for behavior and disciplinary strategies, and observe the behavior of each other’s children in different situations. As illustrated, residents involved in such networks assist each other in socializing and controlling the children living in the area.

The ‘epidemic (or contagion) model’ aims attention at the different ways in which behavior problems among neighborhood residents (and particularly neighborhood peers) can influence or spread to children. This model asserts that an individual’s standards about what is ‘normative’ behavior is formed through observation of the behavior of others residing within the community. Thus, behaviors such as school dropout, substance use, and premarital pregnancy will be accepted as tolerable behavior to the degree that such behavior is prevalent among the residents within the community. This indicates that early behavior

and conduct problems may be more prevalent in communities where adolescent delinquency and crime is more common (Simons, Simons, Conger, & Brody, 2004).

The ‘collective efficacy model’ described by Levanthal and Brooks-Gunn (2000) integrates the above two models but confines the mechanisms of influence to community-level (as opposed to family- or individual-level) regulatory processes and institutions. Neighborhoods with high levels of ‘collective efficacy’- demonstrated by attachment to the community, social connections between parents of interconnected youth, and norms controlling youth behavior- are more likely to be able to augment the supervisory and caregiving abilities of parents (Sampson et al., 1997). Neighborhood structural disadvantage, mainly characterized by a concentration of residential instability, poverty, and ethnic heterogeneity, weakens this neighborhood-based supervisory capacity (Sampson, Morenoff, & Earls, 1999). Aspects such as socioeconomic deprivation, crime, poor housing, and lack of social amenities, which are neighborhood features that are evidenced to affect children’s well-being, are thought to be alterable through social policies (Singh & Ghandour, 2012). Protective features of the neighborhood which are associated with fewer adolescent behavior problems, such as collective efficacy and neighborhood support, are also important (Browning, Burrington, Leventhal, & Brooks-Gunn, 2008). As such, enhancements in neighborhood community environments may be a potentially critical factor to positively impact childhood emotional and behavioral development.

4.6 Post-traumatic stress symptoms

A large body of research has demonstrated the adverse effects of childhood maltreatment and exposure to violence at home, including increased levels of externalizing and internalizing behavior problems. Violence exposure is particularly prevalent among children involved with child protective services, warranting special attention. Although many studies have documented a significant association between child behavior problems and experience of maltreatment, less research has been directed towards identifying the potential underlying mechanisms of this association. One possible mechanism underlying

the development of behavior problems may be related to experience of posttraumatic stress (PTS) symptoms because childhood traumatic experiences such as witness of intimate partner violence (IPV) and child maltreatment, may contribute to later negative developmental consequences and psychopathology, including emotional and behavioral difficulties (Hiller, Meiser-Stedman, Elliott, Banting, Halligan, 2021; Yoon, Steigerwald, Holmes, & Perzynski, 2016). PTS symptoms are one of the many consequences of violence exposure and commonly include the symptoms of intrusive thoughts, nightmares, difficulty concentrating, numbing, increased arousal, and re-experience of the traumatic event (American Psychiatric Association, 2013). Although PTS symptoms and behavior problems may co-occur, the two constructs are distinct. PTS symptoms are oftentimes linked to a particular traumatic event which leads to the fear of experiencing the same or similar negative events in the future again. PTS symptoms manifest in greater levels of aggressive and delinquent behaviors (i.e., externalizing symptoms) or anxiety and depression (i.e., internalizing symptoms), and may thus elicit behavior problems from children. Rates of PTS in children in out-of-home care are estimated to be twelve times higher than among same-age peers in the general population (Ford et al., 2007).

Analyses examining trauma are informed by the developmental psychopathology perspective (Sroufe & Rutter, 1984) and the developmental traumatology model (De Bellis, 2001). The developmental psychopathology perspective assumes that successfully achieving salient age and stage-relevant tasks is critical for children's development and adaptation over time, and that later developmental outcomes depend on foundations which are set by early life experiences (Sroufe & Rutter, 1984). According to the developmental traumatology theory, early experiences of trauma may lead to the dysregulation of biological stress response systems, which may increase behavioral and emotional problems. From this perspective, children who experience violence exposure and maltreatment may be vulnerable to experiencing failures and disruptions in achieving important developmental tasks, leading to the rise of behavior problems. This perspective also emphasizes the importance of assessing different forms of exposure to violence (e.g.,

victimization vs. witnessing), suggesting that the nature of the adverse experience affects individuals differently.

The developmental traumatology model (De Bellis, 2001) posits that PTS symptoms may mediate the relationship between behavior problems and exposure to violence. According to this model, childhood trauma can increase a child's vulnerability to PTS symptoms as well as diminish the biological stress response systems of the body. Dysregulation of these stress response systems and following PTS symptoms interrupt the child's ability to cope and sense of self-continuity, consequently leading to behavioral and emotional maladjustment. As suggested by this model, individuals who experience such severe and intense PTS symptoms face difficulties in managing these symptoms in a healthy manner; as such, they may display greater behavior problems such as aggression, depression, and hostile behavior. In line with the developmental traumatology theory, empirical research has indicated the possible influence of PTS symptoms between childhood maltreatment and later adolescent substance use (Rosenkranz, Muller, & Henderson, 2014). For example, experience of sexual abuse and physical abuse have been associated with increased risk of PTS symptoms, and in turn, PTS symptoms have been associated with substance use. However, fewer studies have examined PTS symptoms as a mechanism connecting maltreatment and behavior problems, and these studies have yielded mixed results (Yoon, Kobulsky, Yoon, & Kim, 2017). One study found a significant indirect effect of overall maltreatment on adolescent substance use via complex PTS symptoms among adolescents in need of treatment for substance use (Rosenkranz et al., 2014). On the contrary, another study found no significant indirect effect between maltreatment and substance use via PTS symptoms (Faulkner, Goldstein, & Wekerie, 2014). Among preschoolers, one study has reported that trauma symptoms mediated the relationship child maltreatment and later problem behavior (Milot, Ethier, St-Laurent, & Provost, 2010). These relationships, however, have yet to be examined in older children, shedding light on the need for more research in this area. Identifying the potential mechanisms linking child maltreatment and problem behavior is important for the prevention of behavior problems through the development of effective interventions.

4.7 Maltreatment severity

The decision to examine maltreatment severity as a specific characteristic of children's maltreatment experience has been made under the rationale that children referred to Child Protective Services often experience multiple types of maltreatment and neglect. In doing so, the Adverse Childhood Experiences (ACEs) literature has been considered. The ACE study, a collaborative project between Kaiser Permanente and the US Centers for Disease Control and Prevention, retrospectively examines the long-term effect of adverse experiences that may cause stress, such as childhood household dysfunction, abuse, and neglect (Felitti, Anda, Nordenberg, Williamson, Spitz, Edwards, & Marks, 1998). This study found that larger numbers of adverse experiences and stressors experienced early in life were associated with unhealthy behavior, risk-taking lifestyles, and disease later in life, suggesting that cumulative stress, or allostatic load, can have lifetime effects on health and well-being. Allostatic load was measured as an ordinal scale which ranged from 0 to 7, with higher numbers indicating more exposure to adversity. The 7 categories for this scale were: experience of (1) sexual, (2) physical, or (3) psychological abuse; living environment with a (4) substance abuser, (5) someone who is suicidal or mentally ill, or (6) has ever been imprisoned; and (7) experience of intimate partner violence. An aggregate number of these experiences were then taken as a measure for allostatic load. This ordinal measure was then entered in a logistic regression model as an independent variable to examine for the presence of disease condition or risk factor (severe obesity, physical inactivity, smoking, depressed mood, and suicide attempts). Results of these models found that with each increase of adverse event experienced by the child, risk and prevalence for each risk factor or disease condition increased as well. Subsequent research has demonstrated the significant link between ACEs and neurobiological changes, as well as both functional and structural alterations in the brain (Hoft & Haddad, 2017). A dose-response relationship between ACEs and negative health/well-being outcomes (e.g., depression, alcoholism/alcohol abuse, heart disease, illicit drug use, and sexually transmitted infections) was found across the life course, indicating that greater numbers of ACEs was related to greater adverse development and health outcomes (Freeman, 2014). In this light, research has

recently begun to examine developmental periods of childhood adversity as potentially important factors for understanding mechanisms and trajectories of chronicity and timing, through which childhood experiences influence adult development (Dunn, McLaughlin, Slopen, Rosand, & Smoller, 2013). However, there is little consensus on whether worse outcomes are associated with earlier or later exposure. Early exposure to maltreatment may be more harmful compared to later exposure to maltreatment because it can deter the child's capacity to meet earlier developmental milestones, and in turn, compromise the child's ability to successfully achieve later stage-salient developmental tasks such as self-regulation skills and secure attachments. From the viewpoint of developmental neuroscience, adverse life experiences that occur early in life may also be more harmful because early childhood is when the foundation of neurobiological systems and brain architecture involved in reward processing, stress response, and arousal regulation are being erected. Early exposure to maltreatment may interfere with typical processes of brain development by disrupting the building of neural circuits, and in turn increasing the risk for an array of mental health and behavior problems. On the contrary, later exposures to maltreatment (e.g., maltreatment during adolescence) may be more deleterious because the cognitive skills to conceptualize experience of maltreatment have been developed among adolescents. Moreover, physiological stress response systems undergo substantial change during adolescence, potentially intensifying the adverse effects of abuse and neglect on mental health. Identifying periods during which exposure to adverse experiences might be followed by heightened vulnerability for negative outcomes may aid the identification of windows of time when the brain responds especially sensitive to environmental stimulus, referred to as 'sensitive periods' of development. Although there is much evidence on the existence of sensitive periods for the visual and auditory systems (Buran, Sarro, Manno, Kang, Caras, Sanes, 2014; Olitsky, Nelson, & Brooks, 2002), less information is available on the presence of sensitive periods for socioemotional and behavioral development. Identifying sensitive periods for children's socioemotional and behavioral development could have immense implications, providing insights into biological pathways that are significant to development, and

highlighting developmental windows and points when interventions could be most effective in reducing children's risk for psychopathology and minimizing the effects of maltreatment.

Multiple ACEs in early childhood have been linked to maladjusted social-emotional development (Freeman, 2014), increased risk of polyvictimization across childhood (Dovran et al., 2019), below-average academic literacy skills (Jimenez, Wade, Lin, Morrow, & Reichman, 2016), as well as increased rates of Post-Traumatic Stress Disorders (PTSD; Brockie, Dana-Sacco, Wallen, Wilcox, & Campbell, 2015) in adulthood. Despite heightened vulnerability to a range of psychopathologic difficulties, some maltreated children show remarkable resilience, which is one of the reasons there exists inconsistencies in the literature on the correlates of maltreatment (Henry, 2002). Although it is the grand consensus in the field that maltreatment during childhood is related to maladjustment and adaptability, how maltreatment is conceptualized matters. Factors such as the severity and type of maltreatment experience, the age and developmental stage at which the experience has occurred, and the recency of the event are all likely important factors of the impact of maltreatment and may be responsible for inconsistencies (Doom, Cicchetti, & Rogosch, 2014). The field has conceptualized maltreatment within empirical research studies through various options, sometimes as the types of experiences, the severity of events, the frequency of exposures, and sometimes, a combination of all three (English, Bangdiwala, & Runyan, 2005). As maltreatment experience can vary in both frequency and severity within the same individual's life history, the absence of a consistent measure of the construct may result in some discrepancy within the field (English et al., 2005). That is, it is unclear what is the best method to conceptualize maltreatment as a construct in research so that prior experiences of maladjustment can be predictable and clear. Of the three main methods of measuring experience of abuse (type, frequency, and severity), severity of the maltreatment incident is agreed by many researchers as an appropriate measure for sensitive conceptualization of maltreatment (Jackson, Gabrielli, Fleming, Tunno, & Makaniu, 2014). Researchers constantly demonstrate that events that are more intrusive, or that leaves lasting injury or disability, are considered more severe compared to events that leave time-limited effects (e.g., acts that result in impaired physical functioning or physical scars

vs. acts that leave minor bruises or cuts) (Charak & Koot, 2015). As such, maltreatment severity has been included for examination with the aim to shed more clarity on the relationship between specifically-defined characteristics of maltreatment and later problem behavior outcomes.

4.8 Summary of the chapter

This chapter consists of the rationale and literature review for Study 2. First, the rationale and contribution of Study 2 in light of the findings from Study 1 are described. Based on the findings of Study 1, Study 2 conducts secondary data analysis on 513 children who have been in long-term out-of-home care in the United States. The analysis investigates whether there are risk and protective variables for problem behavior outcomes. As such, the aims of Study 2 (Chapters 4 to 7) were to examine whether and how different factors affect the onset and change of problem behavior trajectories. In particular, the effects of socioemotional skills on problem behavior outcomes were examined. Chapter 4 thus presents a review of the existing literature on the variables that will be tested as potential risk and protective factors in the later statistical analyses, including type of caregiver, age at initial placement, daily living skills (self-care abilities), school engagement, neighborhood community environment, post traumatic stress symptoms, caregiver involvement, characteristics of maltreatment, and socioemotional competence.

Chapter 5. Methodology for Study Two

5.1 Data source for Study Two: Background to the National Survey of Child and Adolescent Well-Being (NSCAW I)

Study 2 of this thesis uses longitudinal data from the National Survey of Child and Adolescent Well-Being (NSCAW) I, which is a US national survey that covers a three-year time period. When the NSCAW was conceived in 1997, researchers sought to determine whether children and families who were involved in child maltreatment investigations were having their needs met by the United States child welfare system (Dowd et al., 2008). At the time, improvements and policy development to child welfare practices were hindered by a lack of available data on children's development and well-being. Measures related to child and family well-being are examined in detail in the NSCAW dataset. NSCAW developers aimed to connect these outcome variables to experiences with the child welfare system as well as other contextual and environmental factors (i.e., family characteristics, neighborhood community environment, etc.). The NSCAW has been designed with the intention to answer the following questions: 'What factors affect investigation, placements, services, and length of involvement in the child welfare system?' 'What are the different pathways that children follow into and through the child welfare system?' and 'What are the long- and short-term child welfare system-related outcomes (e.g., well-being, safety, permanency) for children and families?'

For the NSCAW I, children aged 0 to 14 years were selected into the sample at baseline (Wave 1) and were followed over time. Data was then collected again 18 months after baseline (Wave 3), then 36 months after baseline again (Wave 4). Wave 2 measures did not include the Wave 1 and Wave 3 comparable measures of functioning and well-being, and therefore will not be considered as a wave of data collection in the longitudinal analyses presented in this study. As such, information from Waves 1, 3, and 4 has been used in this thesis to observe the longitudinal development of problem behavior over time. To avoid confusion, this thesis will now refer to these three waves as Time 1, 2, and 3 from this point forward.

The NSCAW I cohort includes a total of 6,228 children at the time of sampling. These children were comprised of two mutually exclusive groups, the CPS sample and the LTFC sample. Of the two groups, the current study will be working with data from the LTFC sample. Below are the distinctions between the two samples:

- CPS sample: The CPS (Child Protective Services) sample comprises of 5,501 children who were investigated by Child Protective Services for abuse or neglect during the sampling period (October 1999- December 2000).
- LTFC sample: The LTFC (Long-Term Foster Care) sample comprises of 727 children who were investigated by Child Protective Services for abuse or neglect, and in addition, who have been in out-of-home care for approximately one year (ranging between 8 and 18 months) during the sampling period (December 1999- February 2000).

The decision to utilize the NSCAW dataset has been made for three main reasons. First, the dataset includes information on behavior problems, socioemotional skills, and many other risk and protective variables that are key in the child welfare literature, which is required to answer the research questions of this thesis. Second, the dataset allowed for longitudinal analysis to be carried out, which is essential in order to identify risk and protective factors. A longitudinal research design is also required for demonstrating change in behavior over time, and is needed to meet one of the core conditions for inferring a causal connection between two variables (see Chapter 7 Section 7.4 for a discussion on making causal conclusions between variables). Third, the NSCAW data offers a large enough sample size of children with out-of-home care experience required for sufficient statistical power of the models. Before settling on the NSCAW, many existing datasets including administrative data in the UK, Finland, Australia, and the US have been explored. These datasets were considered inadequate for the aims of this thesis, due to reasons such as small sample size and lack of information on problem behavior variables or reasons for out-of-home care entry. Overall, the NSCAW dataset was the only source of data that provided the required information and which

allowed access to a researcher as myself (see *Appendix C* for details of other datasets that have been considered).

5.2 Ethics

The University of Oxford does not require ethical approval when conducting secondary data analysis with datasets that have no identifying information on participants (CUREC, 2021). However, because of the sensitive nature of the data and its participants, ethical approval was sought from the Department of Education Departmental Ethics Committee (DREC) at the University of Oxford. In addition, ethical approval was obtained from the National Data Archive on Child Abuse and Neglect (NDACAN) team, who own the data (application available upon request). The submitted ethical application included information about how the data would be stored and analyzed, and how the findings would be communicated. Specifically, the application stated that the data would be stored on a device located in a private, locked space that is only accessible by at most myself and my supervisors. Such measures were taken in order to ensure that the data would be handled in a safe and ethical way. The CUREC application submitted to gain ethical approval is presented *Appendix D*.

5.3 Sampling strategy of the NSCAW

In this section, I set out some background to the NSCAW, before moving on to discussing the specific methodology relevant to Study 2. In doing so, I describe the types of research which have already been carried out using the NSCAW data, and also discuss the sampling framework used during the data collection process. Data from the NSCAW has been used in more than 500 publications, significantly expanding a body of rigorous and empirically based research that barely existed before 1997. Findings from these studies have documented the high rates of behavioral and developmental problems among children who have been reported for child maltreatment, as well as service needs and gaps in obtaining them. Reports and publications produced using the NSCAW data illuminated issues such as the high rates of intimate partner violence and the prevalence of polypharmacy- the use of multiple psychotropic medications- among children and families living in out-of-home care and involved with the child welfare system (Lacasse, Dunleavy, &

Hughes, 2021; Ogbonnaya, Finno-Velasquez, & Kohl, 2015). This information has been used by child welfare experts and professionals to broaden their focus from children's basic safety to a more holistic perspective that includes the child's well-being, including developmental needs as well as physical and mental health. Further information about the NSCAW can be found [here](#).

After receiving access into the NSCAW dataset, a first step before starting on the analysis was familiarizing myself with the data and the associated documentation, liaising with the NDACAN team, and attending the Summer Research Institute (SRI; <https://www.ndacan.acf.hhs.gov/summer-institute/sri-general-information.cfm>) to work with and receive statistical and computational help from the NDACAN staff and consultants to refine analysis plans and resolve technical problems. One of the most critical aspects of the dataset was understanding the sampling strategy and the relevant implications of it. Strictly speaking, the target population of the NSCAW sample are "all children in the US who are subjects of child abuse or neglect investigations (or assessments) conducted by CPS and who live in states not requiring agency first contact" (Dowd et al., 2008, pg. 2-1) (See *Appendix E* for further information). Although the actual target population is as stated, many researchers who use the NSCAW data have and will make inferences in the context of the entire child welfare population in the United States. However, inferences made from the analysis of the NSCAW data should not include child welfare populations of states that require agency first contact. For such researchers who wish to make inferences at the national level, the removal of children in these agency-first-contact states is a cause for non-coverage bias. A frame non-coverage bias occurs when groups in a target population are not included in the sampling frame and are therefore not selected (Yansaneh, 2003). Nonetheless, the child welfare population in these agency-first contact states is not greater than 5.2%, and NSCAW developers expect that the bias resulting from this exclusion is disregardable, with analyses still likely to be unbiased to generalize to the entire US population of child-welfare involved children (Dowd et al., 2008). Even so, the conclusions which have been made in light of the findings of this study have been done conservatively, and have been interpreted in light of these limitations.

To assess the extent of the non-coverage bias, the NSCAW researchers used data available on the 1999 National Child Abuse and Neglect Data System (NCANDS) Detailed Case Data Component (DCDC). Based on these assessments, it was concluded that the non-coverage error did not result in bias for the estimates of the analyses made. However, the NSCAW team nevertheless created complex sample weights for data analyzers to adjust for minor residual effects of under-coverage bias: a weight for analyses at the national level and a weight for analyses at the stratum level. A fuller description on sampling bias with a more exhaustive methodological discussion of these weights can be found in *Appendix E*. As stated again later in Section 5.5, all analyses have been conducted with the appropriate sample weight.

5.4 Strengths of the NSCAW dataset

The NSCAW is a nationally representative longitudinal dataset surveying children and families in the child welfare system. The data has widely been used to learn about the well-being and development, social care services and needs, and the environmental context experienced by children and families involved with the child welfare system. In this section, I describe the significant strengths of the NSCAW dataset.

First of all, the NSCAW contains rich information about children who have had contact with child protective services (in-home support) as well as involvement in out-of-home care (Dowd et al., 2008). The NSCAW has been designed with the aims to understand characteristics of children and families, their life experiences both within and outside the child welfare system, and their developmental outcomes. Developmental outcomes pertain to multiple areas of well-being, including domains of physical health, academic and cognitive functioning, social development, and behavioral and mental adjustment. These elements can then be viewed in the context of children's prior experience, caregiver characteristics, developmental stage, social service use, and community environment. By engaging these various aspects, the NSCAW data provides opportunities to understand how children's well-being is affected by child, caregiver, community, and service factors. The NSCAW dataset provides a large volume of data that is more cost effective and unlikely to be feasible to collect in primary research for a doctoral thesis. It has also

allowed longitudinal analysis with a relatively large sample possible, which is necessary for understanding patterns of change (Hoffman, 2015).

A second strength of the NSCAW is that the dataset was developed in collaboration between researchers and practitioners of expertise in the field. Experts on child and youth development, child welfare agencies and systems, social welfare policies, and other areas met regularly to provide consultation in areas of research and policy issues, research design and methods, and priorities and plans for analysis and the dissemination of results. They also took part in other study activities such as the development of survey instrument and sample design. A well-planned and research-based data collection process is critical, because improperly collected data cannot be balanced out by statistical analyses (Bullock, Harlow, & Mulaik, 1994; Pearl, 2012). The approach and selection of population sample are all important aspects of data collection (Kelley, Clark, Brown, & Sitzia, 2003). The collaboration of specialists from various areas of expertise allowed the design and data collection process of the NSCAW to be based on research and professional background.

Lastly, standardized and validated instruments, questionnaires, and assessments have been utilized whenever possible. Validated instruments are necessary in order to establish, at baseline, the extent of a problem and measure any changes at the end of the intervention in order to evaluate the impact. Validated instruments are essentially, screening questionnaires which have been psychometrically tested for reliability; that is, they measure what they claim to measure and are sufficiently sensitive to produce test results reflecting the true state of affairs; for example, the instrument score indicates poor mental health and the subject independently reports poor mental health (Spratt, Swords, & Vilda, 2021). The NSCAW instruments were chosen carefully to accurately measure the constructs that have been identified as core interests guiding the study. In addition, all instruments delivered to the children and caregivers have been computerized so that assessments could be carried out both reliably and consistently.

5.5 Limitations of the NSCAW dataset

There are also some limitations of the NSCAW that should be considered. One limitation for the purposes of this thesis is the wide age range of the included sample. To illustrate, the ages of the included sample ranged from 3 to 16 years old at baseline. Typical and atypical development of behavior problems, as well as predictors of behavior problems, vary depending on the age of the child (Caspi, Henry, McGee, Moffitt, & Silva, 1995; Hastings, Zahn-Waxler, Robinson, Usher, & Bridges, 2000; Shaw, Owens, Vondra, Keenan, & Winslow, 1996). If a single trajectory is modeled for this entire sample group as a whole, strong assumptions regarding the equivalence of the model parameters across the whole sample are made. If a single-group model is fitted to a pooled sample, the parameters of this trajectory model is explicitly assumed to be precisely equal for children in all age groups. Based on the large evidence base which establishes that these assumptions may be clearly questionable (e.g., Galera et al., 2011; Marcal, 2020; Miner & Clarke-Stewart, 2008; Van Der Geest, Blokland, & Bijleveld, 2009), the age distribution at baseline for the included sample has been deemed inappropriate to model and generalize as a single trajectory of developmental growth. As such, simultaneous estimation of behavioral trajectories have been modelled across three groups in what are called multiple-group growth models where the sample was divided into three groups of a narrower age range (see Section 5.8.1 for further information). As the LTFC sample size is considerably smaller compared to the CPS sample (see Section 5.1), having to reduce this even further is a limitation related to model estimation and statistical power. The methodology literature recommends a sample size of approximately 200 participants to sufficiently power growth models, but also reports that samples as small as 22 have also been successfully fit (Huttenlocher, Haight, Bryk, Seltzer, & Lyons, 1991). However, a small sample may contain limitations beyond statistical power, such as issues related to generalizability and representativity. Such discussions are made in Chapter 7, Section 7.5.

A second limitation is the availability of only three points of data. Multiple time points of data that measure the same variable of interest (in the case of this thesis, behavior problems) allow identification of the changes in behavior problem levels, patterns over time, and the possibility to identify factors that are associated with changes (Stoolmiller, 1995). Growth models require at least three points of data to model

longitudinal change over time (Curran, Obeidat, & Losardo, 2010). The NSCAW I LTFC data consists of a total of three usable data collection points that span across a time frame of three years in total, with 18 months between each subsequent time point. Additional time points available further down the future may have been useful for examining whether risk and protective factors have lasting effects beyond the 3-year period. Time points that are smaller spaced may have also revealed a more precise trajectory of problem behavior, which would be helpful in identifying more heterogeneous patterns of inclines and declines over time.

Thirdly, multiple respondents have been surveyed for each child in the NSCAW dataset, but have not been utilized in this thesis. Multiple respondents help the further understanding of a phenomenon, by providing viewpoints of children that may be encountered in varying circumstances and environments (Simmel, Lee, Kim, & Miles, 2014). A maximum of five respondents have been interviewed for each child: the current caregiver (the biological parent, another responsible adult, or the out-of-home caregiver), the child welfare worker, the child, the child's teacher, and the former caregiver. In regards to caregiver information, an additional limitation is that any changes in caregivers between the 18-month period of each data collection point is unknown (see Section 7.3.1 for further information on missing variables of interest). Interviews by teachers are only available when the child is of school-age. For this thesis, measures with the least amount of missingness have been utilized even when other respondents were available. The exclusion of other respondents warrants exploration of the 'trade off' between exclusion due to missingness and the potential limitations of not including data about the other respondents' views.

Lastly, the NSCAW may be subject to bias related to data non-coverage due to the sample design (refer to Section 5.3 and *Appendix E* for an in-depth description of this sampling strategy as well as its implications). The NSCAW sampling frame aimed to select and represent all children in the US who have been investigated by child protective services as a victim of child abuse or neglect. Coverage adjustments were made by the NSCAW staff to account for these missing sampling components and unequal sampling

probabilities. As a result, the data contains complex sample weights for analyzing data while adjusting for minor residual effects of under-coverage bias. The correct weight in line with the NSCAW data guidelines has been carefully chosen for all analyses of this thesis, in order to avoid biased parameter estimation. Moreover, inferences and generalizations have been made in light of these limitations in subsequent chapters.

5.5.1 Missing data

Although not an exclusive limitation related specifically to the NSCAW dataset, missing data and attrition are prevalent concerns with secondary and longitudinal data analysis. Given that missing data can bias findings and inferences, it is critical to recognize patterns and mechanisms of missing data (Enders, 2010). As such, preliminary missing data analyses have been conducted to understand this and to compare whether there were any key differences between the included and excluded sample.

Several considerations have been made to address missing data (Enders, 2010). Listwise deletion excludes all missing data, causing diminished sample size and statistical power (Field, 2009). Single imputation does not accurately address the potential bias caused by the missing data (Enders, 2010). Multiple imputation underestimates the standard error, increases estimate bias, and may thus misrepresent small effect sizes, an error common in social sciences (Larsen, 2011). Given the shortcomings of these other approaches, they were not determined to be suitable for this thesis. The MLR estimator produces robust standard errors and chi-square tests for missing data with non-normal and non-independent observations (Muthen & Muthen, 1998-2010). The analyses of Study 2 thus utilize the MLR estimator to treat missing data.

In relevance to such issues, establishing power and identifying an adequate sample size in longitudinal SEM is complex. Statistical power refers to the ability to reject a false null hypothesis; in other words, it is the ability to not make a Type II error (Wolf, Harrington, Clark, & Miller, 2013). If models are

not sufficiently powered, non-significant effects may not be reliable. Power depends on (a) the sample size, (b) the magnitude of the effect of interest, and (c) the chosen alpha level (by convention, typically $\alpha=.05$).

Researchers' evaluation of sample size acceptability is often by considering well-cited 'rules of thumb' - and sample size recommendations based on these rules vary. Some recommendations base the number of cases needed on factors such as number of variables included in a model (e.g., 10 cases per variable; Nunnally & Bernstein, 1967), a ratio of cases needed per estimated parameter (e.g., 5 or 10 observations per parameter; Bollen, 1989), or minimum sample size number (e.g., 100 or 200 cases; Boomsma, 1982). As will be discussed in detail later in Section 5.8, this thesis utilizes latent growth modeling (LGM) within the structural equation modeling (SEM) framework to analyze changes in behavior problems over time (Bollen & Curran, 2006). A simulation study (Shi, DiStefano, Zheng, Liu, & Jiang, 2021) investigating the performance of robust-ML estimators to fit an LGM with non-normal data when the sample size is very small ($N \leq 100$) and missing data were present found that MLR illustrated optimal performance as illustrated by smaller amounts of biases in standard errors and acceptable parameter coverage for most of the study conditions. In terms of the goodness of fit indices (which will be discussed later in Section 5.9 of this thesis), CFI, RMSEA, and SRMR exhibited worse fit as sample size decreased. This study recommended that researchers be cautious in studies where the sample size is less than 100, in rejecting the LGM solely based on SRMR. For all three fit indices, the empirical rejection rates based on the conventional sample cutoffs are generally inflated, implying that researchers tend to reject the correctly specified model too often, even when N reaches 100 (Shi et al., 2021). While experts do not advocate for collecting small sample sizes, this situation is sometimes unavoidable depending on the characteristics under study (Shi et al., 2021). Experts and statisticians argue that since LGM is a restricted SEM model (i.e., the latent variables are used to simply model the random effects), small sample LGM models used in combination with robust ML estimation yielded accurate standard errors and parameter coverage. As the sample size of each subgroup ranged from $N=130$ to 200 in the analyses of this thesis, it was deemed appropriate for the purposes of the analyses of this thesis.

Overall, the benefits of the NSCAW dataset outweigh the limitations of the dataset. The national scale of the NSCAW, its breadth and reliability of the included measures, and longitudinal nature were characteristics that could not be simultaneously found with any other dataset. Moreover, all datasets exist with their limitations. The limitations of the NSCAW were possible to be worked around, and in the instance that it could not be, the limitations were recognized and generalizations were made cautiously at the appropriate level according to such limitations. As such, it was concluded that there was evident added value from analyzing the NSCAW dataset for this thesis.

5.6 Analytic sample

The analytic sample includes 513 children. From the total of 727 children in the NSCAW long-term foster care data, 214 children have been excluded because they were missing at least one data point of information for the problem behavior measure. As one of the main focuses of this thesis is to understand the longitudinal trajectories of problem behavior, it was important for children to have information on all three points of data collection. (To clarify, children did not need to be in long-term out-of-home care for all three time points to be sampled for the NSCAW LTFC study. Rather, they were in a long-term placement for 8 to 18 months at the time of sampling but not necessarily during the entirety of the three data collection time points. Limitations associated with the oscillation in and out of care during the data collection period is discussed in Chapter 7, Section 7.3.1.) As mentioned in Section 5.5.1, a missing data analysis has been carried out and is presented in Table 7 below. An Independent two-samples *t*-test has been conducted to compare the excluded and included sample on key variables at Time 1 to observe whether and how these two groups differed. Chi-square statistics were produced for categorical variables and *t*-statistics were produced for continuous variables.

Table 7. Independent two-samples *t*-test of the included vs. excluded sample on key variables at Time 1

Source	<i>t</i>	χ^2	Included sample mean(SE)/%(SE)	Excluded sample mean(SE)/%(SE)
Child age	27.60***		8.75 (0.23)	1.66 (0.11)
Age at initial placement	16.04***		7.41 (0.25)	1.43 (0.23)
Behavior problems	4.73***		58.12 (1.01)	50.41 (1.98)
Neighborhood Community Environment	0.56		12.46 (0.22)	12.23 (0.39)
Time (in years) with T1 caregiver	7.03***		2.48 (0.19)	1.14 (0.06)
Daily Living Skills	2.91**		89.82 (1.87)	84.46 (1.21)
Post-traumatic stress	2.06*		48.53 (0.98)	42.60 (2.63)
Caregiver involvement	1.68		3.23 (0.09)	2.86 (0.21)
School engagement	-0.54		35.00 (0.33)	36.77 (3.22)
Female gender		0.10	50.9% (3.7%)	49.57% (4.9%)
Out-of-home care setting		12.51**	71.9% (2.9%)	85.10% (0.03%)
Incident of minor abuse in the past year		0.77	30.0% (5.4%)	16.6% (16.7%)
Incident of severe abuse in the past year		1.58	16.46% (3.4%)	-
Incident of very severe abuse in the past year		0.89	8.88% (2.7%)	-
Self-control	-		-	-
Cooperation	-		-	-
Assertion	-		-	-
Responsibility	-		-	-

Note: * $p < .05$, ** $p < .01$, *** $p < .001$

As shown in Table 7, there was a statistically significant difference between the children's age in the included and excluded sample. Such a difference, where the excluded sample was much younger, was expected, since the excluded sample was omitted based on missing problem behavior data. The Child Behavior Checklist (CBCL), which was used to measure problem behavior, has been administered to children ages 3 years and older in the NSCAW. As such, all children that were younger than 3 years were not administered the CBCL and was therefore excluded from the analytic sample of this thesis, resulting in

the excluded sample having a relatively very young average age of 1.66 years. Only 5 children in the excluded sample were not excluded based on this restriction and simply had one or more missing values on the CBCL. As such, for the measures that were only administered to older children according to the interview protocol (see Section 5.7 and *Appendix F* for more information on measures), there were less than 5 children in the excluded sample to make mean comparisons. The measures that were administered to only a limited age range were: behavior problems, post-traumatic stress, caregiver involvement, school engagement, self-control, cooperation, assertion, responsibility, and incident of abuse variables. For these measures, less than 5 children had scores in the excluded sample to compare with scores of the included sample. As such, it was determined that these differences could generally be disregarded.

As for the other measures that yielded significant differences, these could be explained by the age of the included and excluded sample as well. To specify, age at initial placement and time with the current caregiver is significantly younger and shorter for the excluded sample, which is expected since the age of the excluded sample is much younger as well. Likewise, daily living skills scores are significantly lower for the excluded sample. This is again expected since daily living skills refer to abilities regarding self-care such as being able to dress and feed oneself. These skills are expected to be more developed in the older population, reflecting the results of the sample comparison results. Lastly, a significantly larger percentage of children in the excluded sample were placed in out-of-home care compared to the included sample. Again, younger children are reported to be overrepresented in the out-of-home care population, which may explain such results (Child Welfare Information Gateway, 2020).

After deciding on the final sample, it was noted that the included sample were of a wide age range. As typical behavioral development is known to be different for children at particular developmental stages and ages, the sample was divided into three groups based on age: early childhood (3-5 years, $n=130$), middle childhood (6-10 years, $n=200$), and adolescence (11-16 years, $n=183$). This decision is based on the research literature (dividing the database into three age-appropriate developmental periods; (e.g., Grogan-Kaylor et

al., 2008; Wall & Barth, 2005; Yoon et al., 2017), as well as statistical constraints (having a large enough sample size in each group for SEM (Structural Equation Modeling) models to converge without error). A limitation of this approach is the small number of cases in the model after subdividing the data by age groups. The current study has an adequate sample size per each age group, but a larger sample is ideal to sufficiently expand the growth model to include possible predictors of onset and growth (Diallo & Morin, 2015). A strength of this model is being able to see whether the relationship with common variables differ for each age group. Moreover, a wider range of variables can be tested when the sample is divided into smaller age groups, because the interview protocol varied considerably depending on the age of the child. An outline of the interview protocol is included in *Appendix F*.

The above sections described the secondary dataset which will be used for analysis and the analytic sample at depth. Before moving on to the measures that will be used in the analysis and modeling of Study 2, Figure 4 below provides a summary of the key points about the included sample.

Figure 4. Summary of the included sample

- The NSCAW dataset is a nationally representative US panel dataset.
- 513 children who were subjects of child abuse or neglect investigations conducted by Child Protective Services and who had been in out-of-home care for approximately one year at the time of sampling were included for analysis.
- To be included for analysis, children had to have information on problem behavior at all three data collection points.
- The included sample were between the ages of 3 and 16 at baseline.
- The sample was divided into three groups based on age and developmental stage: early childhood (3-5 years), middle childhood (6-10 years), and adolescence (11-16 years).

5.7 Dependent and independent variables

The sections below provide information about the variables that have been used in the main analyses. The full details and coding for each variable are in *Appendix G*. A full review of past research on the relationship between the independent and dependent variables can be found in the literature review chapter (Chapter 4) of the thesis. Again, there are limitations to the quality of the measures. Data reported by

caregivers and social workers are likely to contain errors related to recall bias, in particular administrative information regarding age at first entry into out-of-home care (Brook, Akin, Lloyd, Bhattarai, & McDonald, 2016). I reflect on the implications of these limitations in the discussion chapter (Chapter 7) which addresses the limitations of the study. How the following variables are modelled for this study can be found below in Section 5.8.

5.7.1 Dependent variable: Problem behavior

The dependent variable of this thesis is problem behavior, which was measured using the Child Behavior Checklist (CBCL; Achenbach, 1991). The CBCL is a questionnaire used to measure the level of behavioral difficulties among children between the ages of 2 to 18. It is composed of 100 items for 2- to 3-year-olds and 113 items for 4- to 18-year-olds. The checklist consists of statements about the child (e.g. “argues a lot,” “acts too young for his/her age”). Each item is measured on a 3-point Likert scale (0= not true, 1= somewhat or sometimes true, and 2= very true or often true). In the NSCAW, the CBCL was administered to children who were 3 years and older. The measure has eight different scales: anxious/depressed, withdrawn/depressed, somatic complaints, social problems, thought problems, attention problems, rule-breaking behavior, and aggressive behavior. The measure also contains a scale for Internalizing symptoms, Externalizing symptoms, and Total Problem behavior. This thesis utilizes the Total Problem behavior scale to measure the dependent variable of problem behavior over time. The CBCL scale is also associated with disorders from the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV-TR; American Psychiatric Association, 1994), and has proven to have high reliability with real psychological diagnoses (Warnick, Bracken, & Kasl, 2008). For the CBCL Total Problems scales, scores 60 to 63 (approximately 83rd to 90th percentiles) are considered borderline clinically significant, and scores greater than or equal to 64 are considered clinically significant behavior problems (Loe, Heller, & Chatav,

2019). The CBCL has been completed by the child, caregiver, and teacher. This thesis utilizes reports completed by the caregiver, because it has by far the highest rate of completion⁷.

5.7.2 Independent variables

5.7.2.1 Socioemotional skills

Socioemotional skills have been measured with four subscales of the Social Skills Rating System (SSRS) (Gresham & Elliott, 1990). Namely, these subscales are cooperation, assertion, responsibility, and self-control. The NSCAW contains caregiver and teacher reports of the measure. This thesis again utilizes the caregiver report because it has the least amount of missingness⁸. The questionnaire consists of statements about the child (e.g. “Controls temper in conflict with caregiver,” “Follows household rules,” “Asks permission before using another family member’s property”). Each subscale consists of 10 items, with each item being measured on a 3-point Likert scale (1=never, 2=sometimes, 3=very often).

5.7.2.2 Daily living skills

Daily living skills indicate skills related to personal development (how the child eats and dresses), community development (how the child spends his or her time, telephone skills), and domestic skills (how the child carries out household jobs), and has been measured with the Daily Living Skills subscale within the larger Vineland Adaptive Behavior (VABS) scale (Sparrow, Balla, & Cicchetti, 1984) (e.g. “How is the child with asking to use the toilet?” (0=Toilet training has not yet begun for the child; 1=Child asks to use the toilet or goes on his/her own about half of the time; 2=Child always asks to use the toilet or goes on

⁷ The teacher report of the CBCL Total Problems scale had a completion rate of 22.6% for the full LTFC sample (77.4% missingness). The Youth Self-report of the CBCL Total Problems scale had a completion rate of 25.9% for the entire LTFC sample (74.1% missingness). Lastly, the caregiver report of the CBCL Total Problems scale had a completion rate of 82.4% for the entire LTFC sample (17.6% missingness).

⁸ The teacher report of the SSRS scale had a completion rate of 22.9% for the entire LTFC sample (77.1% missingness). The caregiver report of the SSRS scale had a completion rate of 70.6% for the entire LTFC sample (29.4% missingness).

his/her own initiative). This measure consists of 45 items, with each item being on a 3-point Likert scale which ranged from 0 to 2.

5.7.2.3 Age at initial placement

Age at initial placement refers to children's age at his or her first ever entry to out-of-home placement. This measure has been derived by leveraging three variables from the existing NSCAW dataset (investigation end date (for the report that admitted the children into the study), the child's age in years, and the date of the first reported out-of-home placement).

5.7.2.4 School engagement

School engagement has been measured by the School Engagement scale that was developed by the US Department of Education, Office of the Under Secretary as part of the initiation of the Drug-Free Schools and Community Act (Dowd et al., 2008). The scale is comprised of a total of 11 items that indicate degree of school engagement (e.g. "How often do you enjoy being in school," "How often do you get sent to the office or have to stay after school because you misbehaved"), and each item is measured on a 4-point Likert scale (1=never, 2=sometimes, 3=often, 4=almost always).

5.7.2.5 Neighborhood community environment

Neighborhood community environment is measured using the abridged community environment scale that was developed by Abt Associates to measure neighborhood disadvantage. Neighborhood disadvantage is generally characterized by high levels of poverty, high crime rates, low levels of employment, and less community organization (Gonzales et al., 2011). The scale is comprised of a total of 9 items that indicate characteristics within the neighborhood context (e.g. "Unsupervised children," "Assaults and muggings"). Each item is measured on a 3-point Likert scale (1=not a problem at all, 2=somewhat of a problem, 3=a big problem), and higher scores indicate more disadvantage in the neighborhood context.

5.7.2.6 Post-traumatic stress symptoms

Post-traumatic stress symptoms are measured with the self-reported measure of the Trauma Symptom Checklist for Children (TSCC) (Briere, 1996). The TSCC has been standardized and normed by age and gender, and shows satisfactory reliability and validity within the NSCAW data⁹. The TSCC contains 54 items (e.g. “Desire to physically hurt yourself,” “Flashbacks (sudden, vivid, distracting memories),” “Unnecessary or over-frequent washing”), which result in six clinical scales (Anxiety, Depression, Post-traumatic Stress, Dissociation, Anger, and Sexual Concerns). Each item is measured on a 4-point Likert scale (0=never, 1=sometimes, 2=lots of times, 3=almost all the time). For each of these clinical scales, *t*-scores that are above or equal to 65 are considered clinically significant. This thesis uses the Post-Traumatic Stress score.

5.7.2.7 Incident of abuse (Minor abuse, severe abuse, very severe abuse)

Incident of violence is measured with the Conflicts Tactics Scale-Parent Child version (CTS-PC) (Straus, Hamby, Finkelhor, Moore, & Runyoun, 1998). This measure is comprised of three scales: the Non-Violent Discipline scale, the Psychological Aggression scale, and the Physical abuse scale. This thesis uses three subscales from the Physical abuse scale: the minor physical abuse (corporal punishment) (e.g., “Caregiver shook child,” “Caregiver spanked child with hands”), severe physical abuse (e.g., “Caregiver hit/kicked child,” “Caregiver slapped child on face”), and very severe physical abuse (e.g., “Caregiver choked child,” “Caregiver hit child repeatedly”) subscales. These variables measure incident of the abuse in the past year with a score of 1 assigned if the incident has occurred, and a score of 0 if the incident has not occurred.

5.7.2.8 Caregiver type

Caregiver type (0=permanent caregiver, 1=out-of-home care setting) is a derived measure in the NSCAW dataset, and is a binary measure which indicates whether the child was currently residing with a

⁹ Internal consistency ($\alpha=.82-.89$), Concurrent validity with the CBCL ($r=.72-.80$), Convergent validity with the CBCL Youth-report Internalization correlated most with PTS: $r=.75$ ($p<.01$).

permanent caregiver or at an out-of-home care setting. This measure does not distinguish between a foster (kinship, non-kinship) and residential placement.

5.7.2.9 Caregiver involvement

Caregiver involvement has been measured with the Involvement subscale of the Relatedness scale from the Research Assessment Package for Schools- Self-Report Instrument for Middle School Students (RAPS-SM; Institute for Research and Reform in Education, 1998). This subscale is answered by the child, and contains items on the child's perception of the caregiver's interest in the child, things done intended to help the child, and time spent with the child (e.g. "When I'm with my caregiver, I feel happy," "My caregiver doesn't seem to have enough time for me"). Overall, the scale intends to measure how children feel about their relationship with their caregiver. The scale has a maximum score of 16, and each item is measured on a 4-point Likert scale (1= not at all true, 2= not very true, 3= sort of true, and 4= very true).

5.8 Statistical approach

This section re-states the research questions and sets out the statistical analysis that is used to answer each one. The decision on which statistical method is best suited to answer each question was made after consideration of preliminary analyses, available sample size, and quality of the data.

5.8.1 Method for research question 1: What do the longitudinal trajectories of problem behavior for children in out-of-home care look like?

To answer the first research question, a multiple-group unconditional latent growth curve model has been estimated. Children were divided into three groups based on their age at Time 1: early childhood (3-5 years, n=130), middle childhood (6-10 years, n=200), and adolescence (11-16 years, n=183).

While many analysis strategies exist for studying change, latent growth models (LGMs) within the structural equation modeling (SEM) framework have emerged as one of the most popular longitudinal analysis techniques for assessing changes in psychological constructs across time (Bollen & Curran, 2006).

The LGM allows researchers to model a growth trajectory. Specifically, with a linear LGM, two latent factors, the intercept and slope, are of primary interest. Modeling intercepts and slopes as random effects allow researchers to examine individual differences in initial status and growth rate. In addition, by estimating the covariance between the random slopes and intercepts, the LGM can address the relationship between initial status and growth rate. Although traditional methods of observing change over time such as multivariate analysis of variance and repeated measures analysis of variance are still useful tools, growth curve models offer a number of advantages that make it appropriate and appealing for the research questions of this thesis. To illustrate, growth curve models are highly flexible and robust in circumstances when the data contains partial missingness, non-normal distributions, unequally spaced time points, non-linear trajectories, and time-varying covariates (Curran et al., 2010). Growth curve models are also more reliable in analyzing multiple measurement points, compared to pre-test post-test designs, offering higher sensitivity for identifying change over time (Voelkle, 2007). Furthermore, growth curves enable the simultaneous estimation of multiple outcome measurements without inflating the Type I error that commonly arises with repeated measures analysis of variance (Zinbarg, Suzuki, Uliaszek, & Lewis, 2010). A deeper analysis of the strengths and weaknesses of latent growth curve modeling can be found in the Chapter 7, Section 7.2.2 and Section 7.3.3 of the thesis.

Within growth curve modeling, I estimated a multiple-group growth curve model, which simply means that three different sets of estimated values and figures for each subgroup has been given (Muthen & Asparouhov, 2002). As such, three different latent values have been produced for each age group: 1) the intercept, which is the mean initial level of problem behavior; 2) the slope, which is the mean change in problem behavior levels over time; and 3) the variance and covariance figures that describe the level of deviation individuals have from the mean trajectory (Curran et al., 2010).

5.8.2 Method for research question 2: How do different variables affect the onset and change of problem behavior trajectories?

To answer research question two, the unconditional growth curve models described above in research question 1 has been extended to include speculative, potential predictors of onset and change (Duncan & Duncan, 2004). For this thesis, a series of bivariate analyses as well as findings from the systematic review have been used to prioritize and decide which measures should be included as potential correlates and factors of problem behavior intercept and slope. Based on availability of measures for each age group as well as the child welfare literature, models with different predictors have been fit separately for the early childhood, middle childhood, and adolescent group children. For each age group, the effects of potential predictors on the intercept and slope have been examined.

Based on the literature of growth modelling, there are broadly two types of predictors which exist (Preacher, 2018). The first type of predictor is the time-varying covariate (TVC), which may change in value over time. In statistical terms, time-varying covariates predict the repeated measures directly while controlling for the effects of the growth factors (slope and intercept) (see Figure 5). In doing so, each repeated measurement is collectively predicted by both the growth factors as well as the time-varying covariate that is measured at that time point (McNeish & Matta, 2020).

The second type of predictor is the time-invariant covariate (TIC), which are independent of time and do not change in value (e.g. biological sex, country of origin) (Stoel, Van Den Wittenboer, & Hox, 2004). Whereas time-varying covariates predict the repeated measures, time-invariant covariates directly predict the growth factors (slope and intercept), aiming to identify variables that may predict higher/lower intercepts and flatter/sleeper slopes (see Figure 6 below). By definition, a time-invariant covariate could be measured at any point in time and its value would remain constant. While some studies adhere to these definitions strictly, many studies also conceptualize covariates to be time-invariant if they have only been measured at one time-point (e.g. baseline cognitive scores) even if in theory their values may be malleable and subject to change over time in the actual world (Curran et al., 2010).

Figure 5. Diagram of time-varying covariates directly predicting the repeated measures while controlling for the influence of the growth factors

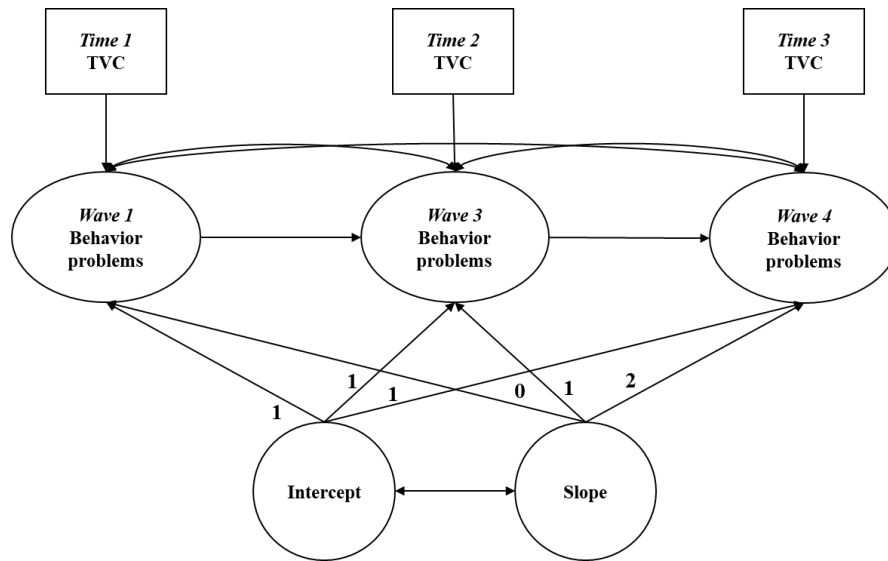
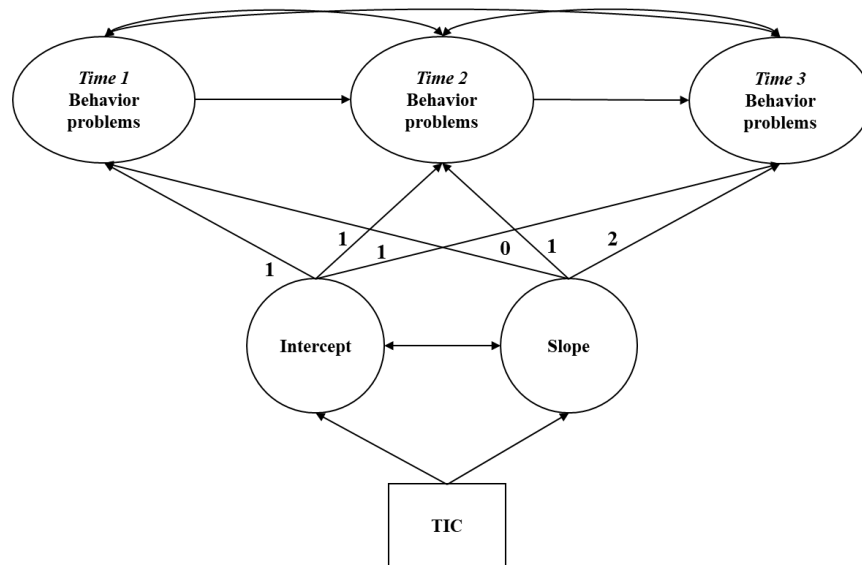


Figure 6. Diagram of time-invariant covariates directly predicting growth factors



As demonstrated by Figure 5 and 6, one way to differentiate time-invariant covariates and time-varying covariates are by how they are modelled in the growth curve models, in addition to their initial definition. In this thesis, I will be conceptualizing all types of covariates as time-invariant covariates. In other words, only Time 1 values of all covariates (see Section 5.7.2 for the full list) will be used in the

analyses, and they will be directly predicting the growth factors rather than the repeated measures to determine whether any statistically significant changes are found on the intercept and slope due to these variables. A discussion on the rationale for choosing to operationalize all of the covariates as time-invariant predictors can be found in Chapter 2, Section 2.1.4.

The selection process for risk and protective predictors consisted of three steps. Step 1 is an initial exploration of the possible variables from the NSCAW codebook. Findings from Study 1 (systematic review) as well as data availability have been taken into consideration when deciding on a list of variables that have initially been chosen. In Step 2, variables chosen from Step 1 were tested in a bivariate correlation analysis with the problem behavior measure at each time point. Variables that did not correlate with any of the outcomes have been excluded at this step. After exclusion of variables that did not correlate, the remaining measures were scrutinized to decide whether or not it should be included in the final models in Step 3. Finally, in Step 3, models for each group were hypothesized and tested. Based on the guidance that parsimonious models are favored in structural equation modeling, non-significant paths were removed in the final model estimation (Preacher, 2006). Potential predictors have been selected based on the current existing literature, explicit hypotheses, and results from preliminary statistical analyses.

5.8.3 Method for research question 3: Is there a protective variable that mediates the relationship between severity of recent abuse incident and future behavior problems?

The third research question was derived from the findings from research question 2. The results of research question 2 found that the variables of severity of recent abuse incident, responsibility skills, and caregiver involvement had a statistically significant relationship with concurrent and future behavior problems. However, the relationship and explicit mechanisms of how this relationship worked for children who have been maltreated at varying levels of severity appeared unclear. As such, research question 3 aimed to understand the relationship between incident of abuse severity, responsibility skills, caregiver involvement, and future behavior problems at greater depth. The theorized moderated mediation

relationship was specified as a path model (see Figure 7). Path analysis models are useful for studying direct and indirect effects simultaneously between several variables, particularly when hoping to understand the mechanisms between different variables (Jeon, 2015). In the mediation model, path coefficients for $X \rightarrow M$ (Path a), $M \rightarrow Y$ (Path b) and $X \rightarrow Y$ (Path c') have been estimated. Both direct and indirect effects are estimated, as the mediation effect can be broken down into indirect and direct effects. Two regression equations can be used as a simplified method to test these effects. The indirect effect occurs when an independent variable (X) has a causal effect on a dependent variable (Y) through a mediating variable (M) (Preacher, Rucker, Hayes, 2007). That is, Y is affected by X because X affects M , and M , in turn, affects Y :

$$M = b_M + aX + e_M \quad (1)$$

The second equation represents the estimation of Y by both X and M , thereby enabling the impact of M on Y to be tested while controlling for X :

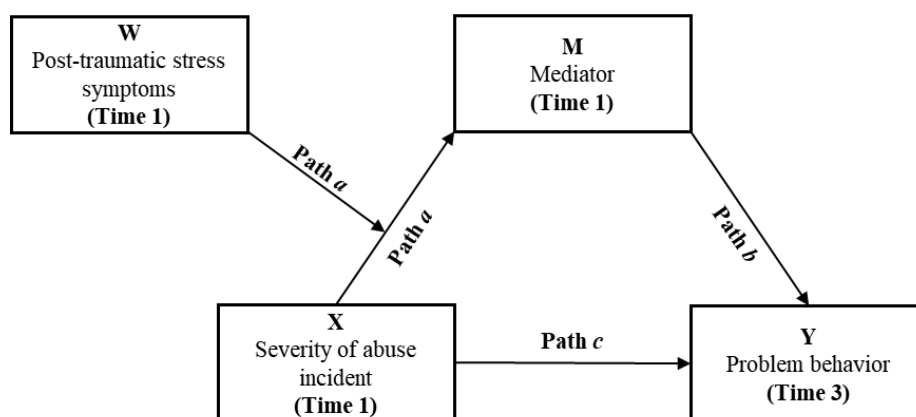
$$Y = b_Y + c'X + bM + e_Y \quad (2)$$

The indirect effect is represented by the product ($a \times b$) in equations (1) and (2). The total effect of X on Y is computed as the sum of the indirect and direct effects ($a \times b + c'$), whereby c' represents the direct effect in the presence of M . As past research has found post-traumatic trauma symptoms to be associated with the relationship between maltreatment incident and child-caregiver relationships (Stevens, Gerhart, Goldsmith, Heath, Chesney, & Hobfoll, 2013; Yoon, Kobulsky, Yoon, & Kim, 2017) as well as between maltreatment incident and socioemotional competence (Ahmad, Qahar, Siddiq, Majeed, Rasheed, Jabar, & Von Knorring, 2005; Dvir, Ford, Hill, & Frazier, 2014), a moderation path has been hypothesized to the mediation model (see Figure 6). Moderation is said to occur when the strength of the association between two variables depends on a third variable. This third variable is called the moderator (W), and it interacts with X to predict Y if the strength of the regression path from Y on X varies as a function of W . Typically, moderation is computed with the regression equation where W is considered the moderator:

$$Y = b_Y + a_1X + a_2W + a_3XW + e_Y \quad (3)$$

Path analysis models also calculate coefficients, which are useful for understanding the size and significance of the direct effect of each path. Figure 7 below shows the structure of the models that were tested.

Figure 7. Model diagram for Research question 3



As shown above in Figure 7, a direct relationship between incident of abuse (X with different levels of severity) and behavior problems three years later was estimated (Y). The effects of a protective variable (M) were then estimated between the incident of abuse variable and the problem behavior variable to examine whether a mediating relationship existed between these two variables. Three levels of incident severity (minor incident of abuse, severe incident of abuse, and very severe incident of abuse) have been tested as independent variables, and two protective variables (responsibility skills and caregiver involvement) have been tested separately and sequentially as potential mediators (M). Levels of post-traumatic stress symptoms (W) have also been added to the model as a moderator between incident of recent abuse and the potential protective mediator. The dependent variable is the same for both of the models, behavior problems at Time 3. In total, two path models have been estimated in order to test two potential effects of the protective variables.

5.9 Statistical norms and parameters

Model fit indices are useful tools to determine whether the model specified is a good fit for the data. In this thesis, model fit indices have been used alongside other important strategies to guide the process of

model estimation. To specify, clear research questions as well as theoretical considerations and literature have been used to support decisions related to model fitting. Further, modifications to the model have been informed by the findings from Study One as well as the wider literature and existing research, and not solely on the modification indices provided in the *Mplus* output. This section will provide an overview of the statistical indices and thresholds that have been used in this thesis.

5.9.1 Statistical significance thresholds used in the thesis

P-values have been used to indicate whether or not the null hypothesis is true. Smaller *p*-values indicate a lower likelihood that the results will be produced when the null hypothesis is true (Hartgerink, Van Aert, Nuijten, Wicherts, & Van Assen, 2016). This thesis uses the common statistical threshold of 0.05 to indicate a statistically significant effect (Field, 2009). As such, *p*-values under 0.05 have been considered small enough to reject the null hypothesis and be considered statistically significant.

5.9.2 Explanation and definitions of model fit indices used in this thesis

This thesis uses both absolute and incremental fit indices to judge how well the proposed model fits the data. The chi-square test of model fit is an absolute measure of model fit that tests the null hypothesis that the estimated model is not significantly different from the perfectly fitted model (Zhonglin, Kit-Tai, & Marsh, 2004). When the *p*-value of this indicator is statistically significant, this means that these two models are significantly different and that the estimated model may be poorly fitted.

The Root Mean Squared Error of Approximation (RMSEA) and Standardized Root Mean Residuals (SRMR) are both absolute fit indices that do not depend on a model of reference to compare and establish model fit (Taasoobshirazi & Wang, 2016). The RMSEA produces values based on the quality of the model and is sensitive to model misspecification. It also computes confidence intervals, which can be biased to be too large when the sample size and degree of freedom of the model is small (Kenny, Kaniskan, & McCoach, 2014). As for the SRMR, this value represents the standardized discrepancy between the observed

correlations and the hypothesized correlations. For both RMSEA and SRMR, smaller values indicate better model fit, with values under 0.08 typically considered to be of good fit (Hu & Bentler, 1999).

The Tucker-Lewis Index (TLI) and Comparative Fit Index (CFI) are both incremental fit indices that again do not depend on a model of reference to establish model fit (Taasobshirazi & Wang, 2016). CFI and TLI are both computed by comparing the degrees of freedom and chi-square of the observed model and hypothesized model. CFI values are between 0 and 1, while TLI values can be above 1. For both the CFI and TLI, values above .90 are considered to represent good fit, with smaller values indicating poorer model fit (Hu & Bentler, 1999). The model fit indices for some of the models look unusual (e.g., TLI and CFI are at 1.00 and RMSEA is at 0.000). This may occur with small sample sizes and degrees of freedom, but does not indicate problems and should be interpreted as a well-fitting model (Anderson & Gerbing, 1984; Kenny, 2011; Muthén, 1998-2004). A more in-depth and technical explanation to this can be found in *Appendix H*.

5.10 Summary of the chapter

This chapter presents the methodology used in Study 2. The chapter begins by describing the secondary dataset used for the thesis, the National Survey of Child and Adolescent Well-Being (NSCAW). I. The NSCAW is a national survey that follows the same children over 3 years who have been investigated for abuse or neglect by the United States child protective system between the sampling period of October 1999 and December 2000. The analytic sample is then described, along with an explanation of how this sample was selected. The three age groups (early childhood, middle childhood, and adolescent) divided within the analytic sample are also introduced. This chapter goes on to describe the measures used in the main analyses. A description of each variable, what it intended to measure, and whether it was used in any of the published research is set out in this section. Lastly, the chapter concludes by presenting the statistical norms and parameters which provide a useful guide for examining whether the model estimated fits the data well. This includes the statistical significance thresholds used in the thesis, as well as explanations and definitions concerned with model fit indices.

Chapter 6. Findings for Study Two

6.1 Characteristics of the sample

In this chapter, the descriptive statistics of the sample is first presented. The descriptive statistics of the sample has been computed using the *SPSS v. 24 Complex Samples*. As shown in Table 8 below, of the 513 children in the study sample, 257 (49.1%) were male and 256 (50.9%) were female. 231 children of the sample (42.6%) were Black; 211 children (42.1%) were White; 37 children were American Indian (6.2%); 9 children (2.6%) were either Asian, Hawaiian, or Pacific Islander; and 25 children (6.4%) indicated they were another ethnicity. At Time 1, 130 children (25%) were between the ages of 3-5 years (early childhood group, $M = 3.95$ (about 3 years and 11 months)), 200 (39%) were between the ages of 6-10 years (middle childhood group, $M = 7.82$ (about 7 years and 10 months)), and 183 (36%) were between the ages of 11-16 years (adolescent group, $M = 12.92$ (about 12 years and 11 months)). The main analysis of this thesis will be conducted within these separate age groups.

Table 8. Demographic characteristics of the sample

	Frequency	Percentage	N
Gender			513
Male	257	49.1%	
Female	256	50.9%	
Age at Time 1			513
3-5 years	130	25.3%	
6-10 years	200	39.0%	
11-16 years	183	35.7%	
Race/Ethnicity			513
Black	231	42.6%	
White	211	42.1%	
American Indian	37	6.2%	
Asian/Hawaiian/ Pacific Islander	9	2.6%	
Other	25	6.4%	

Mean age at initial placement was 7.41 years (about 7 years and 5 months; SE=.25) reported at Time 1 (see Table 9). At baseline, a large majority of children were living with an out-of-home caregiver (71.9%), rather than with a permanent caregiver (28.1%). At Time 1 children had spent an average of 2.48 years (about 2 years and 6 months; SE=.19) with their current caregiver. At Time 1, a very small portion of children in the sample had disabilities, were under treatment for serious mental health, and were involved with juvenile justice for misbehaving¹⁰. Such issues, involvement with juvenile justice in particular, were more prevalent in the older age group than others. The average number of changes in placement prior to the placement children were in at Time 1, nor information on whether children moved in and out of care between data collection periods has not been recorded in the NSCAW data. Other information missing from the data that might be theoretically important when examining the child welfare population will be dealt with in the discussions chapter (Chapter 7), which addresses limitations of the analysis.

Table 9. Care characteristics of the sample at Time 1

	Mean	Frequency	Standard Error/ Percentage	N
Age at initial placement	7.41		0.25	502
Time with current caregiver	2.48		0.19	491
Type of caregiver				513
Permanent caregiver		101	28.1%	
Out-of-home caregiver		412	71.9%	

Compared to the population of all children in the NSCAW I LTFC dataset at Time 1, children in this study sample had approximately the same gender distribution (49.4% compared to 49.1% male children), were slightly older (8.75 years compared to 7.02), entered care older (by a year), had spent approximately the same amount of time with their current caregiver (2.15 years compared to 2.48 years),

¹⁰ At Time 1, 23 out of 513 children have been classified as needing special education; 10 were taking prescription medicine for emotional, behavioral, learning, attentional, or substance abuse problems; and 5 have gone to court for misbehaving (e.g., delinquency, running away, truancy, etc.).

and were more likely to live with a permanent caregiver at Time 1 (28.1% compared to 24.9%). Both groups had the same proportion of children from minority ethnicities (American Indian, Asian/Hawaiian/Pacific Is, ‘Other’), but children in the analytic sample were more likely to be of White race (42.1% compared to 39.5%) and less likely to be of Black race (42.6% compared to 46.8%)¹¹. Implications for external validity are reviewed later in the discussions chapter (Chapter 7, Section 7.5).

A number of other key measures have been administered in the NSCAW dataset and have been included in the main analysis. These measures (i.e. caregiver involvement, incident of abuse, post-traumatic stress, neighborhood community environment, school engagement, daily living skills) have only been administered to a particular age group, but not to the entire sample. As such, Sections 6.1.1, 6.1.2, and 6.1.3 will describe the sample within each specific age group.

6.1.1 Characteristics of the early childhood group

The descriptive statistics for the key variables of the early childhood group are presented below in Table 10.

¹¹ Differences were statistically significant for type of caregiver ($X^2(1)=1.64, p<.001$), age at T1 ($t(74)=-12.97, p<.001$), age at initial placement ($t(74)=-5.97, p<.001$), and time with the caregiver at T1 ($t(74)=-6.5, p<.001$).

Table 10. Descriptive statistics for key variables of the early childhood group at Time 1

	Mean	Frequency	Standard Error/ Percentage	N
Age at Time 1	3.95		0.12	130
Age at initial placement	2.88		0.14	126
Time with current caregiver	1.69		0.16	117
Daily Living Skills	89.83		1.62	130
Socioemotional competence				
Responsibility	18.54		0.43	130
Self-control	22.46		0.42	130
Cooperation	21.42		0.37	130
Assertion	23.81		0.45	130
Type of caregiver				130
Permanent caregiver		33	35.5%	
Out-of-home caregiver		97	64.5%	

As presented in Table 10, the average age for the early childhood group is 3.95 years (about 3 years and 11 months) old, and these children were first placed in their initial out-of-home care placement at the average age of 2.88 (about 2 years and 10 months; age range of 1 to 4) years old. At Time 1, they had spent an average of 1.69 years (about 1 year and 8 months) with their current caregiver. For daily living skills, children had an average score of 89.83. A score of 85 or above indicates being in the average range (Green & Carter, 2014). Out of the highest possible score of 30 for each socioemotional scale, children in the early childhood group had scores ranging from 18.54 to 23.81, scoring the lowest in responsibility and the highest in assertion. Lastly, 64.5% of children were living with their out-of-home caregiver at Time 1.

6.1.2 Characteristics of the middle childhood group

The descriptive statistics for key variables of the middle childhood group are presented below in Table 11.

Table 11. Descriptive statistics for key variables of the middle childhood group at Time 1

	Mean	Frequency	Percentage/ Standard Error	N
Age at Time 1	7.82		0.11	200
Age at initial placement	6.58		0.13	195
Time with current caregiver	2.16		0.24	191
School engagement	35.58		0.49	175
Daily Living Skills	89.82		2.62	200
Socioemotional competence				
Responsibility	21.02			200
Self-control	20.83		0.37	200
Cooperation	21.39		0.45	200
Assertion	23.83		0.45	200
Type of caregiver				200
Permanent caregiver		35	25%	
Out-of-home caregiver		165	75%	

For the middle childhood group, children were on average 7.78 years (about 7 years and 9 months) old at baseline. They were approximately 6.58 years old (about 6 years and 7 months; age range of 1 to 9) when they were first placed into their initial out-of-home placement. At baseline, they had spent an average of 2.16 years (about 2 years and 2 months) with their current caregiver. Children in the middle childhood group also scored daily living skills in the average range, with an average score of 89.82. Children's socioemotional competence were a little higher compared to those in the early childhood group, ranging from 20.83 (self-control) to 23.83 (assertion). 75% of the children in the middle childhood group were living with an out-of-home caregiver at Time 1.

6.1.3 Characteristics of the adolescent group

The descriptive statistics for key variables of the adolescent group are presented below in Table 12.

Table 12. Descriptive statistics for key variables of the adolescent group at Time 1

	Mean	Frequency	Percentage/ Standard Error	N
Age at Time 1	12.92		.16	183
Age at initial placement	11.10		.26	181
Time with current caregiver	3.29		.47	183
Neighborhood Community Environment	12.36		.31	183
Trauma	48.79		.97	181
Relationship with caregiver Involvement	3.23		.10	181
Socioemotional competence				
Responsibility	23.75		.35	183
Self-control	20.42		.35	183
Cooperation	20.92		.40	183
Assertion	22.11		.45	183
Incident of minor physical abuse in the past year				171
Yes		115	70%	
No		56	30%	
Incident of severe physical abuse in the past year				170
Yes		29	16.5%	
No		141	83.5%	
Incident of very severe physical abuse in the past year				170
Yes		20	8.9%	
No		150	91.1%	

Children in the adolescent group were on average 12.92 years (about 12 years and 11 months) old at baseline. These children were on average 11.10 years old (about 11 years and 1 month; age range of 1 to 15) when they first entered out-of-home care. At baseline, they had spent an average of 3.29 years (about 3 years and 3 months) with their current caregiver. Children indicated an average score of 12.36 out of 27 for perceiving problems in the neighborhood community environment. Children scored on average 48.79 on the Trauma Symptom Checklist for Children (TSCC), which is below the score of 65 that marks clinically

significant levels of post-traumatic stress. The average amount of caregiver involvement was a relatively low score of 3.23 (out of 16) for the adolescent group. For socioemotional competence, children scored the lowest on the self-control scale (20.42) and the highest on the responsibility scale (23.75). Lastly, 70% of the sample children experienced an incident of minor physical abuse in the past year, with diminished rates for incident of severe physical abuse (16.5%) and very severe physical abuse (8.9%) experienced in the past year. I have described the three sample groups of Study 2 thus far, and will now move on to describing the findings of each research questions.

6.2 Research question 1: What do the longitudinal trajectories of problem behavior for children in out-of-home care look like?

In order to answer the first research question, a multiple-group unconditional growth curve model (UGM) estimated children's average initial level of behavior problems (intercept) and growth trajectories (slope) without any predictors or covariates in the model over the course of 36 months. In this thesis, the intercept parameter was set at Time 1 of data collection. As children were followed up for data again 18 months after baseline and 36 months after baseline, slope parameters for the three time points were set at 0, 1, and 2. In addition, parameters that indicated the relationship between the intercept and slope (covariance), as well as the variance in the intercept and slope were produced as well.

The multiple-group unconditional growth model had good model fit ($X^2=0.961(3)$, $p=.811$, CFI= 1.000, TLI= 1.000, RMSEA= .000, SRMR= .013). As noted in the methodology section, the sample was divided into three groups based on age: early childhood (3-5 years, $n=130$), middle childhood (6-10 years, $n=200$), and adolescence (11-16 years, $n=183$). As such, three separate growth curves were estimated for each group. The next sections describe each of these trajectory shapes. Syntax for the multiple-group unconditional latent growth model is presented in *Appendix I*.

Before examining the unconditional growth models, the correlations between problem behavior at Time 1, 2, and 3 have been examined. This was to explore the strength and direction of the relationship between behavior problem scores for each age group. This is presented below in Table 13.

Table 13. Correlations between problem behavior at Time 1, 2, and 3

	Time 1	Time 2	Time 3
Early childhood group			
Time 1	-	-	-
Time 2	.309***	-	-
Time 3	.183***	.294***	-
Middle childhood group			
Time 1	-	-	-
Time 2	.499***	-	-
Time 3	.369***	.294***	-
Adolescent group			
Time 1	-	-	-
Time 2	.285***	-	-
Time 3	.215**	.516***	-

Note. * $p < .05$, ** $p < .01$, *** $p < .001$

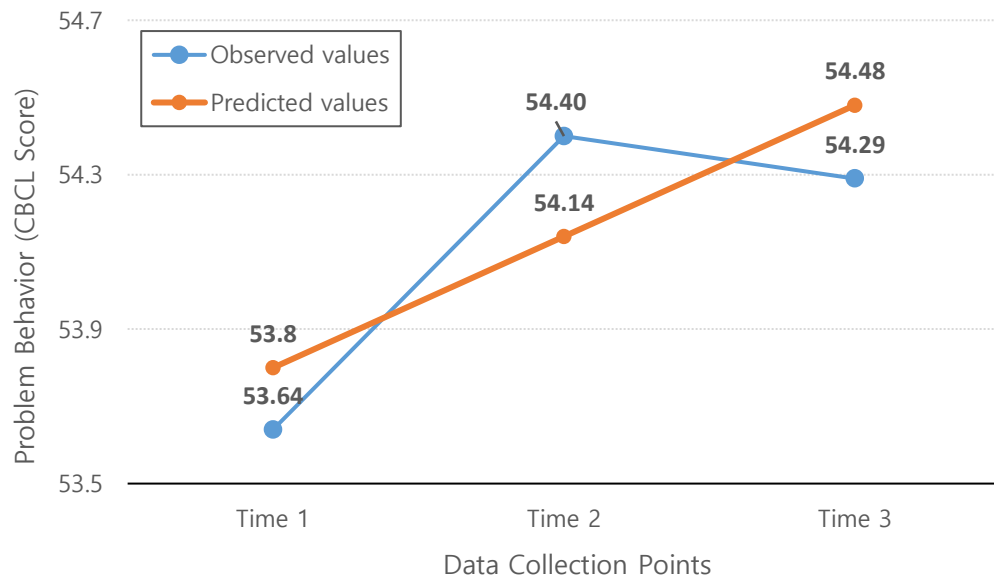
As shown above in Table 13, the correlations between problem behavior at Time 1, 2, and 3 show positive correlation and statistical significance. These values demonstrate that there is a substantial relationship between behavior problems across time, in that higher behavior problems at previous time points are associated with higher behavior problems at later time points. These correlation coefficients show that there may be an important relationship between past and future behavior problems. To understand this relationship further, the next section presents the unconditional growth curves for each age group.

6.2.1 Unconditional growth model for early childhood group

For the early childhood group, the model results show that the mean level of behavior problems for the study sample was 53.64 (equivalent to ‘normal range behavior’) at Time 1 and there was a nonsignificant positive growth in scores over time ($s = .105$, $p = .698$). The average observed and predicted trajectories for the early childhood group is depicted below in Figure 8. The observed value is the actual average value of the CBCL scores for the early childhood group sample, whereas the predicted value is the estimated score

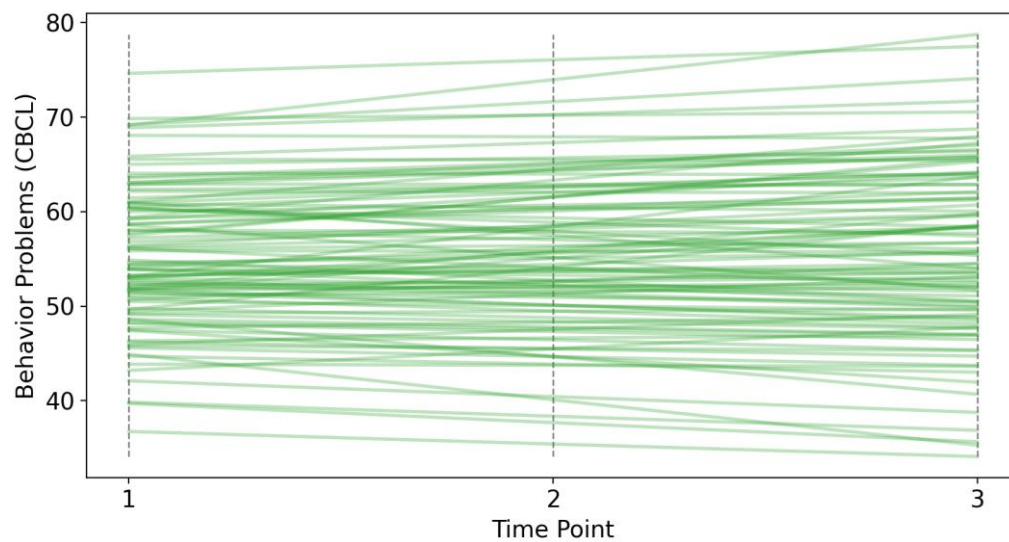
which is calculated using the slope and intercept values of the model results output. As shown in Figure 8, the predicted values show a linear and increasing pattern of problem behavior over time. However, the actual observed scores show that scores begin to decrease at Time 3 rather than continue to linearly rise over time. This shows that a linear effect of time may not be the best fitting model, and that quadratic or cubic models may be a better fit for the data. However, these types of models can only be tested with data points greater than 3. This limitation has also been discussed further in Chapter 5, Section 5.5. One analytical method to deal with such circumstances is the use of nonlinear LGMs, such as piecewise LGMs (Kohli & Harring, 2013). Piecewise LGMs, as its name suggests, ‘piece’ together two or more smaller linear fragments. These smaller pieces of slopes are tied together at what are called ‘knot points’ or ‘break points’ (Sterba, 2014), at which the linear path of development takes on a different direction (Grimm, Ram, Hamagami, 2011). Despite the availability of such analytical methods, this thesis proceeds with a linear model for two main reasons. Firstly, using multiple pieces to describe the data can lead to overfitting which occurs when a model is too closely aligned to a limited number of data samples and may fail to generalize to future samples or populations (Hawkins, 2004). Secondly, it is presumed that the break points of the piecewise growth model should depend on age rather than the data collection time points. Given that the data collection time points of the NSCAW data are not synchronized with children’s age when the data has been collected, fitting multiple linear models or misspecifying a break point may be misleading for interpretations concerning the interactions between time points and problem behavior outcomes, possibly leading to inaccurate inferences about development (Ning & Luo, 2017). Instead, this thesis focuses on the linear models to approximately estimate the linear trajectory of time points on problem behavior.

Figure 8. Average behavior problem trajectory for the early childhood sample from Time 1 to Time 3



The model results also indicated that the covariance between the intercept and slope was nonsignificant ($cov(I,S) = -.097, p = .889$). There was also nonsignificant variability in both the intercept ($\sigma^2 = 56.731, p = .082$) and the slope ($\sigma^2 = 10.712, p = .401$). These parameters indicate homogeneity in both the onset (intercept) and change (slope) in behavior problems across the early childhood group. The lines in Figure 9 below illustrate the individual differences across children's initial level and growth rates of problem behavior among a subsample of 100 children in the early childhood group. As illustrated by the non-significant variance parameters, the trajectories of problem behavior development display patterns that are similar across the subsample of 100 children. However, despite such homogeneity, there still appears to be some variability among the trajectories of children's problem behavior, as some children start off with high values and stayed high, other children started low and stayed low, and still others started low but increased over time, and so on (see Figure 9). In the next section, the problem behavior trajectories for the middle childhood group have been investigated.

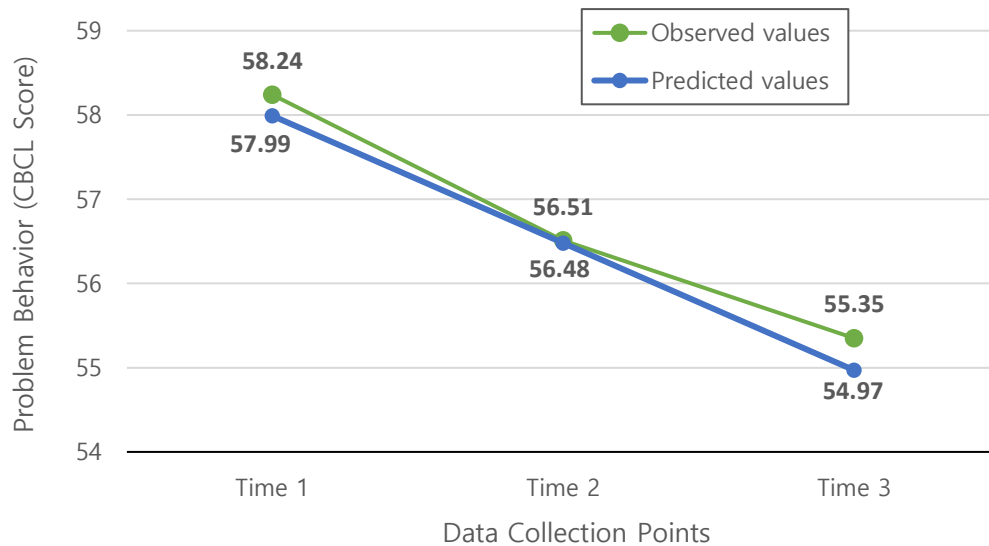
Figure 9. Variability in problem behavior developmental trajectories of a sub-sample of 100 children in the early childhood group



6.2.2 Unconditional growth model for middle childhood group

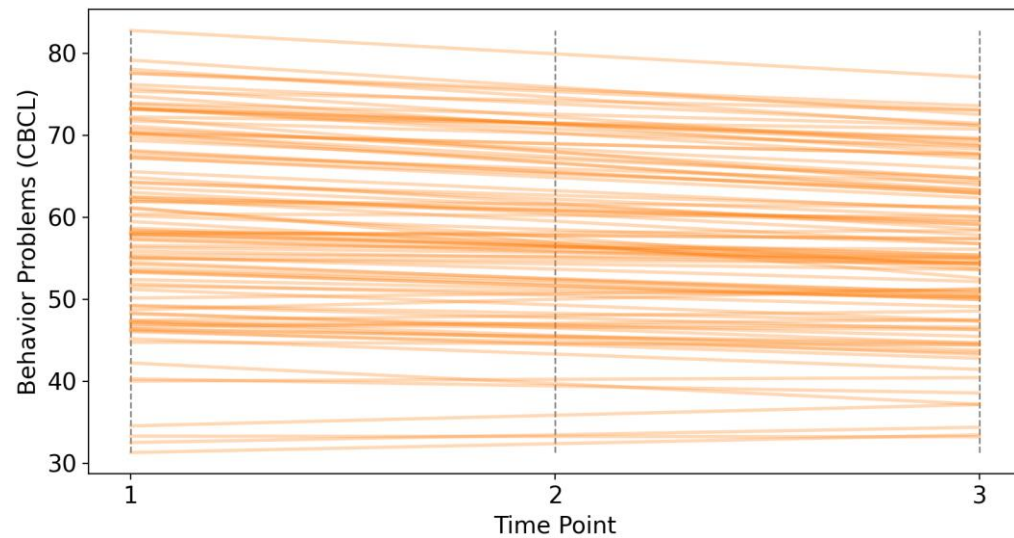
For the middle childhood group, the model results show that the mean level for behavior problems for the study sample was 58.24 (equivalent to 'normal range behavior') at Time 1 and there was a nonsignificant decline in scores over time ($s=-.598$, $p=.245$). The average observed and predicted trajectories for the middle childhood group is shown below in Figure 10. As shown, the predicted values show a linear and decreasing pattern of problem behavior over time. Overall, this model fits very well with the actual scores. This demonstrates that a linear effect of time is indeed a well-fitting model for this age group.

Figure 10. Average behavior problem trajectory for the middle childhood sample from Time 1 to Time 3



The model results also indicated that the covariance between the intercept and slope was significant ($cov(I,S) = -.458, p < .01$). These results indicate that children with higher onset levels of problem behavior experience steeper drops, while children with lower onset levels of problem behavior experience more gradual drops. There was also significant variability in the intercept ($\sigma^2 = 145.502, p < .001$) but not the slope ($\sigma^2 = 6.394, p = .585$). These parameters indicate significant heterogeneity in the starting point (intercept) but relative homogeneity in the rate of change (slope) of behavior problems across the middle childhood group. As shown in Figure 11 below which displays the individual variability among the middle childhood sample, the pattern of behavior trajectories takes on a similar shape, but there are considerable differences in the onset levels of behavior problems. In the next section, the problem behavior trajectories for the adolescent group have been examined.

Figure 11. Variability in problem behavior developmental trajectories of a sub-sample of 100 children in the middle childhood group



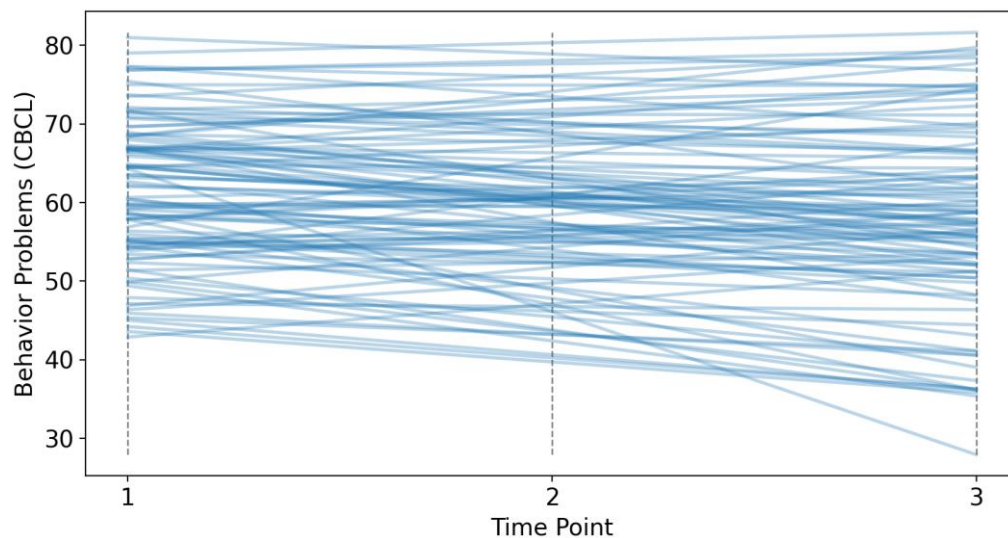
6.2.3 Unconditional growth model for adolescent group

For the adolescent group, the model results show that the mean level for behavior problems for the study sample was 62.73 (equivalent to 'borderline clinically significant') at Time 1 and there was a significant decrease in scores over time ($s=-.392, p<.05$). The average observed and predicted trajectories for the adolescent group is presented below in Figure 12. As shown, both the predicted and observed values are closely aligned and show a linear and decreasing pattern of problem behavior over time. In other words, the model results fit very well with the actual observed scores and indicates that a linear effect of time is a well-fitting model.

Figure 12. Average behavior problem trajectory for the adolescent sample from Time 1 to Time 3

The model results also indicated that the covariance between the intercept and slope was nonsignificant ($cov(I,S) = -0.212$, $p = .252$). There was also significant variance in the intercept ($\sigma^2 = 99.897$, $p < .001$) but not the slope ($\sigma^2 = 44.720$, $p = .188$). These parameters indicate significant heterogeneity in the starting point (intercept), but homogeneity in the rate of change (slope) of behavior problems across the adolescent group. As displayed below in Figure 13, the lines represent the variance among the subsample of 100 children in their trajectories of problem behavior over the three time points. This visualization of the problem behavior trajectories of the adolescent group shows that there exists noticeable heterogeneity, especially when compared to the visualizations of the early and middle childhood groups (see Figure 11 and 12).

Figure 13. Variability in problem behavior developmental trajectories of a sub-sample of 100 children in the adolescent group



Overall, the three models show that children in the early childhood group had an upward trend of behavior problems over time, while children in the middle childhood and adolescent group had a downward trend over time. However, the absolute level of behavior problems was the highest in the adolescent group and lowest in the early childhood group. Adolescents also start higher up in behavior problems compared to children in the middle childhood group as well. It was also found that children in the early childhood group had relatively homogeneous levels of intercepts and slopes overall, while children in the middle childhood and adolescent group had significant heterogeneity in the intercept of their problem behavior trajectories. These results suggest that patterns of behavior development are very different for children depending on their age groups. The heterogeneity within the intercepts of the middle childhood and adolescent group also indicates that there are individual differences in onset, which could be explained by covariates. As such, research question 2 builds onto the models in research question 1 to investigate where these differences come from, and what factors exacerbate or decrease the growth of problem behavior over time. Related to expected behavior problems, this pattern is very much like what is found in the general

population. Behavioral and emotional outbursts are characteristic of early childhood (Basten et al., 2016), and the development of self-regulation and language capacities are followed by decreased levels of behavior problems during middle childhood and adolescence (Menting, van Lier, & Koot, 2011). It should also be noted that adolescence is commonly a time marked by high levels of impulsive behavior that decreases with time (Bongers et al., 2003), hence the high yet decreasing pattern demonstrated in the findings of the adolescent group. Lastly, the heightened heterogeneity in the levels of onset among the middle childhood and adolescent group has also been anticipated, as new factors such as new adult figures, peers, and after school activities emerge into children's developmental context as children grow older, in turn contributing to greater variety in the range of factors that may affect behavior problems (Coll & Szalacha, 2004). A discussion of these results at greater depth can be found in Chapter 7, Section 7.1.1.3 later on. In the next section, the results to research question 2 are presented.

6.3 Research question 2: How do different variables affect the onset and change of problem behavior trajectories?

Research question 2 was concerned with identifying whether there were risk and protective variables of problem behavior development. In order to answer this question, a conditional growth model estimated the direct (statistical) effect of various selected measures on behavior problem trajectories.

The NSCAW dataset is extremely large and complex, and it was important to have a systematic process of selecting measures to identify risk and protective variables to answer this research question. This process was determined by consulting the wider literature (the systematic review in Study 1), as well as data availability of the NSCAW dataset. As such, I aimed to examine variables which are key in the literature on children in out-of-home care and were identified in the systematic review in Study 1. These variables were: type of caregiver (permanent/non-permanent; Dowdell & Cavanaugh, 2009), age at initial placement (Wulczyn, Hislop, & Harden, 2002), daily living skills (Haggman-Laitila, Salohekkila, & Karki, 2018), school engagement (Mihalec-Adkins & Cooley, 2020), neighborhood community environment (Huang et al., 2016), post-traumatic stress (Barboza et al., 2017), child-perceived involvement of the

caregiver (Dubois-Comtois et al., 2015), and severity of abuse incident in the past year (Naar-King, Silvern, Ryan, & Sebring, 2002). I also include variables in the analyses that have been identified in the systematic review as a gap in the literature, namely, effects of socioemotional skills (Lee & Holmes, 2021). There is a large amount of literature covering the critical role of socioemotional skills on behavioral development in the general population, but the systematic review revealed that there was a significant dearth in the child welfare literature covering this, particularly using longitudinal data.

Regarding controlling for other factors, it is recognized that there is a strong body of evidence that race and ethnicity, age, and gender effects exist on the levels of problem behavior of children (Barth, 1997; Christov-Moore, Simpson, Coude, Grigaityte, Lacoboni, & Ferrari, 2014; DeLisi et al., 2017; Gray, Indurkha, & McCormick, 2004; Sternberg, Baradaran, Abbott, Lamb, & Guterman, 2006; van Beijsterveldt, Hudziak, & Boomsma, 2006). Since including them as covariates reduces the already limited amount of statistical power, the modeling for research question 2 has been preceded by an analysis using race and ethnicity, age, and gender as a predictor of the intercept and slope. The aims of this preliminary analysis were to be able to determine whether the demographic characteristics of race and ethnicity, age, and gender were not a significant factor in this particular sample. Results of these preliminary models can be found in *Appendix J*. To give a brief summary of the results, none of the demographic characteristics of gender, age, and White race were significant on the intercept and slope for the early childhood and adolescent group. However, for the middle childhood group, gender had a significant effect on the intercept of the problem behavior trajectory. As such, it was determined that gender should be controlled for in the models for the middle childhood group, and was thus included in the models (see Section 6.3.3.2 of this chapter). Scrutiny as to why gender may only be significant for the middle childhood group as opposed to the other age groups is made in the following chapter (Chapter 7, Section 7.1.2.2).

Altogether, three main steps were taken to achieve this final set of variables, as described below. This process has been undertaken with the aim to not only replicate and compare results with prior studies,

but also close gaps in the literature (mainly concerning the relationship between socioemotional skills and later problem behavior outcomes) that have been identified by the systematic review (Study 1). It has thus been informed by currently existing research evidence as well as exploratory statistics.

6.3.1 Step 1. Preliminary examination of measures

Step 1 is a preliminary examination of the possible variables available in the NSCAW dataset that has been considered for inclusion in the analysis. Table 14 below is a list of these variables that were initially selected, organized by category.

Table 14. Initially extracted measures

Category of development	Measure
Care characteristics	Type of abuse, type of caregiver (perm/non-perm), time with caregiver, age at first placement, total number of living arrangements
Demographic characteristics	Child gender, Child race, Child age
Individual characteristics	Prosocial behavior, Cooperation, Assertion, Responsibility, Self-control, Daily Living Skills
Cognition	PLS-3 ^a : Auditory comprehension skills, PLS-3 ^a : Expressive communication skills, PLS-3 ^a : Total language skills, W-J MBA ^b : Reading score, W-J MBA ^b : Math score, School engagement
Relationships	Parent-Child Emotional security, Parent-Child Involvement, Parent-Child Autonomy support, Parent-Child Structure, Parental Monitoring
Mental health	Depression, Trauma
Adverse life experiences	Total number of exposure to severe violence, Total number of exposure to mild/severe violence, Sexual activity, Substance abuse, Non-Violent discipline score, Psychological aggression score, Minor physical abuse score, Severe physical abuse score, Very severe abuse score, Total physical abuse score, Non-violent discipline past year, Psychological aggression past year, Minor physical abuse past year, Severe physical abuse past year, Very severe physical abuse past year, Physical abuse past year, Non-violent discipline ever, Psychological aggression ever, Minor physical abuse ever, Severe physical abuse ever, Very severe physical abuse ever, Physical abuse ever
Contextual variables	Neighborhood Community Environment, Home Environment: Cognitive stimulation, Home Environment: Emotional stimulation, Home Environment: Total score, Total family income per year

^a PLS-3- Preschool Language Scale-3; ^b M-BA- Mini-Battery of Achievement

The measures presented above in Table 14 were initially selected because they are key variables in the child welfare literature, as well as the literature on behavior and psychopathology. I also considered measures according to the bio-ecological systems theory (Bronfenbrenner, 1979), which means I considered factors from multiple spheres of ecology. As included in Table 14, care characteristics, demographic characteristics, individual characteristics, cognition, relationships, mental health, adverse life experiences, and contextual variables are areas that have been identified in both the systematic review and the wider

literature as being important to children's problem behavior outcomes. The next section, Step 2, describes how these variables have been narrowed down to be included in the final analyses.

6.3.2 Step 2. Bivariate correlation analyses

This section examines whether problem behavior is statistically associated with the measures selected in Table 15 under Step 1. To do this, bivariate correlation analyses have been carried out between the measures chosen from Step 1 and problem behavior measures at Time 1, 2, and 3. This step has been taken to ensure that all measures included in the final model are selected based on explicit hypotheses and preliminary statistical analyses. Such preliminary steps are important because parsimonious models are preferred in structural equation modeling, and researchers recommend for non-significant paths to be removed in the final model estimation (Raykov & Marcoulides, 1999). Based on these guidelines, variables that did not correlate with the outcomes in the bivariate analysis were excluded from subsequent longitudinal analyses. Table 15 below is a list of significant and non-significant variables.

Table 15. List of included and excluded variables

	Included	Excluded
All age groups	Prosocial behavior, Type of caregiver, Cooperation, Assertion, Responsibility, Self-control, Age at first placement, Neighborhood community environment, Child age, Total family income	Type of abuse, Child gender, Child race, Time with caregiver at Time 1, # of Total Living Arrangements
Early childhood	Daily Living Skills, Home Environment: Emotional Support, Home Environment: Total home score	Parent-Child: Autonomy Support, Home Environment: Cognitive stimulation
Middle childhood	Daily Living Skills, Home Environment: Total Home score, Total exposure to severe violence, Total exposure to mild/severe violence, School engagement, PLS-3 ^a : Auditory comprehension, PLS-3 ^a : Expressive communication, PLS-3 ^a : Total language, W-J MBA ^b : Reading, W-J MBA ^b : Math	Home Environment: Cognitive Stimulation, Home Environment: Emotional Support
Adolescents	Depression, Trauma, Non-violent discipline score, Minor physical abuse score, Severe physical abuse score, Total physical abuse score, Minor physical abuse past year, Severe physical abuse past year, Very severe physical abuse past year, Physical abuse past year, Minor physical abuse ever, Severe physical abuse ever, Very severe abuse ever, Physical abuse ever, School engagement, Parental monitoring, Parent Emotional security, Involvement with caregiver, Parent-Child Structure	Sexual activity, Psychological aggression, Very severe abuse score, Non-violent discipline past year, Psychological aggression past year, Non-violent discipline ever, Psychological aggression ever

^a PLS-3- Preschool Language Scale-3; ^b M-BA- Mini-Battery of Achievement

As presented in Table 15 above, measures in the left column showed a statistically significant correlation with problem behavior outcomes at either Time 1, 2, or 3. Some measures were only administered to children of a particular age range. Correlations were only sought between these measures and problem behavior outcomes for children who had data available. For the full sample, measures for socioemotional skills were all significant, again indicating a potentially important relationship that may benefit from further investigation. Care characteristics such as age at first placement and type of caregiver, and contextual variables such as neighborhood environment and family income were also shown to be related to behavior as well. Further analysis would be needed to understand whether some of these variables are more relevant and important to certain age groups.

For each of the specific age groups, daily living skills and characteristics of the home environment were associated with problem behavior outcomes for the early childhood group. School engagement and other measures of cognition such as reading and math scores were related to behavior for the middle childhood age group. Measures of mental health as well as severity of abuse experience, and measures indicating relationship with the caregiver were significant for the adolescent group. Other correlations (e.g.: type of abuse, sexual activity, autonomy support by the parent, etc.) were not statistically significant. The next section, Step 3, tests selected variables from these statistically significant correlations as potential predictors of a conditional growth model.

6.3.3 Step 3. Final model: Conditional growth analysis

This section presents the conditional growth models that were fit for each age group. After exclusion of variables that did not correlate, the remaining measures were scrutinized to decide whether or not it should be included in the final models. This process was informed by the existing literature as well as exploratory statistical analyses processes. A hypothesized model was defined, and non-significant parameters were excluded in order to create the most parsimonious model. For each of the three age groups, two types of models have been specified. The first type of model tests variables that have been identified because they were significantly correlated with behavior problem outcomes at Time 1, 2, or 3 (see Table 15). These variables vary for each age group because the significant correlations varied as well. As such, the purpose of the first model was to find risk and protective variables that may vary for each age group. As for the second type of model, the effect of socioemotional skills while controlling for the type of caregiver was tested. The aim of the second model was to explore the effects of socioemotional skills on the trajectories of problem behavior development, and compare these effects between different age groups. Specifically, it was to compare whether different types of socioemotional skills were more relevant to children in different age groups. A variable for indicating type of caregiver (permanent caregiver or caregiver from an out-of-home care setting) was also included in the model because the literature stresses the important role that caregivers have on children's socioemotional development (Smeekens et al., 2009).

In the sections below, the final conditional growth models are presented. The *Mplus* syntax for each conditional growth model is presented in *Appendix K*.

6.3.3.1 Conditional growth model for the early childhood age group

Table 16 below presents the conditional growth model for the early childhood group. Both models had excellent model fit. A core purpose of estimating conditional growth models is to determine what variables predict intercept or slope variance (Curran et al., 2010). As presented in Section 6.2.1, both variances for the intercept and slope for the early childhood group were not statistically significant. Despite variances not reaching statistical significance, however, Figure 9 which presents the individual trajectories demonstrate that there is still some variance within the group. As such, this section presents the results for the growth model which includes potential predictors of this variance. In Model 1 ($\chi^2=0.290(3)$, $p=.962$, CFI= 1.000, TLI= 1.000, RMSEA=0.000, SRMR=.026), daily living skills and age at initial placement were regressed onto the intercept (onset) and slope (change) of problem behavior. For Model 2 ($\chi^2=0.284(4)$, $p=.991$, CFI= 1.000, TLI= 1.000, RMSEA= 0.000, SRMR= .027), self-control skills, cooperation skills, and caregiver type (0=permanent caregiver, 1=out-of-home care setting) were fit as predictors of the conditional growth model. The standardized estimates are presented in Table 16 below.

Table 16. Conditional growth model for the early childhood age group

Model	Variable	Intercept (Std. Estimate)	Slope (Std. Estimate)	Model fit Indices
1	Daily Living Skills	-0.636*	0.068	$\chi^2=0.290(3)$, $p=.962$, RMSEA: 0.000 CFI/TLI: 1.000/1.000 SRMR: 0.026
	Age at initial placement	0.356**	-0.521	
2	Self-control	-0.488**	-0.001	$\chi^2=0.284(4)$, $p=.991$, RMSEA: 0.000 CFI/TLI: 1.000/1.000 SRMR: 0.027
	Cooperation	-0.281*	0.218	
	Out-of-home care setting	-0.070	0.541*	

Note. * $p<.05$, ** $p<.01$, *** $p<.001$

The results for Model 1 indicated that those with higher daily living skills had lower starting trajectories (-0.636, $p<.05$) than children with lower daily living skills. Likewise, children who were older

at initial placement had higher starting trajectories (0.356, $p < .01$) compared to children who were younger at initial placement. This means that a one-unit increase of daily living skills resulted in a 0.636-unit decrease of problem behavior onset ($p = .016$), while one-unit younger age at initial placement resulted in a 0.356-unit decrease of problem behavior onset ($p = .003$). However, neither level of daily living skills nor age at initial placement predicted a change in problem behavior development (significant slope). This suggests that children's daily living skills measured at Time 1 and age at initial placement play an important role in predicting the starting scores for problem behavior. However, both measures were not associated with development over time. The intercept represents behavior problems at Time 1, so it was measured at the same time point as the daily living skills variable used in the analysis. Therefore, the analysis demonstrates that daily living skills act as a protective correlate for problem behavior. However, it does not provide evidence that it is a protective factor. Although age at initial placement is also measured concurrently with behavior problems at Time 1 as well, the event has occurred before Time 1 (since all children have been in out-of-home care for approximately 12 months at Time 1). As such, it may be that age at initial placement is an important variable for children's problem behavior outcomes that are measured in the future. However, the nonsignificant relationship with the slope (rate of change) of problem behavior shows that this effect does not affect changes in behavioral paths over longer lengths of time.

For Model 2, self-control skills, cooperation skills, and caregiver type (0=permanent caregiver, 1=out-of-home care setting) were fit as predictors into a conditional growth model. The model results indicated that children who had higher self-control skills had lower starting trajectories (intercept), when compared with children who had lower self-control skills (0.488, $p < .01$). Likewise, children with higher cooperation skills had lower starting trajectories (intercept), than children who had lower cooperation skills (0.281, $p < .05$). However, neither self-control nor cooperation skills predicted declines in problem behavior development (negative and significant slope). This suggests that self-control and cooperation skills, measured at Time 1, play an important role in predicting lower starting scores, even after controlling for type of caregiver. However, both self-control and cooperation were not associated with change over time.

This casts doubt on the hypothesis that socioemotional skills are not just a protective correlate, but a protective factor for the early childhood group. The type of care variable, inserted in the model as a covariate, showed that children in an out-of-home care setting, compared to children with a permanent caregiver, experienced a rise in problem behavior over time (0.541, $p=.033$). This may indicate that being in an out-of-home care setting is a risk *factor* for healthy behavioral adjustment. Whether it is *the* setting or that a child is in *a* setting that contributes to growth in problem behavior, is unclear with the information that is available in the data. However, given that the effect is statistically significant for this early childhood group as a whole, it may make more sense to interpret the findings as the average child in the early childhood group facing difficulties over time when placed in an out-of-home care setting.

6.3.3.2 Conditional growth model for the middle childhood age group

Table 17 below presents the results for the conditional growth model for the middle childhood group. Previously, results from the unconditional growth curve models found that the variance of the intercept was statically significant ($p<.001$), but not the variance of the slope (See Section 6.2.2). As with the conditional growth models of the early childhood group, models estimated to look for predictors of these significant and non-significant levels of variance have been estimated. Both models had excellent model fit. In Model 1 ($X^2=4.246(5)$, $p=.515$, CFI= 1.000, TLI= 1.000, RMSEA=0.000, SRMR=.039), school engagement, daily living skills, caregiver type (0=permanent caregiver, 1=out-of-home care setting), and gender (1=male, 2= female) have been regressed onto the intercept (onset) and slope (change) of problem behavior. For Model 2 ($X^2=1.824(5)$, $p=.873$, CFI= 1.000, TLI= 1.000, RMSEA= 0.000, SRMR= .013), self-control skills, cooperation skills, caregiver type, and gender were fit into the conditional growth model. The standardized estimates are presented in Table 17 below.

Table 17. Conditional growth model for the middle childhood age group

Model	Variable	Intercept (Std. Estimate)	Slope (Std. Estimate)	Model fit Indices
1	Daily Living Skills	-0.150*	0.134	$\chi^2=4.246(5)$, $p=.515$, RMSEA: 0.000 CFI/TLI: 1.00/1.00 SRMR: 0.039
	Age at initial placement	-0.546***	0.292	
	School engagement	-0.167**	0.366**	
	Female gender	-0.071	-0.121	
2	Self-control	-0.511***	0.277	$\chi^2=1.824(5)$, $p=.873$, RMSEA: 0.000 CFI/TLI: 1.000/1.000 SRMR: 0.013
	Cooperation	-0.192*	0.211	
	Out-of-home care setting	-0.049	0.373*	
	Female gender	-0.095	-0.154	

Note. * $p<.05$, ** $p<.01$, *** $p<.001$

The results for Model 1 indicated that a one-unit increase of school engagement was associated with a 0.150-unit decrease in the problem behavior starting trajectory ($p<.05$), and a one-unit increase of daily living skills was associated with a 0.546-unit decrease in the problem behavior starting trajectory ($p<.001$). However, neither daily living skills nor school engagement predicted a decline in problem behavior development (negative and significant slope). This suggests that children's daily living skills and level of school engagement measured at Time 1 play an important role in predicting the baseline scores for problem behavior. But both measures were not associated with development over time. Likewise, model results also indicated that children in an out-of-home care setting at Time 1 had lower starting trajectories for problem behavior (-0.167, $p<.01$), compared to children living with a permanent caregiver. However, results also indicated that children in an out-of-home care setting had a positive growth trajectory for behavior problems ($p<.01$). This suggests that out-of-home care setting is initially associated with lower behavior problems, but is later associated with rising problem behavior development over time. This may indicate that out-of-home care is a protective correlate, but a risk factor.

For Model 2, a one-unit increase of self-control skills was associated with a 0.511-unit decrease of the problem behavior starting trajectory ($p < .001$), while a one-unit increase of cooperation skills was associated with a 0.192-unit increase of problem behavior onset ($p < .05$). Neither self-control skills nor cooperation skills predicted a decline in problem behavior development (negative and significant slope). This again suggests that children's self-control skills and cooperation skills measured at Time 1 play an important role in predicting the starting scores for problem behavior, but both measures were not associated with development over time. As observed in Model 1, out-of-home care setting (in comparison to being with a permanent caregiver) resulted in a 0.373-unit increase of problem behavior change ($p < .05$). This means that out-of-home care is again associated with positive growth of problem behavior. This result is similar to what is seen for Model 1 in the middle childhood group, as well as for Model 2 in the early childhood group. Discussions on why this may be and what this may imply are in the discussions chapter (Chapter 7).

6.3.3.3 Conditional growth model for the adolescent age group

Table 18 below presents the conditional growth model for the adolescent age group. As presented in Section 6.2.3, results from the unconditional growth curve models found that the variance of the intercept was statically significant ($p < .001$), but not the variance of the slope. Conditional growth models estimated to look for predictors of these significant and non-significant levels of variance (see Figure 13) have been estimated, as done with the conditional growth models of the early and middle childhood group. In Model 1, neighborhood community environment, age at initial placement, and post-traumatic stress symptoms have been regressed onto the intercept (onset) and slope (change) of problem behavior. Model 2 consists of three parts: Models 2-1, 2-2, and 2-3. These models have been specified to test whether controlling for the severity of maltreatment affected the strengths of the hypothesized protective factors (assertion, responsibility, and involvement of the caregiver). The three types of abuse are 'incident of minor physical abuse in the past year,' 'incident of severe abuse in the past year,' and 'incident of very severe abuse in the past year.' The standardized estimates are presented in Table 18 below. All models had excellent model fit.

Table 18. Conditional growth model for the adolescent age group

Model	Variable	Intercept (Std. Estimate)	Slope (Std. Estimate)	Model fit Indices
1	Neighborhood community environment	0.150	0.290**	$\chi^2=0.742(4)$, $p=.946$ RMSEA: 0.000 CFI/TLI: 1.000/1.000 SRMR: 0.023
	Age at first out-of-home placement	-0.237**	-0.049	
	Post-traumatic Stress Symptoms	0.301**	-0.003	
2-1	Incidence of minor physical abuse in the past year	0.225*	-0.065	$\chi^2=0.770(5)$, $p=.979$ RMSEA: 0.000 CFI/TLI: 1.000/1.000 SRMR: 0.009
	Responsibility	-0.665***	0.087	
	Assertion	-0.047	0.240*	
	Relationship with caregiver: Involvement	-0.056	-0.279*	
2-2	Incidence of severe physical abuse in the past year	0.203	0.228	$\chi^2=2.071(5)$, $p=.839$ RMSEA: 0.000 CFI/TLI: 1.000/1.000 SRMR: 0.029
	Responsibility	-0.647***	0.090	
	Assertion	-0.067	0.257*	
	Relationship with caregiver Involvement	-0.050	-0.210	
2-3	Incidence of very severe physical abuse in the past year	0.104	0.152	$\chi^2=1.762(5)$, $p=.881$ RMSEA: 0.000 CFI/TLI: 1.000/1.000 SRMR: 0.022
	Responsibility	-0.628***	0.122	
	Assertion	-0.085	0.231	
	Relationship with caregiver: Involvement	-0.098	-0.262	

Note. * $p<.05$, ** $p<.01$, *** $p<.001$

The results for Model 1 indicated that a one-unit increase in post-traumatic stress symptoms resulted in a 0.301-unit increase in problem behavior starting trajectory ($p<.01$). Likewise, being one year younger at initial age of placement resulted in a 0.237-unit increase in problem behavior starting trajectory ($p<.01$). However, both post-traumatic stress symptoms and age at initial placement measured at Time 1 did not predict a change in problem behavior development. This suggests that children's post-traumatic

stress symptoms and age at initial placement have an important role in predicting the starting scores for problem behavior, but both measures were not associated with predicting change over time. Likewise, neighborhood community environment did not have a statistically significant effect on the starting trajectory for behavior problems, but increased problems in the neighborhood predicted positive growth for problem behavior trajectories ($p < .01$).

Results in Model 2 first indicated that assertion, which was included in the model as a measure of socioemotional competence and hypothesized to be a protective correlate or factor, predicted inclining trends for problem behavior trajectories in Model 2-1 and 2-2. This was not expected, as assertion was a subscale of the Social Skills Rating System, typically used to measure prosocial, positive, and desired behavior. The results may be related to the characteristics of the children, as they are in their adolescence, a period of significant change in friendships and related assertive behavior (Ozdemir, Utkualp, & Pallos, 2016). Further analysis of these results is made in the discussions chapter (Chapter 7).

Results also indicated that when controlling for a minor incident of abuse (Model 2-1), one-unit more involvement of caregivers predicted a declining trend for problem behavior trajectories (-0.279 , $p < .05$). This suggests that despite incident of minor abuse in the past year, children who perceived that their caregivers were more involved experienced declining behavior trends over time (-0.279 , $p < .05$). However, involvement of the caregiver is no longer statistically significant in the models which controlled for incident of severe physical abuse (Model 2-2) and very severe physical abuse (Model 2-3), suggesting that it is no longer a protective correlate nor a protective factor, as the variable is not significant in predicting the onset (intercept) nor the change (slope) of behavior problems over time.

On the other hand, the socioemotional measure ‘responsibility’ appears to remain a protective correlate even after controlling for various levels of maltreatment. To illustrate, children with higher responsibility scores indicated lower starting trajectories for behavior problems in all models controlling for various levels of maltreatment (Model 2-1, 2-2, and 2-3).

From the results in Model 2, it appeared as though there was an important relationship between severity of abuse incident, responsibility skills, level of caregiver involvement, and behavior problem outcomes. However, the explicit association of the relationship still remained unclear. As such, the next section answers the third and final research question: Is there a protective variable that mediates the relationship between severity of recent abuse incident and future behavior problems?

6.4 Research question 3: Is there a protective variable that mediates the relationship between severity of recent abuse incident and future behavior problems?

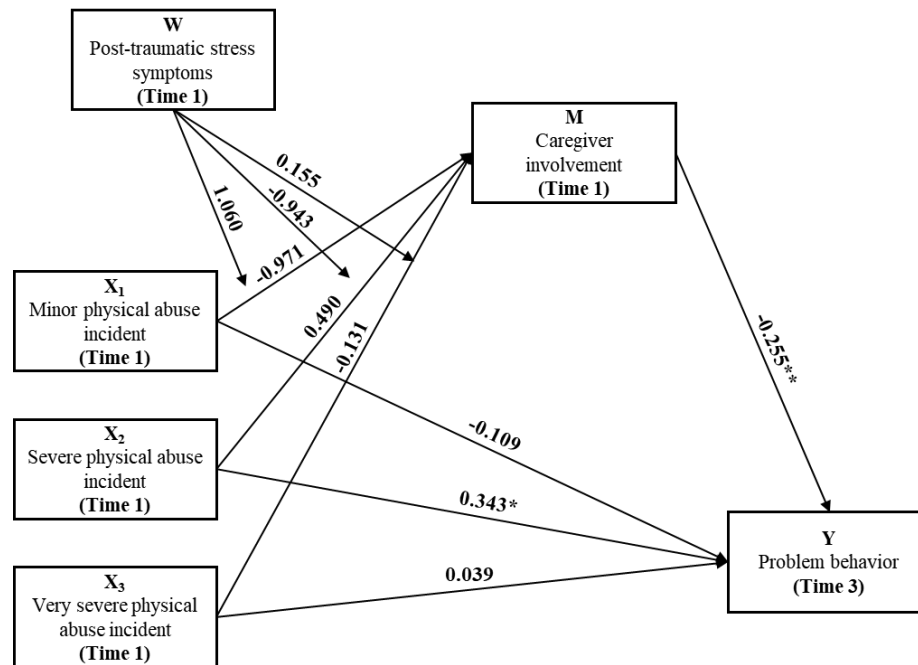
In order to statistically test whether a mediating relationship exists between severity of abuse, child-perceived caregiver involvement, and later problem behavior, two moderated mediation models have been estimated as presented below in Figures 14 and 15. For both models, the independent variables were: (1) minor physical abuse incident in the past year, (2) severe physical abuse incident in the past year, and (3) very severe physical abuse in the past year. Each measure is a dichotomous variable, with 0 indicating that the incident did not happen, and 1 indicating the incident did happen. The dependent variable was problem behavior at Time 3 for both models. Problem behavior outcomes at Time 3 has been used because risk and protective factors need to precede the outcome (Kraemer et al., 2005). The mediating variable being tested is child-perceived caregiver involvement for the first moderated mediation model and responsibility skills for the second moderated mediation model. These two variables were selected as mediating variables because results from the conditional growth models in Section 6.3.3.3. indicated that these two measures may have protective effects against exacerbation of later problem behavior outcomes. It was hypothesized that caregiver involvement and responsibility skills would mediate the relationship between recent incident of abuse and problem behavior levels, in that higher level of caregiver involvement and responsibility skills will decrease later levels of behavior problems. Lastly, post-traumatic stress symptoms have been hypothesized to be a moderator between the incidents of abuse and the potentially protective variable, because the results from the first model of the adolescent conditional growth model in Section 6.3.3.3.

showed that post-traumatic stress symptoms are a statistically significant correlate of problem behavior. The literature evidence also demonstrates that post-traumatic stress may result from abuse incidents (Cloitre et al., 2010; Deblinger, Mannarino, Cohen, & Steer, 2006) which may in turn affect the relationship between both abuse incident and caregiver involvement (Muller, Sicoli, & Lemieux, 2000; Stovall-McClough & Cloitre, 2006), as well as between abuse incident and responsibility skills (Cloitre, Miranda, Stovall-McClough, & Han, 2005; Stevens et al., 2013). Each research hypothesis is tested using a moderated mediation path model, with direct and indirect effects estimated as parameters (Preacher et al., 2007). The *Mplus* syntax for the path models is presented in *Appendix L*.

6.4.1 Moderated mediation model: Caregiver involvement as the mediating variable

This section presents the results for the first moderated mediation model. Model fit was good for this model ($X^2= 1.310(4)$, $p=.8596$, RMSEA: 0.000, CFI/TLI: 1.000/1.000, SRMR: 0.007). Each solid arrow represents a regression path, and is accompanied by a coefficient and p -value which indicates the direction, size, and statistical significance of the path. Below in Figure 14, the estimated model results are presented.

Figure 14. Moderated mediation model based on severity of recent abuse incident with caregiver involvement as mediating variable



Note: * $p < .05$, ** $p < .01$, *** $p < .001$

Indirect effect of minor incident of abuse (X_1) on Y via $M = 8.012$ ($p = 0.246$)
 Indirect effect of severe incident of abuse (X_2) on Y via $M = -4.929$ ($p = 0.542$)
 Indirect effect of very severe incident of abuse (X_3) on Y via $M = 1.623$ ($p = 0.836$)
 Total effect of minor incident of abuse (X_1) on $Y = 4.472$ ($p = 0.551$)
 Total effect of severe incident of abuse (X_2) on $Y = 8.609$ ($p = 0.190$)
 Total effect of very severe incident of abuse (X_3) on $Y = 3.525$ ($p = 0.613$)

As presented above, the estimated model shows that minor and very severe physical abuse does not have a significant statistical relationship with later problem behavior, suggesting that the effects of minor and very severe physical abuse do not have a direct effect on behavior problems 3 years later. However, incident of severe physical abuse in the past year show to have a significant effect on problem behavior at Time 3, respectively indicating a 0.343-unit ($p < .05$) increase in problem behavior outcomes three years later.

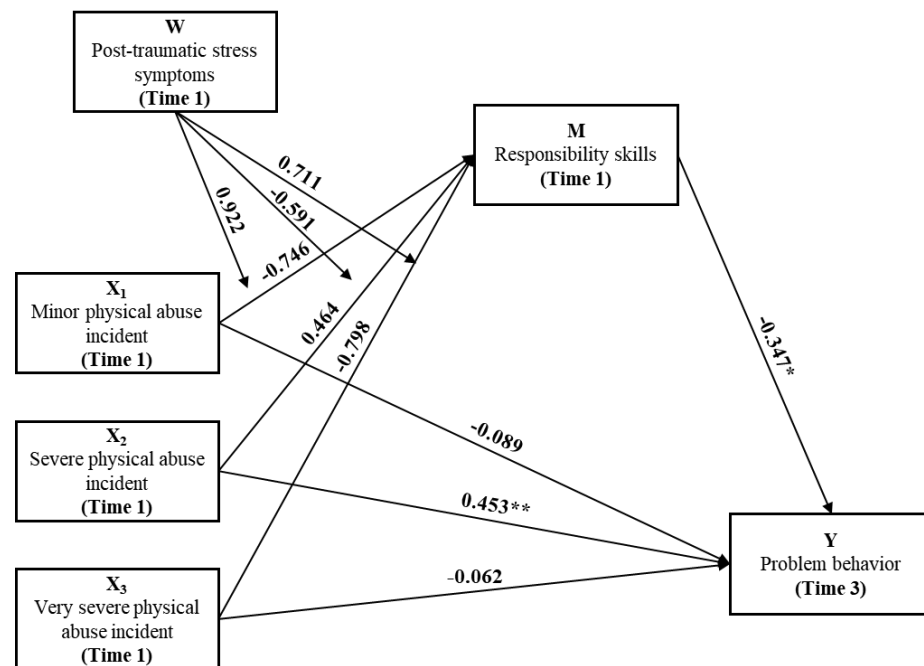
A mediating relationship is not detected between recent abuse incident (for all three levels of severity), caregiver involvement, and later problem behavior levels. This can be observed from the indirect mediation effects of each model, as well as the total direct effects which are all statistically non-significant. The caregiver involvement measure is answered by the child at Time 1, and represents the child's perception of the caregiver's interest in the child, things done intended to help the child, and time spent with the child. This caregiver could be either an out-of-home or permanent caregiver, depending on who the child was residing with at Time 1. Overall, the results suggested that all incidents of maltreatment, regardless of the level of severity, did not significantly affect child perceived levels of caregiver involvement. This may be because the incident of abuse variable measures events that have occurred within the past year, which may indicate that the caregiver that is caring for the child at the time of assessment is different from the caregiver that has afflicted the abuse in the past year. It is a limitation of the measure that this distinction is not made clear (this limitation is discussed later in Chapter 7, Section 7.3.1). Bowlby's attachment theory (1982) states that distress, grief, and anger that results from loss of an attachment figure can be alleviated only when children form secure attachments with alternative caregivers; however, exposure to extreme caregiving conditions may reduce the chances of formal attachment relationships with new caregivers (Oosterman & Schuengel, 2008). This leads to inquiry with regards to the nature of attachment formation among children in out-of-home care. Due to early adverse experiences of early and/or abusive care, children in out-of-home care tend to display internal working models of attachment reflective of histories of insecure attachment (Dozier, Stoval, Albus, & Bates, 2001). The formation of subsequent attachment relationships may be disrupted by such internal working models. To illustrate, children in out-of-home care have been found to exhibit behaviors that suggest that caregivers are not needed and push them away (Bovenschen et al., 2016). This behavior often unsettles and alienates new caregivers and may diminish the ability of out-of-home caregivers to act as a secure base for their out-of-home care child. A more in-depth discussion of the role of the caregiver in the literature is presented later as well (Chapter 7, Section 7.1.3). Following these results, caregiver involvement has a significant effect on later behavior problem outcomes, with

higher perceived caregiver involvement indicating a 0.255-unit ($p < .01$) decrease in problem behaviors over time. Lastly, post-traumatic stress symptoms that were hypothesized to moderate the relationship between incident of abuse and caregiver involvement, did not have a statistically significant effect. This suggests that any symptoms of post-traumatic stress that may have been acquired by the child as a result of past adverse life experiences, does not affect the relationship between incident of abuse and perceived caregiver involvement. In the next section, I now examine whether a similar relationship exists for responsibility, as the conditional growth model in Section 6.3.3.3 seemed to indicate it as a protective correlate.

6.4.2 Moderated mediation model: Responsibility as the mediating variable

This section presents the results for the second moderated mediation path model. Again, model fit was excellent ($X^2 = 2.656(4)$, $p = .6170$, RMSEA: 0.000, CFI/TLI: 1.000/1.000, SRMR: 0.017). As with the path models presented above in Section 6.4.1, the three independent variables are the incidents of abuse that occurred in the past year, differentiated by levels of abuse severity. Rather than caregiver involvement, this moderated mediation path model tests the mediating effects of responsibility skills. Again, post-traumatic stress symptoms have been added as a moderator between the independent variables and the mediator. The responsibility measure represents behavior that would be expected from a responsible child above the age of 11 years old. Such behavior includes actions such as being able to wait turns in games or other activities, informing caregivers before going out with friends, following household rules, and reporting accidents to the appropriate person. Below in Figure 15, the estimated model is presented.

Figure 15. Moderated mediation model based on severity of recent abuse incident with responsibility as mediating variable



Note. * $p < .05$, ** $p < .01$, *** $p < .001$

Indirect effect of minor incident of abuse (X_1) on Y via $M = 8.398$ ($p = 0.259$)
 Indirect effect of severe incident of abuse (X_2) on Y via $M = -6.38$ ($p = 0.542$)
 Indirect effect of very severe incident of abuse (X_3) on Y via $M = 13.483$ ($p = 0.232$)
 Total effect of minor incident of abuse (X_1) on $Y = 5.498$ ($p = 0.639$)
 Total effect of severe incident of abuse (X_2) on $Y = 11.385$ ($p = 0.439$)
 Total effect of very severe incident of abuse (X_3) on $Y = 10.485$ ($p = 0.418$)

As shown above in Figure 15, minor and very severe incident of abuse in the past year does not have a significant effect on later problem behavior outcomes. However, experience of a severe incident of abuse in the past year is associated with increased levels of problem behavior at least three years later (0.453, $p < .01$). Again, both the indirect and direct mediation effects are all statistically nonsignificant for the three hypothesized pathways, which indicates there is no significant mediation effect detected between abuse incident, responsibility skills, and later problem behavior. This is the same pattern that has been observed for the previous moderated mediation path model (see Figure 14). Next, the abuse variable consistently has

no significant effect on children's responsibility. This holds true for all three levels of severity (minor, severe, and very severe) ($-0.746, p=\text{ns}$; $-0.464, p=\text{ns}$; $-0.798, p=\text{ns}$). In addition, responsibility skills have a significant effect for decreased levels of problem behaviors at Time 3 ($-0.347, p<.05$). As in the previous series of path models, post-traumatic stress symptoms that were hypothesized to moderate the relationship between incident of abuse and responsibility skills, did not have a statistically significant effect. In the next chapter, a brief summary and discussion of the findings for each research question is given. Further speculation on the internal and external validity, suggestions for future intervention practitioners and service providers, as well as considerations for generalizability and implications for research and practice will also be made.

6.5 Summary of the chapter

This chapter summarized and appraised the findings of Study Two, which examines potential risk and protective variables, and how they are associated with problem behavior over time. It also explores whether there was evidence of a protective variable that mediated the relationship between severity of recent abuse incident and future behavior problems among adolescents with histories of long-term out-of-home care. For research question 1, the unconditional growth curve is presented for the early childhood, middle childhood, and adolescent age group. For each age group, the mean level of behavior problems, the shape of the problem behavior trajectory, heterogeneity of the intercept and slope, association between the intercept and slope, and a diagram of the average problem behavior trajectory are presented. Next, the results for the second research question are presented, which is concerned with identifying whether there were correlates and factors of problem behavior development. Lastly, the results for the third and final research question are presented. The third research question examined whether there was a protective variable that mediated the relationship between severity of recent abuse incident and future behavior problems among adolescents who have been in long-term out-of-home care.

Chapter 7. Discussion for Study Two

7.1 Summary and discussion of findings for each research question

Study 2 utilized the secondary dataset NSCAW I to analyze the nature of the relationship between various measures (i.e. age at initial placement, school engagement, neighborhood community environment, trauma symptoms, socioemotional skills, etc.) and problem behavior development in a sample of 513 children with histories of long-term out-of-home care in the United States. The longitudinal analysis covers 3 time points spanning the time frame between 2001 and 2004. In this chapter, I first summarize the findings for each research question. Then, I place the findings in the context of existing research literature and the findings of Study 1 (systematic review), and explore the potential for comparisons of the children in the study sample to children in different population groups. Throughout the discussion there is variability in comparison groups (i.e. general population, lower socio-economic profile children, etc.), because comparisons can only be made where there is evidence available. Both the appropriateness and limitations of different comparison groups are considered, as each type of comparison group are not straightforward comparisons. In addition, the comparisons made in the discussion of this chapter draw on data from other countries, although the sample is US data (see Chapter 1, Section 1.1 and 1.3.1 for a discussion of some of the complexities in making comparisons between different child welfare systems). The summary and discussion of this section only pertains to the results of Study 2. A synthesis of both studies will be made in the conclusion chapter (Chapter 8).

7.1.1 Research question 1: What do the longitudinal trajectories of problem behavior for children in out-of-home care look like?

7.1.1.1 Early childhood age group: Problem behavior trajectory

Table 19. Summary of ages covered by analysis in the early childhood group

Time of analysis	Age range of sample	Mean age
1	3-5 years	3.95 (3 years 11 months)
2	4-7 years	5.15 (5 years 2 months)
3	5-8 years	6.40 (6 years 5 months)

The first research question examined the growth trajectories of problem behavior for children who have histories of long-term out-of-home care. For the first research question, no covariates were included, and only the unconditional growth curves were examined. A multiple-group growth model was specified according to age intervals. The following paragraphs discuss the results of the first research questions separately for the three childhood groups.

Early childhood is a time when behavior problems such as outbursts of anger and temper tantrums are common (Basten et al., 2016). In the general population, such behavior is found to decrease over time from ages 2 to 6 years old as children begin to enter education environments such as kindergarten or preschool settings, and learn behavioral and emotional regulatory skills (Schmitt, Pentimonti, & Justice, 2012). As such, slight increases in behavior problems are very common and are considered a natural part of development at this stage (Wakschlag et al., 2007). This makes it difficult to define emotional and behavioral problems and associate them with experiences during the preschool years. Behaviors that adults such as caregivers and teachers find ‘problematic’ and difficult to manage are usually just a part of normative development during early childhood (Basten et al., 2016). However, the stability of such behavior(s) as children grow older may indicate problems. This trend is supported by the average trajectory shown in the early childhood age group in the current study sample, demonstrated by the growth curves which show that as children age throughout their preschool years, their behavior problems first increase sharply (from Time 1 to Time 2), then gradually decrease (from Time 2 to Time 3). A summary table of the ages covered by Time 1, 2, and 3 are presented in Table 19 above.

For the CBCL Total Problems scale, scores 60 to 63 (approximately 83rd to 90th percentiles) are considered borderline clinically significant, and scores greater than or equal to 64 are considered clinically significant behavior problems (Loe et al., 2019). Children's starting trajectories in the early childhood group sample were relatively low at a score of 53.64. As such, children in the early childhood group were in the 'normal range behavior.' However, studies of children in the general population show that a group of typically developing preschoolers (mean age 4.4 years old) in the United States had a mean CBCL score of 40.5(SD=7.2) (Loe et al., 2019). Another study with a group of typically developing preschoolers in Turkey had a mean score of 47.41(SD=11.4) (Hesapcioglu, Ceylan, Erdogan, Kandemir, & Cop, 2017). Such differences suggest that children who have experienced contact with child protective services and involvement in long-term out-of-home care exhibit more severe levels of problem behaviors compared to their same-age counterparts in the general population. Results also found that patterns of onset and change among children in this age group were homogeneous, with indicators of variability not reaching statistical significance. Such homogeneity may reflect the notion that as children enter formal school settings, other factors such as new adult figures, peers, and activities may become part of the context, contributing to greater variability in behavioral pathways (Coll & Szalacha, 2004). At a younger age, however, children's context is mostly limited to the interactions that they share with their caregivers (McClelland, Ponitz, Messersmith, & Tominey, 2010). This limits the number of additional environmental elements children are exposed to as they grow older and enter school, allowing less room for variability of circumstances and experiences. It is recognized that one could still argue there is substantial heterogeneity within family circumstances. However, it is the pivotal role of educational institutions that introduce an additional layer of external factors into the child's context.

7.1.1.2 Middle childhood age group: Problem behavior trajectory

Table 20. Summary of ages covered by analysis in the middle childhood group

Time of analysis	Age range of sample	Mean age
1	6-10 years	7.82 (7 years 10 months)
2	7-12 years	8.90 (8 years 11 months)
3	8-13 years	10.52 (10 years 6 months)

The problem behavior trajectory for the middle childhood group showed a decreasing trend as children aged throughout their early school years. For reference, a summary table of the ages covered by Time 1, 2, and 3 are presented in Table 20 above. Evidence of children in the general population (age range 4 to 7, mean age=5 years 10 months, SD=1.12) also report that during middle childhood, a significant decline in aggressive and delinquent behaviors are found (Prinz, Onghena, & Hellinckx, 2006).

In the middle childhood age group sample, children's starting scores for problem behavior were higher than the early childhood group at a score of 58.24. Similar scores were found in the general population, although samples were from a high-risk population. For instance, a US study investigating children with a mean age of participants 7.63 years old (SD=1.83, range 5-12 years) from Title I elementary schools had a mean CBCL Total Behavior score of 62.33(SD=10.03) (Lambie, Solomon, Joe, Kelchner, & Perleoni, 2019). In the US, Title I elementary schools are given extra funding to aid their students, who are mainly from low socioeconomic status households. Given the difficulties associated with such backgrounds, students from Title I schools may be prone to a higher rate of mental health and behavioral difficulties. Essentially it could be argued that the cohort in the Title I schools are more comparable to the out-of-home care population (as opposed to the general population). There is also recent literature that evidences the relationship between low socioeconomic status and involvement with the child welfare system (Bywaters, 2020), highlighting how children from high-poverty families are more likely to enter out-of-home care.

Another study investigated two German speaking samples consisting of children (mean age 10.6, SD=2.7) referred for psychiatric services (Pauschardt, Remschmidt, & Matthejat, 2010). The group

diagnosed with no psychiatric disorder had a mean CBCL score of 59.4(SD=9.6). Although these children were not diagnosed, they are still likely to have higher rates of problem behavior compared to their typically developing peers, because they have been referred for services. This suggests that children in the sample for this thesis share similar scores with children in vulnerable contexts such as low-income communities and psychiatric institutions. Comparable scores for typically developing children at similar ages were not yet available in the literature.

Results also indicated that there was significant heterogeneity in the onset, but not the change, of problem behavior among children in this group. This means that children had differing levels of behavior problems at Time 1, with some children starting with high levels of behavior problems and others with low levels of behavior problems. However, the non-significant variance in the slope indicates that over the follow-up period of three years, children generally had similar patterns of change over time. This may reflect the greater variance within their context that may emerge at this age (e.g., classmates from school, teachers, playing in the neighborhood, after-school activities, etc.) (Coll & Szalacha, 2004). Middle childhood is a crucial stage in development during which children begin to navigate their way through social structures and have substantial encounters with different contexts and institutions outside their families (Coll & Szalacha, 2004). Depending on these wider varieties of factors that come into play, results suggest that children's onset of behavior problems during middle childhood are at varying levels (Fosco, Stormshak, Dishion, & Winter, 2012).

Finally, there was a significant and negative association between the intercept and slope (see Chapter 6, Section 6.2.2 for the section presenting this finding). This suggests that children with higher levels of problem behavior at Time 1 show steeper decreases in their problem behavior slopes compared to children with lower levels of problem behavior at Time 1. This trend is also identified in the general population (Flouri, Midouhas, & Joshi, 2014), and implies the need to look for risk and protective factors of problem behavior onset and change, in order to support positive behavioral development. In other words,

it is important to identify which individual and contextual characteristics contribute to varying levels of problem behavior over time. To address this need, research question 2 looks for both individual and contextual factors that affect the onset and change of problem behavior trajectories, as will be discussed further in Section 7.1.2.

These results may also imply that children with more behavioral difficulties, particularly those in the clinical or borderline clinical range, are more likely to receive attention and support in the form of identification and/or intervention (Jensen et al., 2011). On the other hand, children who exhibit less severe levels of problem behavior are less likely to receive this support (Jensen et al., 2011). Rather, they are likely to be overlooked, remaining on the path of maladaptive behavioral adjustment (Lee & Sohn, 2020). As persistent and exacerbated problem behavior have been evidenced to adversely affect many domains of well-being and development over time, it is critical to become aware of children who show moderate levels of problem behavior as well, so that they may also attain timely support and intervention (Brooks-Gunn, 2003). Risk and protective factors work in multidimensional and complex paths, and can be associated with the individual or environmental context. Such risk and protective factors appear very early in life in the form of biological and contextual channels, and continue to affect children's subsequent development and well-being (Smith, Dishion, Shaw, Wilson, Winter, & Patterson, 2014). For example, intrauterine substance exposure has been shown to affect the HPA axis, which is later related to the child's ability to regulate stress and behavior (Beijers, Buitelaar, & de Weerth, 2014; Rothbart, Sheese, Rueda, & Posner, 2011). This demonstrates that risk and protective factors can emerge as early as the prenatal period. Further, risks that are associated with such early factors are more likely to co-occur with other risk factors, heightening exposure to more difficulties over time (Wellman et al., 2018). A review of the definitions and concepts of risk and protective factors can be found in Chapter 2, Section 2.1.2 and 2.1.3.

7.1.1.3 Adolescent age group: Problem behavior trajectory

Table 21. Summary of ages covered by analysis in the adolescent group

Time of analysis	Age range of sample	Mean age
1	11-16 years	12.92 (12 years 11 months)
2	11-17 years	14.26 (14 years 3 months)
3	13-18 years	15.31 (15 years 4 months)

Early adolescence is generally a time characterized by high levels of impulsive behavior (Bongers et al., 2003). Such behavior is however found to be transient and decrease over time with the development of behavioral and emotional regulatory skills as individuals age into their later adolescent years (Bongers et al., 2003). Such patterns have also been found in the adolescent group in the study sample, as the mean growth trajectory suggests that, as children age throughout their adolescent years, their behavior problems show a steep decreasing trend. A summary table of the ages covered by Time 1, 2, and 3 are presented in Table 21 above.

Children in this group had the highest starting problem behavior trajectory scores out of all of the age groups, beginning at a score of 62.73. A score of 62.73 is in the borderline clinical significance range, and is much higher than what past studies have found for similar-aged counterparts in the general population. For example, a group of adolescents in the US with a mean age of 13.05(SD=2.73) had a total problem score of 42.33 (SD=10.20) (Mazefsky et al., 2011). This may suggest that despite the declining trends found in the study sample, problem behavior is a prevalent concern among adolescents in the out-of-home care population. Such findings may be relevant to adolescence being a stage of heightened vulnerability, characterized by hormonal, cognitive, physical and emotional changes (Gunnar, Wewerka, Frenn, Long, & Griggs, 2009; Steinberg, 2005). Such developmental changes are nothing atypical, and are a part of normative development that all children go through. Yet, the adolescent group of this sample have particularly high levels of behavior problems that surpass the level of behavior problems shown by both early and middle childhood group samples. Furthermore, they are the only group who have Time 1 (mean

age 12 years, 11 months) behavior problems in the borderline clinical range. Such values may indicate behavioral problems that are beyond the range of normative pre-adolescence behavior, but rather reflect the onset of further difficulties, such as delinquency, substance abuse, conduct problems, and depression (Steinberg, 2005). Essentially a key point for this adolescent group is that through the NSCAW we do not know if they are adolescent entrants, or early childhood entrants to out-of-home care who then returned home and re-entered the care system as adolescents. Although we are unable to know the exact experiences of these adolescents before Time 1 in attempting to understand where their behavioral difficulties may be coming from, there is evidence in the child welfare literature that older children and adolescent entrants are more likely to experience greater difficulties (Becker, Jordan, & Larsen, 2007; Sinclair, Baker, Lee, & Gibbs, 2007; Wulczyn et al., 2002). One study reported that children from middle childhood and adolescence (i.e., ages 6-17) are more likely to have multiple placements and re-enter care (Wulczyn et al., 2002) compared to younger children, making it difficult to achieve permanency and stability. Furthermore, older children are also more likely to have shorter care episodes (Becker et al., 2007). Copious amounts of research have demonstrated the detrimental effects of placement instability (Rubin et al., 2007; Ryan & Testa, 2005; Stott, 2012), shedding light on why children in the adolescent group sample may be facing heightened difficulties.

Very much like the middle childhood group, the adolescent group also showed significant heterogeneity in the onset of problem behaviors but not the rate of change. This again reflects the broadened context of development that adolescents are now a part of. With older age, adolescents have the autonomy to expand their context even further than in the middle childhood period, contributing to more variability in their individual contexts and experiences. Furthermore, the physical, hormonal, and emotional changes that were aforementioned to contribute to adolescents' heightened vulnerability occur at different rates for individuals, adding to the heterogeneity (Benson, 2002).

Overall, while children in the early childhood group were the only ones with a rising trend in behavior problems, children in the middle childhood and adolescent group had higher initial levels. Furthermore, the ‘decreased’ scores of children at Time 3 for those in the middle childhood and adolescent group are still higher than the ‘increased’ scores of those in the early childhood group. This suggests that, generally speaking, children with the highest amount of problems were in their adolescent group, while children with the lowest amount of problems were in their early childhood group. In the next section, I will synthesize the results of research question 2 and how it relates to the existing literature.

7.1.2 Research question 2: How do different variables affect the onset and change of problem behavior trajectories?

This question investigated whether variables identified by Study 1 and preliminary statistical analyses, may act as a risk or protective variable for problem behavior outcomes. Detailed definitions of risk and protective correlates and factors are provided in Chapter 2, Section 2.1.2 and Section 2.1.3. To identify correlates, I first examined bivariate cross-sectional associations between the key variables (see Table 14 in Section 6.3.1) in the quantitative and mixed-methods child welfare literature and problem behavior outcomes. Then to identify factors, I examined longitudinal associations between these measures and problem behavior outcomes. Secondly, I estimated the direct effects of selected measures on problem behavior trajectories using a conditional latent growth curve model.

Bivariate analyses showed that different variables were protective and risk variables for behavior problems. Model 1 tested for variables that were significant in these bivariate analyses for each age group, and within them those which have been identified by the systematic review as being key to behavioral development were chosen. Model 2 tested for the effects of socioemotional skills. While other research has identified consistent cross-sectional associations between socioemotional skills and behavior problems, no longitudinal studies have been carried out in the out-of-home care population, a gap in research identified by the systematic review of the literature. To illustrate, one existing study investigated the impact of child

maltreatment on the socioemotional development of children at school (Kurtz, Gaudin, Wodarski, & Howing, 1993). In this study, abused children displayed severe socioemotional problems (Kurtz et al., 1993). However, the effects of these socioemotional competence (or lack of) on behavior problems were not examined. In a study by Baptista and colleagues (2018), child maltreatment and caregiver insensitivity predicted socioemotional difficulties 6 months after institutionalization. Again, whether and how these socioemotional difficulties were related to later problem development was not examined (Baptista et al., 2018). As such, there are empirical research studies which indicate that socioemotional difficulties exist among maltreated and out-of-home care involved children, but the consequences of these difficulties on behavior development are not yet known. Further, no existing studies have been identified that have used growth models to examine socioemotional skills and behavioral outcomes in the child welfare population. As such, the following sections will synthesize the results of both Model 1 and 2 within the existing literature.

7.1.2.1 Findings for the early childhood group

Effects of daily living skills and age at initial placement

Conditional growth curves for Model 1 show that daily living skills and younger age at initial placement are protective correlates for less problem behavior development for the early childhood group. As described in the methods chapter, daily living skills assess the ability to successfully complete tasks relevant to self-care, such as dressing and eating by themselves and practicing personal hygiene. Research shows that differences in the development of daily living skills are related to the caregiving environment including parenting beliefs, practices, and expectations (DeFlorio & Beliakoff, 2015; Kim, Sheridan, Kwon, & Koziol, 2013). To illustrate, caregivers' expectations in regard to elements of self-care in the early years may motivate children with a willingness to rise to these expectations and grow more developed forms of self-care. In turn, higher expectations for more capable levels of self-care may also affect children's behavior, in that caregivers who encourage and facilitate self-caring behaviors may also promote better

behavior. It may also be that caregivers who encourage children to learn these skills are more likely to interact positively with children in order to facilitate positive behavioral development (Trivette et al., 2010).

In the same model, older age at initial placement was a risk correlate for higher onset of problem behaviors. The same is found in existing research, as Cutuli and colleagues (2016) found that older age at first out-of-home care placement signaled progressively greater risk for children between the ages of 0 and 9. This elevated risk may be that those first identified as needing out-of-home care placement later in childhood had experienced previously unrecognized abuse or neglect for a longer duration prior to identification. One meta-analysis which included 26 studies each studying children in out-of-home care identified older age as a risk factor for placement instability (Oosterman, Schuengel, Slot, Bullens, & Doreleijers, 2007). Placement instability is distressful for children, and in turn may worsen behavior problems (Rubin et al., 2007).

Effects of self-control skills, cooperation skills, and type of caregiver

Model 2 shows that self-control and cooperation skills are protective correlates for problem behavior development, even after controlling for the type of caregiver. Socioemotional skills such as self-control and cooperation skills have not been studied yet in the existing child welfare literature. As such, the findings related to socioemotional skills presented in this thesis are exploratory in nature. Although socioemotional skills and its association with problem behavior have not been examined in the longitudinal context of out-of-home care, longitudinal research on children in high-risk communities demonstrate that aspects of socioemotional skills are indeed protective factors for children's positive behavioral development (Vazsonyi & Javakhishvili, 2019). For example, results from one longitudinal study found that children with higher self-control skills were more likely to have better behavioral outcomes, even after controlling for other risk factors (Sektnan, McClelland, Acock, & Morrison, 2010). Another cross-sectional study found similar results with a sample of homeless children (Obradovic, 2010). In this study, self-control skills predicted teacher reports of internalizing and externalizing behavior problems among a sample of homeless

children. Taken together, these studies suggest that even for children who face considerable adversity, higher self-control skills play an important role in promoting better behavioral outcomes. The development of self-control skills emerge as early as infancy, when babies learn to soothe their emotions with the help of their caregivers (Grolnick, McMenemy, & Kurowski, 1999). The literature on self-control asserts that separate domains of self-control develop at different rates (Montroy, Bowles, Skibbe, McClelland, & Morrison, 2016). For example, emotional self-control appears to develop earlier than behavioral self-control, which suggests that there are many windows of opportunity and periods of sensitivity for children to develop and strengthen self-control skills and for interventions to mediate this development (Paschke et al., 2016). Cooperation skills are another protective socioemotional skill which has been found in this model. Existing research indicates that cooperative behavior emerges as early as 18 months of age, when toddlers sometimes engage in helping behavior and listen to requests from adults (Karttinen et al., 2017). By the time that they are 24 months old, toddlers are able to cooperate with peers in working towards a common task together (Brownell, Lesue, Nichols, & Svetlova, 2013). While it is plausible to think that children who are more cooperative show less behavior problems, research to examine this specific mechanism has not been conducted yet.

Lastly, results show that living with an out-of-home caregiver, compared to living with a permanent caregiver, is a risk factor. Existing research indicates that many children who are placed in out-of-home care experience deep emotions of confusion and instability, as they are separated from their biological family, school, and community for an indefinite amount of time (Vanderwill et al., 2020). One of the largest concerns for children in out-of-home care is placement instability, which becomes a greater problem as children become older (Vanderwill et al., 2020). Placement instability is also related to a host of other difficulties, such as school mobility, and the consequent loss of social connections, relationships, and emotional supports (Vanderwill et al., 2020). Such difficulties have also been found to have negative impacts on educational attainment and low academic attainment (Maclean, Taylor, & O'Donnell, 2017; Pecora, 2012). Such results may shed light on the difficulties associated with being in out-of-home care and

the importance of striving for permanency. Obviously, placement stability is only one piece of the puzzle when assessing outcomes for children in out-of-home care. It is also important to gain an overall idea of children's competence, both within and outside the out-of-home family setting (Schofield & Beek, 2005).

The sample of children in this thesis have all had approximately one year of experience in out-of-home care at the time of sampling. This means that those who have indicated 'to live with a permanent caregiver' at Time 1 have either returned to their biological families or have been adopted to a permanent family. It may be that children who have been reunified with their biological caregivers are in a better position for healthy development, as it has been deemed by caseworkers that children are now able to reunify with their biological parents. According to US federal law, 'reasonable efforts' must be made for children to return back to their biological families and expedite permanency (Smithgall, DeCoursey, Yang, & Hazeltine, 2012). Although many children live with their out-of-home care families, in principle it is preferred for children to remain with their biological family rather than with an alternate out-of-home care family (United National General Assembly, 1989). Remaining at home prevents the potential negative effects that are associated with the separation of children from their biological parents, and the risk of instability that may follow placement in out-of-home care. If children are living with an out-of-home caregiver at Time 1 rather than with their biological caregiver, this may indicate the degree to which returning to their birth parents are inappropriate at this time- which would reflect negatively on their behavioral development. There is also longitudinal research evidence which shows that children with behavioral or emotional problems were less likely to be reunified than were children who did not face these difficulties (Landsverk, Davis, Ganger, Newton, & Johnson, 1996). Additionally, children reunified following relatively longer placements (approximately 18-35 months prior time in out-of-home care) appear to have lower reentry rates (25%) (Wulczyn, 2004). Experts suggest that maintaining a close child-caregiver relationship during a long separation is associated with lower rates of reentering into out-of-home care (Wulczyn, 2004). Since children in this study have all experienced long-term out-of-home care at recruitment, those that are in permanent care in Time 1 may have sustained this parent-child relationship,

and in turn, exhibit less behavior problems. It may also be that children in out-of-home care have experienced oscillation (Bullock, Gooch, & Little, 1998), defined as an experience of one or more failed returns into out-of-home care. Research on the difficulties faced by children oscillating between home and care (Farmer, 2014; Farmer & Wijedasa, 2013) asserts that a history of previous failed returns is associated with a higher likelihood of experiencing delayed reunification with the biological caregiver- an increasing issue as children become older (Webster, Barth, & Needell, 2000). In fact, one UK study showed that only in one quarter of the cases (26%) had all the problems for children and their biological parents been addressed before reunification, so that oftentimes issues that may jeopardize successful reunification and permanence remain unresolved, particularly difficulties related to substance use and enduring relationships with violent partners (Farmer & Wijedasa, 2013). Such issues would have negative consequences for the child's mental health and behavior problems, which would in turn provide an explanation for the results found. The next section will discuss the results in light of the literature for the middle childhood group.

7.1.2.2 Findings for middle childhood group

Effects of school engagement, daily living skills, age at initial placement, and type of caregiver

For the middle childhood group, conditional growth curves for Model 1 show that school engagement, older age at initial placement, and daily living skills are protective correlates for problem behavior development, even after controlling for type of caregiver. The analytic sample of children in the middle childhood group are entering or in the middle of their primary school years. At this developmental stage, the daily living skills that children are expected to perform are tasks such as answering the phone, preparing food, and carrying out simple household chores (Dieterich et al., 2004). Similar to interpretations made for the early childhood group, higher caregiver expectations for the middle childhood group are likely to be related to not only higher daily living skills children exhibit, but also the amount of positive behavior they demonstrate as well. In line with these presumptions, one study which examined caregiver-child dyads in the general population showed that higher parental expectations were associated with higher levels of daily living skills among children 4 to 8 years of age (Dietrich et al., 2004). In this study, it was also

important that caregivers' expectations were appropriately matched at the level of the child's age and developmental stage, and were not excessively high or low. Furthermore, levels of caregiver expectations were similar across various domains, so caregivers who had higher expectations for their children in the area of self-care also had higher expectations for their children in the areas of language and mental development. This may indicate that caregivers who have higher expectations of children's daily living skills also have higher expectations for their behaviors, and in turn facilitate and instigate higher daily living skills as well as better behavior. On a similar note, Hess and colleagues (1980) found that children's higher academic and cognitive scores at early school age were predicted by higher parental expectations for social skills and verbal assertiveness by US parents and self control by Japanese parents. It was speculated that this occurs because parents who have higher expectations are more likely to stimulate ability development and create opportunities to promote appropriate and relevant skills (Hess et al., 1980). Thus, as for the early childhood group, it may be that children with caregivers with a generally high level of expectation behave better, which may explain the results found in this model.

School engagement is the second protective correlate identified for the middle childhood group. Research on children in the general population suggest strong associations between school engagement and a host of developmental outcomes, including behavioral outcomes (Oliver, Morin, Langlois, Tadif-Grenier, & Archambault, 2020). Research evidence shows that school disengagement coupled with internalizing and externalizing behavior problems are one of the strongest predictors of school dropout and academic failure (Oliver et al., 2020). Moreover, internalizing symptoms can hinder school engagement (Pears et al., 2013). One study also showed that school engagement predicted decreased delinquent behavior among elementary school children (Hirschfield & Gasper, 2011). One possible explanation for difficulties in school engagement among the out-of-home care population is heightened school instability that is followed by placement changes (Pears, Kim, & Brown, 2018). One report also found that many of the schools attended by children in out-of-home care were in high deprivation areas (Brown, Ward, Blackmore, Thomas, & Hyde-Dryden, 2016). This report showed that the children's schools were more likely to have above average

numbers of children with special educational needs (18/26: 69%), more likely to have a larger than average student body (15/26: 58%), and/or eligible for pupil premium funding (21/26: 81%) (Brown et al., 2016). Pupil premium funding refers to social policy in the UK introduced in 2011 which provides additional school funding for those children who have been looked-after by local authority for more than six months and also those who have been classified as having deprived socioeconomic backgrounds (Gorard, 2016). The task of teaching became more difficult in these schools due to the high proportion of children with additional support needs. Within these schools, teachers were generally aware of children's difficult family circumstances, and acknowledged that school could serve as a safe haven for them (Garcia de Jesus & Ferriani, 2008). A wide range of resources are provided by schools to intervene in children's behavioral and emotional difficulties, and also to assist their achievement of meeting expected standards of academic progress for their age group (Brown et al., 2016). School engagement may also be a particular concern for children in out-of-home care due to their histories of maltreatment. To illustrate, lower levels of school engagement are found to be more prevalent in children from high-poverty, high-risk families (Perdue, Manzeske, & Estell, 2009; Tyler, Johnson, & Brownridge, 2008). Researchers also found that maltreated children from high-poverty families are more likely to have low school engagement compared to children in high-poverty families alone (Shonk & Cicchetti, 2001). Collectively, these studies suggest that children in out-of-home care may experience particularly higher risk of low school engagement, which have a bi-directional relationship with increased behavior problems. From the results of this thesis, school engagement is a correlate of behavior problems, which means the direction of the effect is unclear. Fortunately, school engagement as a trait is generally agreed to be malleable and able to be improved with environmental support (Dotterer & Lowe, 2011; Wang & Eccles, 2013). Thus, it is a useful target for intervention efforts to reduce problem behavior levels. Further research is required to understand the relationship between school engagement and behavior problems among children in out-of-home care, in order to efficiently and effectively inform the planning and enforcement of interventions.

Effects of self-control skills, cooperation skills, and type of caregiver

Model 2 shows that self-control skills and cooperation skills are protective correlates for problem behavior among children in the middle childhood group even after controlling for type of caregiver. Research on children from the general population indicates that between the ages 3 and 7, the essence of self-control goes through a transition from a co-regulated form (control of emotions and behavior are guided by an adult) to a more complex, independent form (control of emotions and behavior are enforced by the individual) that may necessitate the combination of multiple skills, such as executive functioning and verbal skills (Montroy et al., 2016).

Cooperation skills have also been found to be a protective correlate for the middle childhood group. The same has been found in the early childhood group as well, but the literature asserts that cooperative behavior developed during the middle childhood years are more complex and advanced than during the younger years (Kaartinen et al., 2017). A child's decision to cooperate with another person now depends on an internal reputation that is created based on past interactions (Warneken, 2018). For example, children may choose not to cooperate with an individual if they have experienced uncooperative interactions in the past, or if being cooperative did not result in gratifying outcomes. Further, research demonstrates that children who show more cooperative behavior are less likely to be aggressive (Kaartinen et al., 2017). Collectively, these studies suggest that cooperative behavior may occur in a transactional process, where children act more cooperatively when they have had positive experiences associated with it. Again, intervention efforts to promote specific cooperative behavior that are age and developmentally appropriate may be useful in reducing problem behaviors in the future.

In line with the results set out in this thesis, developmental theories and previous research have emphasized the significance of cooperation and self-control skills (Eisenberg et al., 2015; Lickona & Davidson, 2005; McClelland et al., 2015). Cooperation and self-control skills become increasingly critical in middle childhood as children interact with peers and adults outside of their family and these skills help set the stage for the development of important interpersonal and intrapersonal skills, which are reflective

indicators of socioemotional development, moral development, positive youth development, and academic achievement into adolescence (Bandura, 1991; Gulseven et al., 2021; Vaish & Tomaselo, 2014). Cooperation and self-control skills develop throughout early childhood and adolescence (Takahashi, Okada, Hoshino, & Anme, 2015; Vazsonyi & Huang, 2010). Developmental scholars have argued that cooperation and self-control are related and can influence each other over time (Lickona & Davidson, 2005; Weissberg, Durlak, Domitrovich, & Gullotta, 2015). Self-control is an intrapersonal skill theorized to facilitate cooperation (Eisenberg et al., 2015), because cooperation, which requires two or more individuals to share goals and intentions and work together to achieve a mutual goal (Tomasello, Carpenter, Call, Behne, & Moll, 2005), requires more coordination and collaboration than other prosocial behaviors, such as helping or sharing. At the same time, cooperation affords opportunities to model and practice self-control skills that can deter instances of personal distress (i.e., a self-focused and aversive emotional reaction to the needs of others) (Hoffman, 2000). Existing research suggests that self-control or self-regulation measured at a single time point in early or middle childhood is positively associated with their concurrent and later cooperation (Carlo, Crockett, Wolff, & Beal, 2012; Laible, Carlo, Murphy, Augustine, & Roesch, 2014). Researchers have yet to test the bidirectional relations between self-control and cooperation as posited by developmental scholars (Lickona & Davidson, 2005; Weissberg et al., 2015). It is also notable that a large body of empirical research suggests that sensitive parenting is linked to children's self-control and cooperation (e.g. Laible, Carlo, Davis, & Karahuta, 2016; Newton, Laible, Carlo, Steele, & McGinley, 2014). Sensitive and stimulating parents support their children's capacities of cooperation and self-control by being warm, responsive, and supportive, respecting children's autonomy in parent-child interactions, encouraging and helping their children to complete tasks, and providing constructive feedback (Grolnick, Causo, & Levitt, 2019; Hirsh-Pasek & Burchinal, 2006; Spinrad, Eisenberg, & Valiente, 2019). Grolnick and colleagues (2019) argued that the values of parents are then internalized by children who become inherently motivated to perform self-control and cooperation behaviors voluntarily. Notably, the results of this study coupled with other existing research emphasize early and middle childhood as an important period of development

to master these social skills to foster behavioral adjustment. Further, prevention and intervention programs that aim to foster self-control will be helpful in concurrently fostering cooperation and vice versa.

Lastly, results show that living with an out-of-home caregiver, compared to living with a biological caregiver, is a risk factor. Out-of-home care was related to lower onset of problem behavior, but steeper increase of symptoms over time. This suggests that the out-of-home care setting is initially associated with lower levels of behavior problems, but is later associated with rising levels of problem behavior over time. Such results indicate that out-of-home care is a protective correlate, but a risk factor. Findings may reflect the ‘honeymoon period’ in out-of-home care, where children display better behavior at the beginning of a new placement (Szilagyi, 1998). Caregivers indicated in a qualitative study (Lance, 2020) that during the honeymoon phase, there is generally very little behavior that is difficult to manage. Researchers and the caregivers of this study speculate that the low amounts of behavior problems are due to children taking their time to adjust to their new setting and not knowing how to behave (Hedin, Hojer, & Brunnberg, 2011). However, as the results show, out-of-home care setting showed to predict maladjustive behavioral trends over time. These results may indicate that there may be hardships associated with being in out-of-home care compared to living with a permanent caregiver that predicts the development of increased problem behavior over time. Such difficulties concerning issues related to out-of-home care, including placement instability and oscillation in and out of care are described in further detail in Section 7.1.2.1.

On the other hand, there are also concerns for children who remain at home with their biological families related to their vulnerability to repeated maltreatment (Campbell, Thomas, Cook, & Keenan, 2012) and risk of developmental difficulties resulting from less favorable home environments such as parental psychopathology, poverty, family violence, and substance abuse (Campbell et al., 2012; Lloyd & Barth, 2011). However, for the evaluation of placement settings, the possible negative consequences of remaining in a dysfunctional home, which may be accompanied by in-home services, have to be balanced against out-of-home care and its related aspects such as removal of the child from their home, separation from parents,

and the stressful period of getting used to a new family and home for the well-being and developmental outcomes of the child (Britner & Moddler, 2002). Some studies have found better outcomes for children who were placed in out-of-home care (Barber & Delfabbro, 2005), while others found better outcomes for children who remained at home (Bada et al., 2008). In short, these separate studies have not convincingly established how the developmental outcomes of children in out-of-home care relate to those of children at risk who remained at home (Janssens & Deboutte, 2010). However, an important issue in the individual studies comparing children in different placement settings is whether a meaningful comparison can be made between children in out-of-home care, children at-risk who remained at home, and children from the general population. The evidently unavoidable preexisting differences between children in particular living arrangements complicate simple comparison; differences on many dimensions and aspects of child development, in caregivers' competences and personalities, as well as in contextual affordances makes 'common' *ceteris paribus* reasoning (i.e., all other things being equal), which is fundamental to making systematic comparisons, challenging. Such decisions in child welfare, on whether children can remain with their biological family or instead should be placed in out-of-home care, are among the most difficult and complex decisions that child welfare professionals have to make (Goemans, van Geel, van Beem, & Vedder, 2016).

Effects of gender, race and ethnicity

As mentioned in Chapter 6, Section 6.3, the effects of gender have been controlled for in both models of the middle childhood group. This has been done because it was shown that girls were less likely to show behavior problems compared to boys when entered separately in the growth curve with the middle childhood sample. When gender was entered as a covariate with other predictors, it was no longer significant. That gender was only statistically significant for the middle childhood group may be related to their developmental stage. To specify, middle childhood is when children first enter grade school. Research shows that, on average, boys first entering school show more difficulty in the areas of behavioral self-control, paying attention, and regulating impulsivity (Chapple & Johnson, 2007; Owens, 2016).

Psychological research asserts that children with lower levels of verbal and language skills at this age may face more difficulties with controlling impulsivity (Hebert-Myers, Guttentag, Swank, Smith, & Landry, 2006; Villemarette-Pittman, Stanford, & Greve, 2003). This is proposed to be because children who are unable to express their emotions and desires into words are more likely to feel frustrated and may instead fall back on expressing themselves through aggressive behavior (Gremillion & Martel, 2014). Indeed, gender differences are consistently found in both national and international assessments of reading in the favor of girls (Logan & Johnston, 2010). According to Hirschi and Gottfredson (1994), impulsivity is a natural trait of humans, and these natural instincts are regulated through the development of self-control and verbal abilities as children grow older. Such literature may explain why gender is no longer statistically significant in the adolescent group, because at this age it is no longer a difference of gender, but a difference of each individual and their ability to regulate behavior. Alongside gender, both age and White race were also tested as a part of the preliminary model to investigate whether it had a significant effect on the slope and intercept of behavior problem trajectories (see *Appendix J* for model results). As discussed in both Section 6.3 and *Appendix J*, results of these models demonstrated that none of the demographic characteristics except gender for the middle childhood group had significant effects. Although a multitude of past research asserts that developmental age is strongly related to the growth of behavior problems (e.g. Campbell, 1997; Caspi et al., 1995; Dubois-Comtois, Moss, Cyr, & Pascuzzo, 2013; Mahoney, Jouriles, & Scavone, 1997), age in years was not a significant factor in the models of each age group. This is most likely because the division of the age groups have already accounted for the effects of age, and that within the smaller age groups, each year does not have a significant effect.

As for race and ethnicity, past research shows that there is a historically disproportionate representation of non-White children in out-of-home care compared to their numbers in the general population (Barth, 1997). To illustrate, Yi and colleagues (2020) found that American Indian/Alaska Native children were at higher risk for child maltreatment and out-of-home care placement in the US throughout 2012 and 2016. Prior research also suggests that parenting practices may differently affect children of color

and White children (Ma & Klein, 2018). According to group differences hypothesis, the development of children reflects the cultural and environmental contexts of their race and ethnicity (Rushton, 1985). Thus, socioeconomic, cultural, and other contextual factors that are confounded with race and ethnicity are expected to moderate the relationships between children's caregiving experiences and behavior. Several studies have shown support for this hypothesis, finding differential effects of social conditions on child behavior problems by racial and ethnic groups (McLeod & Owens, 2004; Samaan, 2000; Spriggs, Iannotti, Nansel, & Haynie, 2007). Despite such evidence, White race (compared to other minority race of color) of the children in this study were not significantly related to problem behavior. Such results align with the findings of the systematic review of this thesis (see Study 1 in Chapter 3), which found that none of the static individual characteristics (age, race and ethnicity, gender) are stand-alone factors for problem behavior development. Many of the included studies focused on a particular population group with a distinct demographic feature, but findings proved to be different depending on the type of out-of-home placement, inclusion criteria, defined comparison group, outcome measure, and study design. However, a certain characteristic may be associated with certain environments or experiences of risk. For example, one study found significant differences exist in vulnerability and exposure to childhood adversity depending on gender, race, and ethnicity (Roxburgh & MacArthur, 2014). Children of color often represent a vulnerable population in terms of their psychological and behavioral problems due to their high likelihood to be of low socioeconomic status, limited access to physical and mental health services, and minority status (Cheng, 2010; U.S. General Accounting Office, 2007). However, despite their greater risk for problem behavior outcomes, the majority of children develop as effectively functioning adults and successfully adapt to their environments. Clearly, these children benefit from protective factors that act as important buffers against the challenges of prejudice, poverty, and social isolation. These protective factors may include social networks and supportive kin, extended families, traditional sources of healing or help, and strong religious beliefs (Gibbs, Huang Larke, & Associates, 1989).

7.1.2.3 Findings for the adolescent group

Effects of neighborhood community problems, post-traumatic stress symptoms, and age at initial placement

For the adolescent group, conditional growth curves for Model 1 showed that neighborhood community problems were a risk factor for problem behavior development, while post-traumatic stress symptoms and younger age at initial placement were risk correlates. Behavior problems during the preadolescence period is an important indicator for later antisocial behavior, delinquent behavior, and criminal behavior (Plybon & Kliewer, 2002). Model 1 (see Chapter 6, Section 6.3.3.3 for model results) shows that neighborhood community problems are a risk factor for adolescent problem behavior. There is growing literature on this finding, and recognition of potential harm outside of the family environment as a safeguarding concern for adolescents (Firmin, 2018). Such research presents the contextual account of out-of-home care which not only highlights the risks posed to children within environments beyond their homes, but also recognizes the interplay between familial and extra-familial contexts (Firmin, 2017). Research shows that the characteristics of neighborhood communities have important implications for adolescents' development, because neighborhoods are where adolescents use education, health, and social services; cultivate a sense of cultural beliefs, habits, and norms; and engage with community members at close proximity. Researchers have shown that rates of juvenile crime are more likely to occur in neighborhood areas that are characterized by dense populations, high poverty, highly mobile residents, physical depreciation, and disorganization (Ingoldsby & Shaw, 2002). The level of direct contact individuals have with one's neighborhood context varies depending on his or her age. This may explain why this variable was a risk factor for the adolescent group, but not for the other younger age groups. When children are in their early childhood years, their direct interactions with the neighborhood are relatively small. Rather, the influences of the neighborhood are more likely to indirectly affect children through their caregivers. However, as children grow older, their interaction with the neighborhood becomes more frequent and direct. The findings indicate that the neighborhood is an additional social context influencing behavior problems. As proposed by social disorganization theory, neighborhood context is a distal factor

that influences more proximal contexts of adolescent development including family and peers (Deutsch, Crockett, Wolff, & Russell, 2012).

Model 1 also found post-traumatic stress symptoms to be a significant risk correlate for higher problem behavior onset. This is a prevalent finding in the child welfare literature, and is confirmed by past studies that have found that children who have experienced chronic early maltreatment are likely to experience post-traumatic stress symptoms, and are at significant risk for a variety of other difficulties (Becker-Weidman, 2009; Yoon et al., 2016). When the traumatic experience of maltreatment is imposed by a primary caregiver, effects may be more detrimental and disrupt the development of attachment security (Cicchetti & Doyle, 2016). According to the developmental traumatology theory (De Bellis, 2001; De Bellis, 2002), early child maltreatment and traumatic experiences may contribute to the dysregulation of biological stress response systems, which may in turn increase behavioral and emotional problems and post-traumatic stress symptoms (Yoon et al., 2016). Such psychiatric symptoms may then lead to adolescents' substance use as they look for ways to relieve potentially mentally painful psychiatric symptoms (De Bellis, 2002). In line with the developmental traumatology theory, empirical research also demonstrates the potential relationship between childhood maltreatment, PTS symptoms, and adolescent behavior problems (e.g., Rosenkrantz et al., 2014). For example, experiences of physical abuse and sexual abuse have been related to increased risk of post-traumatic stress symptoms, and post-traumatic stress has been reported to be a predictor of behavior problems (Goldstein et al., 2011; Ullman, Najdowski, & Filipas, 2009). Less studies, however, have examined post-traumatic stress as a mechanism connecting maltreatment and behavior problems, and these studies have yielded mixed results. One study found that complex post-traumatic stress symptoms mediated the relationship between overall maltreatment exposure and adolescent substance use, among youth seeking substance use treatment (Rosenkranz et al., 2014). On the contrary, another study found no such mediating effect of PTS symptoms between maltreatment and substance use (Faulkner et al., 2014). Further research is needed to understand whether PTS symptoms have a mediating effect between maltreatment exposure and adolescent behavior problems.

Lastly, Model 1 also found younger age at initial placement to be a risk correlate. This is the exact opposite of results for the early childhood group, which found older age at initial placement to be a risk correlate. These findings are unusual, as older age is mostly considered to be a risk factor in the child welfare literature (Rock, Michelson, Thomson, & Day, 2013; Steen & Harlow, 2012). Although it was uncommon, one study in the research literature found that children first placed into out-of-home care at a younger age showed more delinquent behavior (Huang et al., 2016). It is difficult to understand the precise mechanisms underlying this inconsistency, but it may be that older age within the adolescence period reflects a more stable mental state (Meeus, van de Schoot, Keijsers, Schwartz, & Branje, 2010). (Such uncertainty is due to limitations of the NSCAW data such as lack of data concerning oscillation of care pathways, a limitation that is explored further in Section 7.3.1). On the other hand, younger age during the adolescence period is characterized as a transitory period when adolescents go through many changes including those that are both biological and psychological (de Goede, Branje, & Meeus, 2009; Luna, 2009). It may be that transitioning into out-of-home care at this age adds to the instability that already exists from transitioning from middle childhood to preadolescence, and this stress is expressed as heightened internalizing and externalizing symptoms. Although the factor of age at first ever out-of-home care placement is examined in this thesis, another important factor emphasized in the research literature that could not be investigated in this thesis is the rate of placement stability of the included children across the three data collection time points. As past research asserts the importance of placement stability and consistency of caregivers on the behavioral development of children (Rubin, Alessandrini, Feudtner, Mandell, Localio, & Hadley, 2004; Rubin et al., 2007), it is a limitation that the NSCAW does not have sufficient information on what happens to the children and young people between data points. Understanding whether children had consistent caregivers or if they oscillated in and out of different placements and out-of-home care would have a very different impact on their out-of-home care experience and behavioral trajectory as well (Corradini, 2018; Kimberlin, Anthony, & Austin, 2009).

Effects of responsibility skills, incident(s) of recent abuse, assertion skills, and caregiver involvement

Model 2 shows that responsibility is a protective correlate of problem behavior development, even after controlling for minor, severe, and very severe incident(s) of abuse in the past year. In this context, responsibility skills represent behaviors that demonstrate the child's concern for property or work and his capability to communicate with adults. Incident of a minor physical abuse in the past year was a risk correlate. Assertion skills were a risk factor, but only when controlling for incident of minor physical abuse and severe physical abuse in the past year. After controlling for incident of very severe physical abuse, assertion no longer had any statistically significant association with problem behavior. Lastly, caregiver involvement was only a protective factor when controlling for incident of minor physical abuse, but had no statistically significant association after controlling for more severe levels of physical abuse.

In other words, when severe and very severe abuse incidents were controlled for, involvement of the caregiver no longer had a positive effect on children's problem behavior. For the other less severe level of maltreatment, involvement of the caregiver acts as a protective factor, predicting a declining trend for problem behavior over time. This may mean that these children have difficulty recovering from severe abuse to be able to benefit from other positive relationships that form later in life with other adults. Relationships with a caregiver are important during this developmental period, as adolescents are more likely to take advice from caregivers when they feel closer to them (Ungar, 2004b). Also, valuing this child-caregiver relationship will mean wanting to spend more time together which in turn may mean less time to take part in deviant behavior outside of the home context. To illustrate, better caregiver-child relationships have been associated with decreased risk of substance use, early sexual relations, and depressive symptoms (Fosco et al., 2012). Furthermore, research found that, among adolescents from high-risk families, higher quality mother-adolescent relationships had a mediating effect on the relationship between maternal history of victimization and adolescent internalizing and externalizing symptoms (Claridge, Lettenberger-Klein, Farineau, Wojciak, & McWey, 2014). Similarly, another study found that child welfare-involved adolescents who report to have experienced mild or moderate violence in the home exhibited significantly lower levels of out-of-home caregiver-child relationship quality, which was in turn associated with greater

levels of caregiver and adolescent reports of behavior problems (Yoon et al., 2015). However, it was difficult to understand the direct and explicit associations between the variables in this model, and was thus explored further in research question 3.

Assertive behavior was initially hypothesized as a protective correlate, as it was a subscale of prosocial skills, which would intuitively be considered to be a positive characteristic. Assertiveness refers to the direct expression of desires, feelings, and thoughts during interpersonal exchanges. According to a definition put forth by Lange and Jakubowski (1976), “assertiveness involves standing up for personal rights and expressing thoughts, feelings, and beliefs in direct, honest, and appropriate ways which do not violate another person’s rights” (p. 7). However, results showed that assertion was actually a risk factor, predicting steeper inclining trends for behavior problems over time. The assertion subscale measures initiating behaviors, such as introducing oneself and asking others for information. It is an important social skill, but is found to be a risk factor for the adolescent sample group of this thesis. While this remains an understudied topic, past research shows that different domains of social skills have been shown to be differentially associated with delinquent behavior (Laporte et al., 2021). In alignment with the findings of this thesis, high levels of assertiveness have been found to be related to a higher risk of cannabis use in past studies (Griffith-Lendering et al., 2011; Veselska, Geckova, Orosova, Gajdosova, van Dijk, & Reijneveld, 2009). This result may be because children with higher assertive skills are more likely to be able to engage in activity with peers (Eskin, 2003). Adolescence is a time when young people spend more time with peers than their caregivers, leading to less monitoring and supervision (Hill, 1993). As such, adolescent problem behaviors occur for the most part in the peer context (Fosco et al., 2012). Adolescents in out-of-home care may have even stronger ties with their peers because they may have experienced weakened connections with their biological family members or may not have developed a strong enough relationship with their out-of-home care family (Farineau, Wojciak, & McWey, 2013). It may also be that adolescents find a sense of consistency in their peer group, if they have experienced a placement change but not a change in schools (Torronen, 2006). Within the peer context, it has been shown that adolescents may be at heightened risk for

participating in substance use and delinquent behaviors when they spend time with delinquent peers (Fosco et al., 2012). Thus, it may be that assertion is related to the problem behaviors that occur in the peer context. Delinquent behaviors such as substance use very seldom occur in solitary, demonstrating again the importance of peer-related deviation of behavior (Fosco et al., 2012). Further, affiliation with deviant peers has consistently predicted adolescent problem behavior in both cross-sectional and longitudinal research. In these studies, peers are seen as risk factors, and negative aspects of peer relations (e.g., peer pressure, association with deviant peers) are emphasized (Dekovic, Buist, & Reitzthe, 2004).

On the other hand, higher responsibility skills predicted lower onset of behavior problems. Research indicates that adolescence is a period of increased responsibility and ability to suppress impulses (Monahan, Steinberg, Cauffman, & Mulvey, 2009). In addition, pubertal transitions and hormonal changes come before stability in regulating one's impulses (Steinberg, 2005). As such, it may be that this new development of responsibility works as a key measure for problem behavior development during adolescence. Data on adolescents' behavior often present adolescents as poor decision-makers (e.g., engagement in activities such as drug use, unprotected sex, participation in dangerous activities) (Berns, Moore, & Capra, 2009; Johnston, O'Malley, & Bachman, 2003; Kirby, 2002). However, there is ample evidence showing that adolescents participate in dangerous activities in spite of knowing the impending risks (Johnson & Malow-Iroff, 2008). This means that, in reality, adolescents recognize the consequences of their behavior, but are swayed by peer pressure and social influences. In relation to the findings of this thesis, this may indicate that having a stronger sense of responsibility may influence their decisions to stay away from risky activities (Steinberg, 2005). This may imply that despite children experiencing extreme levels of adversity, positive adaptation is still possible through the protective correlate of responsibility skills. To explore this relationship further, the analyses for research question 3 have been tested, as synthesized and presented in the following section.

7.1.3 Research question 3: Is there a mediating relationship between incident of abuse within the

past year and future behavior problems?

Research question 3 examined the relationship between severity of recent abuse incident(s), caregiver involvement, responsibility skills, and later problem behavior at greater depth. To do this, two moderated mediation path analysis models have been estimated. This meant that the relationships between variables could be more explicitly estimated (Chan, Lo, & Ip, 2018). Moreover, it allowed the understanding of how the relationship between severity of recent abuse incident and caregiver involvement/responsibility worked, something that could not be explicitly observed with the growth curve models. In doing so, this analysis used a different analytical strategy to explore whether either responsibility skills or caregiver involvement was a protective factor for the behavior problems of children in out-of-home care. The statistical models also examined whether post-traumatic stress symptoms moderated the relationship between incident of abuse and caregiver involvement, as well as incident of abuse and responsibility skills.

Model results indicated that neither caregiver involvement nor responsibility skills mediated the association between incident of abuse and problem behavior outcomes three years later. To explain further, the independent variables of incident of severe physical abuse in the past year predicted significantly higher levels of behavior problems at Time 3. However, incident of minor and very severe physical abuse in the past year did not have any statistically significant associations with problem behavior at Time 3. These results suggest that minor and very severe physical abuse does not have lasting effects on future problem behavior levels, but more severe levels of abuse such as those categorized as severe physical abuse are associated with heightened behavior problems up to at least three years later. While it may seem inconsistent that incident of very severe abuse in the past year has null effects while incident of severe abuse is associated with significantly more difficulties three years later, I attribute this to the low sample size and statistical power which may prevent the detection of certain effects (Button et al., 2013). Low power means that the probability of identifying genuinely true effects is low. In other words, studies with low power are more

likely to produce false negatives compared to high-powered studies. Small sample size is a limitation of this study, and it is recommended that future studies try to replicate these results with a larger sample.

The mediation relationship tested in these path models was involvement of the caregiver perceived by the child. Before testing for a mediating effect, a significant association between the independent and dependent variable must first be identified (Baron & Kenny, 1986). Following these guidelines, the mediating effect of caregiver involvement is only tested when the independent variable is severe abuse incident in the past year. A mediating variable intervenes between the independent and dependent variable to indirectly affect the dependent variable (Kim, Kaye, & Wright, 2001). In other words, it is a variable that is affected in some way by the independent variable and in turn affects the dependent variable. A mediating variable explains the underlying mechanism present in the relationship between the independent and dependent variable. Results indicated that caregiver involvement is not a significant mediating variable between incident of severe abuse in the past year and problem behavior 3 years later. To explain further, incident of severe physical abuse did not significantly predict levels of caregiver involvement. However, more caregiver involvement did predict less problem behavior development 3 years later.

The internal working model hypothesis of attachment theory (Bowlby, 1982) predicts that previous experiences of maltreatment will affect the attachment relationship with the caregiver to impact ongoing interactions in a transactional way. Research demonstrates that children who are placed in out-of-home care after experiencing maltreatment are at risk for relationship difficulties with their out-of-home caregivers (Cooley, Farineau, & Mullis, 2015). In the current research question, the incident of abuse variable asks about events that have occurred within the past year. This may indicate that the child is under the care of a different caregiver at the time of measurement from the caregiver who has afflicted the abuse indicated in the variable. Of children who indicated they had experienced minor experience of abuse in the past year, approximately 55% (31 out of 56) of them had spent over a year in care with their current caregiver, indicating that their current caregiver was the perpetrator of the abuse. Similarly, 38% (11 out of 29) and

35% (7 out of 20) of children who indicated respectively severe and very severe experience of abuse in the past year, had spent over a year with their current caregiver, again indicating that their caregiver at the time of data collection was the perpetrator of the abuse. However, even for children who have lived with their current caregiver for less than a year, there still exists some possibility that their current caregiver is the perpetrator of the abuse, because the abuse measure indicates any incident that has occurred within the past year. By and large, we are not able to ascertain whether the caregiver involvement measure represented involvement of the perpetrating or non-offending adult. This indicates that the findings may require significant caution in interpretation. At present, it is difficult to know whether greater child-perceived caregiver involvement is protective regardless of the status of the caregiver. It is recommended that future studies define and label these measures more precisely, in order to understand the meticulous mechanisms that may be occurring between caregiver involvement, severity of abuse, and children's behavior.

Model results indicate that more caregiver involvement perceived by the child predicts less future behavior problem outcomes, and that the strength of child-perceived caregiver involvement is not affected by the severity of the recent abuse incident in the past year. In this case, the findings would suggest that there is potential for physically abused children to develop subsequent secure attachments during adolescence with the support of involved and caring caregivers. To reinforce the implications of these results, one study (Joseph, O'Connor, Briskman, Maughan, & Scott, 2013) compared the characteristics of attachment relationships that adolescents had with their birth parents and out-of-home care parents. Results found that whereas all adolescents showed insecure attachment patterns with their biological families (90%-100%), almost half of the adolescents showed secure attachment patterns with their out-of-home care families (46%-49%). Although I would like to avoid drawing conclusions too firmly given the difficulty in knowing whether the caregiver who has inflicted the abuse is different from the caregiver represented in the mediating variable, the results of these models may indicate that adolescents who experienced severe abuse are nevertheless open and susceptible to new caregiving relationships and substantial recovery. (To clarify, while children have already been placed in out-of-home care and have stayed in care for

approximately 12 months at Time 1, it is still possible that the caregiver completing the Time 1 survey will have been the perpetrator of the abuse indicated in the abuse incident measure. This does not necessarily mean that this is the same perpetrator of the abuse that led the child being placed in the NSCAW study, because many children move in and out of care as well as between multiple caregivers (Kimberlin et al., 2009).) Furthermore, results showed that child perceived level of caregiver involvement was associated with less behavior problems three years later. A large body of research demonstrates that caregiver involvement is an important factor for behavior problems (Cole & Eamon, 2007; Cooley et al., 2015; Fosco et al., 2012). During adolescence, elements of child-caregiver relationships are transitioning. Caregiving that is characterized by support and closeness may reduce adolescent behavior problems. Contrarily, adolescents who are prematurely given too much freedom and lack of supervision may receive inadequate caregiver guidance and resort to seeking inappropriate advice from peers. As such, it is important that both caregivers in the out-of-home placement context as well as in the biological family context provide close and connected relationships with the child in order to help children onto a path of positive behavioral development.

The second moderated mediation path model tested whether responsibility is a protective mediating factor between incident of abuse and later problem behaviors, as responsibility was identified as a protective correlate in the conditional growth models. As with the first moderated mediation path model with caregiver involvement, incident of minor and very severe physical abuse in the past year did not predict problem behavior outcomes at Time 3. As such, a mediating relationship was not examined in this model. However, incident of severe abuse in the past year predicted problem behavior outcomes at Time 3, so the mediating measure of responsibility was investigated. Results of both indirect and total effects indicated that there was not a mediating relationship between severity of abuse incident and problem behavior. Responsibility did, however, predict later levels of problem behavior at Time 3. This suggests that responsibility is only associated with future problem behavior outcomes, but not incidents of abuse which have occurred in the past year. As such, responsibility skills may be used as a protective characteristic which mitigates the

development of behavior problem outcomes in the future, as it is not affected by the incident of maltreatment.

In summary, this chapter so far gave a brief overall discussion for each research question. In doing so, the findings are reiterated once more and also placed in the context of the existing research literature. The first research question examined the growth trajectories of problem behavior for children in out-of-home care within each age group. A discussion of the expected and typical trajectory of behavior problems that are often observed is presented, and the findings of the thesis (Study 2) are compared within this typical pathway. The second research question investigated whether variables identified by Study 1 and preliminary statistical analyses, act as a risk or protective variable for problem behavior outcomes. The findings of identified risk and protective variables are discussed in light of each relevant age group and developmental stage. For the third and final research question, the relationship between severity of recent abuse incident(s), caregiver involvement, responsibility skills, and later problem behavior are examined at greater length. The chapter will now turn to the strengths and limitations of the study, as well as the external and internal validity of the findings.

7.2 Strengths of the study

In this section, the strengths of the study are first described. Then the limitations, internal and external validity, and lastly, implications for research, practice, and policy are discussed. Overall, the study has three noteworthy strengths, each of which are discussed below. The first is the originality and relevance of the study, the second is the sophistication of the statistical approach, and the third is the quality of the data.

7.2.1 Originality and relevance of the study

The originality and relevance of this study is the first main strength of this thesis. This is one of the first longitudinal study to focus exclusively on socioemotional skills for children in out-of-home care and

identifies risk and protective factors for behavior problems. Its findings are also relevant to practice, research, and policy (see Section 7.6.2 and Section 7.6.3 below).

A systematic search conducted for the literature review of Study 2 (see Chapter 3) identified 224 risk and protective variables associated with longitudinal outcomes of problem behavior for children in out-of-home care. To date, no such systematic search (or review) has been carried out yet. Given the unique and complex circumstances of children in out-of-home care it is important to understand how and whether different factors work to mitigate behavioral maladjustment. The findings from the included studies provide some insight into the current existing evidence on the risk and protective factors for problem behavior outcomes. It suggests that there is a lack of consistency in the literature on the evidence of risk and protective factors, and identifies a large gap in the literature on the effects of socioemotional skills for problem behavior outcomes. For details, see Chapter 3, Section 3.5. Study 1 also raises issues related to the methodological reporting of studies. It identifies that a lot of the necessary details are often missing in published research articles and reports, which is a pivotal methodological reporting point for the sector. Further, Study 1 has been subject to external peer review and has been published (Lee & Holmes, 2021).

The empirical analysis (Study Two) speaks to this gap in the literature by examining key variables in the child welfare literature within a well-defined age-specific subgroup of children in out-of-home care. It also examines whether different aspects of socioemotional skills are a protective factor for problem behavior outcomes. As far as I have been able to ascertain this is the first study to use longitudinal data of problem behavior and socioemotional skills simultaneously to investigate such questions. Such analyses provide a far greater understanding than offered by previous studies about how these variables work together over time and ultimately elucidate some of the pathways underlying behavioral maladjustment of children in out-of-home care. In doing so, the study found that out-of-home care placement is a risk factor for problem behavior increases for the early and middle childhood group, school engagement is a protective factor for problem behavior decreases for the middle childhood group, and that negative neighborhood

community environment and assertive skills are a risk factor for problem behavior increase. It also found that responsibility skills and child-perceived caregiver involvement are protective factors for older children in out-of-home care. Moreover, the findings held for children who have experienced various levels of abuse. That is, children with minor, severe, and very severe experiences of abuse all experienced the benefits of responsibility skills and caregiver involvement. Responsibility skills are a potentially important variable that has received little attention as a protective factor in the child welfare literature that may buffer the effects of adversity during adolescent development (Picci, Rose, VanMeter, & Fishbein, 2020). Two core goals of adolescent development are to take on adult responsibilities and develop an adult psychosocial identity (Silveira & Habermas, 2011). These developmental changes occur gradually, beginning with the increasing independence of the preadolescents in deciding things such as what their hobbies are, how they look, where and how they spend their time, and who their friends are. In line with this increased sense of autonomy, there is also a corresponding increase in relevant responsibilities, such cleaning their room, caring for their body, driving potentially dangerous vehicles, and accepting the consequences of their behavior (e.g., using legal drugs such as alcohol and cigarettes). Legal responsibility (also known as criminal responsibility, which refers to the age at which a person becomes subject to full penalties provided by the criminal) is given and implemented at age 18, but the ultimate responsibilities that follow adulthood, such as choosing a partner, becoming financially self-sufficient, and becoming a parent, may be postponed for many more years (Micucci, 1998). Responsibility-taking is central to the various competences that children solidify during adolescence. For children, this means that higher levels of responsibility skills allow them to act as competent and autonomous individuals in other social contexts (Everri, Mancini, & Fruggeri, 2015). Research into how adolescents develop a sense of responsibility in the context of the family may be important for understanding about the broader development of psychosocial maturity. These are important findings for future intervention research, as will be discussed later in Section 7.4.1 and 7.4.2 which discuss the implications for research and practice.

7.2.2 Sophistication of the statistical approach

The second strength of this study is the sophistication of the statistical approach. The analyses of this thesis build on the existing foundations of the extensive literature that utilizes the NSCAW data to date. To ensure that the empirical work of this thesis goes beyond the previous studies which have used the NSCAW data, the archive of all publications based on the NSCAW data since 1999 (including theses, journal articles, and conference papers) have been searched. This analysis is one of few to use prospective longitudinal data to examine behavior problems of children in out-of-home care; this is crucial to understanding how children's behavior problems develop over time. Such data is also needed to identify risk and protective factors. Longitudinal data collection has been noted to be difficult to carry out in this population, as children move in and out of care and attrition rates are high, further complicating modelling. However, results from longitudinal studies often differ substantially from those of cross-sectional studies. Still, current practice and policies lean on implications and conclusions of cross-sectional studies, since these are far more common in the field of child welfare research.

The analyses of this thesis also went beyond approaches that have previously been used in this field (i.e., linear and logistic regression, ANOVA and controlling for previous time points), by examining the relationship between risk and protective factors and behavior problems using latent growth curve models. In doing so, the analyses surpass traditional techniques by modelling intra- and inter-individual differences in behavior problems as of substantial interest rather than as error variance. Additionally, by including structural equation models, the relationship between important constructs of maltreatment, post-traumatic stress, and problem behavior could be visualized and examined.

Additionally, this thesis addressed methodological limitations of the conventional growth curve model which assumes that an entire population can be estimated by a single trajectory. Rather, multiple-group latent growth curve modeling was incorporated in order to account for the differences which have been found to exist by age and developmental stages (Curran, Obeidat, & Losado, 2010). The use of this approach enabled the exploration of heterogeneity in behavior trajectories. Furthermore, this study

contributed to the limited understanding of maltreated children's behavior trajectories who have also been involved in long-term out-of-home care. This has been done by following the development of children who were investigated by child protective services for abuse and neglect and involved in long-term out-of-home care, and tracked their behavior problems over a broad age span, from early childhood to adolescence, rather than just focusing on behavior problems during middle childhood or adolescence. Finally, this study added to the limited understanding of the role of factors and correlates of change across the social ecology by including both individual and contextual variables. In this study it was recognized that children develop through interactions between their immediate and adjacent environments (Bronfenbrenner & Morris, 2006) and that their previous experiences shape their interactions with new contexts. Characteristics of the children and their proximal environment might decrease the risk of behavior problems (protective factors) or, rather, increase the risk of behavior problems (risk factors).

7.2.3 Quality of the data

The present analysis was possible through the use of secondary data made available by the National Data Archive on Child Abuse and Neglect (NDACAN) at Cornell University, United States of America. An in-depth analysis of the strengths of the NSCAW dataset can be found in Chapter 5, Section 5.4. The present section focuses more on how well-fitting the NSCAW data was specifically for the research of this thesis, and how it enabled the analysis for this particular study.

The use of longitudinal outcome data collected at three time points over the course of 3 years allowed the examination of the long-term effects of child maltreatment and out-of-home care on problem behavior trajectories. To date, much research on behavior problems of children in out-of-home care has used cross-sectional designs, and thus, most clinical implications have been derived from cross-sectional studies. By the nature of the longitudinal aspect of the data, this study was uniquely suited to address this limitation. The longitudinal analyses of this study enable the discussion and implications for clinical avenues that can lead to long term positive behavioral adjustment among children with experiences of maltreatment and long-term out-of-home care. Moreover, the NSCAW was the only dataset that I was able

to access that met all of the requirements for this study. Although numerous international, administrative and large-scale datasets were explored for the UK, Finland, and Australia, each one proved to be insufficient to answer the desired research questions. The NSCAW dataset provides high quality longitudinal data for the population of interest in this study through multiple waves of data. It also contains rich information on child, parent (both permanent and non-permanent), and care measures. By providing a standardized and valid measure of behavior problems and a strong emphasis on numerous other well-being measures, it offered the most suitable opportunity to examine the research questions of interest. The NSCAW data enabled the quantitative analysis of multiple variables, latent growth curve modeling, and structural equation modeling. The quality of the data and the rich information it had to offer allowed me to aim attention to understanding the way protective factors work and can facilitate positive turning points during transitional periods frequently present in the lives of children who have experienced out-of-home care.

7.3 Limitations of the study

Despite these strengths, this study has some limitations that should also be considered. The limitations of this study are grouped under the following three categories: the absence of certain variables for analysis, the lack of time-varying variables, and limitations of the statistical approach. The following sections discuss the limitations that fall under each of these categories, and how each of these affect the thesis.

7.3.1 Data available for analyses

The current study carried out secondary data analysis using a preexisting dataset, the National Survey of Child and Adolescent Well-Being (NSCAW) I to answer the research questions. Although this method and approach were most appropriate to answer the research questions, there are unique methodological questions which should be asked when utilizing existing data to generate new knowledge and investigate new research questions. The main limitation of secondary data analysis is that the data was not collected with the same specific research question in mind as the researcher analyzing the data for their

individual research questions (Johnston, 2017). Rather, since the data was collected for some other purpose, it may not have particular variables or information that is needed.

While the quality of the NSCAW data is a strength of the thesis, no dataset is perfect and thus also comes with its limitations. The analyses of Study 2 were limited by the data available in the NSCAW dataset. First of all, there was no data available on children in the general population. Therefore, no comparisons with the general population could be made. Research on the general population has found that approximately 10-15% of typically developing preschoolers are diagnosed with chronic mild to moderate levels of behavior problems, and this percentage is even greater among children from families of low socioeconomic status (Hemmeter, Ostrosky, & Fox, 2006). In addition, data from the National Early Intervention Longitudinal Study, which studies infants and toddlers, indicate that 10 to 40% of the children included in the study were identified as experiencing behavioral difficulties (U.S. Department of Education, 2001). Based on prevalence figures, this means that within a preschool setting, there could be as many as a third of the children with significant problem behaviors. Behavior difficulties are therefore a prominent issue in both the general and out-of-home care population that requires further attention and intervening through research, practice, and policy efforts. Future studies should therefore include a comparison group to understand how the identified relationships and findings are different for the general and out-of-home care population.

Secondly, the NSCAW does not collect data on a number of variables, which may confound the results found on the risks and protective factors for behavior problems. For example, parent-child attachment and emotional regulation skills which have been supported as important correlates of behavior problems, both theoretically (e.g., attachment theory: Bowlby, 1969) and empirically (Allen, Timmer, & Urquiza, 2014; Wyman, Cross, Brown, Yu, Tu, & Eberly, 2010), were not included in this study due to lack of data. Some important broader environmental factors were also not accounted for, such as peer relationships (Reijntjes, Kamphuis, Prinzie, Boelen, van der Schoot, & Telch, 2011), school adjustments

(Bradshaw, Waasdorp, & Leaf, 2012), and local (state/county level) variations (Herbst & Tekin, 2010; Reback, 2010). Such factors may have strong and significant influences on children's behavior trajectories especially as children grow older and expand their social networks throughout the life course.

Another limitation is that this study does not differentiate between types of care, in particular kinship care and non-kinship out-of-home care, due to restrictions related to statistical power. Past literature has demonstrated that the difference in this type of care is important and relevant to the development of behavior problems (Rubin, Downes, O'Reilly, Mekonnen, Luan, & Localio, 2008). There is a large body of research evidence that asserts that children in kinship care are less likely to experience placement disruptions, benefitting from increased placement stability, compared with children in non-kinship out-of-home care (Farmer, 2009). Children placed in kinship care have also been found to be more likely to be placed with siblings, maintain regular contact with their biological parents, and remain in their same neighborhoods compared to children in non-kinship out-of-home care, all of which may create a less disruptive experience for children in out-of-home (O'Brien, 2012). There is evidence which demonstrates that, compared with children entering non-kinship out-of-home care, children in kinship care exhibited fewer behavior problems, even after accounting for increased placement changes and less baseline behavior problems (Rubin et al., 2008). Even those who moved from longer periods of non-kinship out-of-home care to kinship care showed some improvement (Rubin et al., 2008). However, other evidence raises safety concerns for children in kinship care due to the heightened risk that children's relatives may share analogous problems as the offending parents and of continuous and unsupervised contact with abusive parents (O'Brien, 2012). There are also long-term outcome studies which have not been able to demonstrate significant differences between children who grew up in kinship or non-kinship out-of-home caregivers (Holtan, Handegard, Thornblad, & Vis, 2013). The same is true for residential group care; it is important to distinguish between residential care and family-based care. Efforts to compare outcomes across residential and family-based care settings have been limited in quantity by methodological challenges such as selection bias given the assumption that children placed in residential care have greater behavioral

difficulties than those placed in family-based care (Barth, 2002). In fact, a growing body of research indicates that children in residential care exhibit more severe types of chronic problems at the outset when they first enter out-of-home care, than do children placed in family-based care (Leloux-Opmeer et al., 2016). In order to control for this potential bias, careful efforts were made to create matched samples in a study by Lee and Thompson (2008). This study found that, compared to therapeutic foster care, residential group care may actually be more effective for some children, with participants in therapeutic care generally showing less favorable discharges, less likelihood to return home, and higher rates of future out-of-home care placement compared to children in residential care settings. In another study, Lyons and colleagues (2009) followed a statewide care system over a five-year period, and found that residential care plays an important role in helping children with high levels of need. In residential care, every level of care serves different needs and is designed with different objectives in mind (Huefner & Ainsworth, 2020). Clearly, the ideal is for children and adolescents to receive care at home within the context of their families. There are times, however, when a child's needs cannot be met in family-based care. Children in residential care are more acute in their clinical needs and typically require more intensive interventions than family-based care can effectively provide (James et al., 2006). Residential care is intended to meet the needs of children with emotional and behavioral challenges that have not been, or cannot be, met in less restrictive settings of care. Residential care may be most appropriate for some children with serious emotional and behavioral challenges. Therefore, it may make more sense for children to be placed in appropriate, higher-level programs at the outset, according to their needs (Holmes, Connolly, Mortimer, & Hevesi, 2018). Given this conflicting evidence, there is a need for future studies to consider the type of care children are in to better understand the experiences and behavioral outcomes of children in out-of-home care.

Lastly, we are unable to know whether there were placement or caregiver changes between each 18-month period that the data collection took place. Since placement instability is a major defining feature of the out-of-home care system and has been shown to contribute to behavioral difficulties (Konijn et al., 2019; Stott, 2011), it is important for future studies to consider these factors. For example, within existing

research, older age is oftentimes cited as a risk factor for higher rate of placement disruptions (Sattler, Font, & Gershoff, 2018). On the other hand, it is also possible that, children who are removed from their families at an older age experience heightened exposure to abuse or trauma, and therefore receive more careful attention to be placed in well-matched homes (Sattler et al., 2018). Additionally, it may be that adolescents who experience placement in out-of-home care at an older age have a lower rate of placement instability because they are closer to ‘aging out’ and have limited time in care (Sattler et al., 2018). What we do know in the context of the wider existing literature is that risk factors for specific placement disruptions depend on the child’s developmental stage (Sattler et al., 2018). At each developmental stage, children have individual vulnerabilities and needs, and confront unique challenges related to bonding, adjustment, child-caregiver relationships, and behavior problems (Chopik, Edelstein, & Fraley, 2013). These findings reinforce the need for additional research on risk and protective factors using a developmental and age-specific approach.

7.3.2 Lack of time-varying variables

The lack of time-varying variables in the statistical analysis is the last main limitation of the study. All study covariates, including independent variables and control variables, were assessed only at baseline, omitting potentially important time-varying predictors.

Therefore, this study was not able to examine how the changes in children and their surrounding environment may be related to children’s behavior trajectories. Time-varying confounding occurs when confounders have values that change over time (Mansournia, Etminan, Danaei, Kaufman, & Collins, 2017). For instance, longitudinal socioemotional and placement information, such as placement changes, changes in socioemotional skills, and caregiver changes occurring at different developmental periods, was not assessed in this study and therefore, the effects of time-varying variables on children’s behavior trajectory patterns could not be investigated. In general, the aims of observational research are to assess the possibility of a causal relationship between an exposure or treatment and a particular outcome. In determining the ‘true effect’ of the possible ‘cause’ or exposure, this value can be dependent on external factors, referred to as

confounders, which also affect the outcome. This may result in a ‘mixing’ effect brought on by the confounders. To properly conduct and analyze observational studies, it is therefore particularly important to carefully control these confounding variables (Norgaard, Ehrenstein, & Vandenbroucke, 2017). In the context of most maltreated and out-of-home care child populations, more than one risk factor is involved. The main goal is to prioritize various risk factors to relative importance so that decisions about interventions can be focused where they will be most effective. The lack of time-varying variables in the statistical analysis limits the ability to understand the relationship and timing between these various types of risk factors and how they develop over time.

7.3.3 Limitations of the analytical and statistical approach

The first limitation under the category of analytical and statistical approaches of the research is related to limitations of latent growth curve models (Curran & Hussong, 2002; Duncan, Duncan, & Strycker, 2013; Voelkle, 2007). When estimating growth curve models, it is assumed that the model parameters are equal across all individuals within the sample (Curran et al., 2010). Depending on the circumstance, these assumptions may be either perfectly acceptable, or clearly questionable. If estimated parameters are distinctly different across groups, but a model is estimated that assumes these to be the same, then parameter estimates are expected to be biased. Both the multilevel and structural equation modeling approaches address this issue through the use of multiple-group growth models, which simultaneously estimate growth models across two or more groups (Muthen & Asparouhov, 2002). In the multiple-group growth models, the variable of interest which distinguishes the groups must be directly observed within the data. In the analysis of this thesis, this grouping variable is age, and groups based on early, middle, and adolescent age groups were explicitly specified for each observation in the dataset. This group identification measure was used to assign each child to their relevant group, and the growth models were then simultaneously fit to the set of groups. Although this does not apply to the sample group of this thesis, there may be population groups in which two or more groups are hypothesized to exist in the sample, but the grouping variable is not directly observed. For example, when examining trajectories of delinquency, group membership may

not be directly observed as a specific variable in the dataset, although according to developmental theory specific subgroups defined by behavioral patterns may exist. That is, there may be a latent group that needs to be estimated from the characteristics of the data, but is not directly observed by the researcher. There has been a rush of recent research which estimates these questions, such as latent class growth models, semi-parametric groups-based trajectory models, and growth mixture models, which describe these types of models (Bowers & Sprott, 2012; Gage, Prykanowski, & Larson, 2014; Herrenkohl, Hill, Hawkins, Chung, & Nagin, 2006; Jung & Wickrama, 2008; Tofighi & Enders, 2008; Wei, 2004). Many researchers have applied these techniques with increasing frequency to undertake developmental research, including the study of criminology (Kreuter & Muthen, 2008), alcohol abuse (Huh, Huang, Liao, Pentz, & Chou, 2013), parenting (De Haan, Dekovic, Van den Akker, Stoltz, & Prinzie, 2013), and reading difficulties (Boscardin, Muthen, Francis, & Baker, 2008). In particular, some important differences across various approaches exist, and careful attention must be given to select the best methodology for a given research question. Further, although growth mixture models are both powerful from an analytical perspective and intriguing from a theoretical one, a number of issues have been identified concerning the application of these techniques (Dahly, 2012). As with any statistical method, researchers must clearly establish the rationale for using the growth mixture model in terms of appropriateness to answer the specific research questions at hand. To identify any grouping variables that may have been overlooked, a longitudinal latent class growth analysis (LGCA) was run on the included sample before they were divided into their age group as part of a sensitivity analysis. In LGCA, individuals are classed into latent classes based on similar patterns of data (Jung & Wickrama, 2008). As such, the goal of LGCA is to assign individuals into distinct groups that represent subpopulations based on each individual's growth model trajectory (Berlin, Parra, & Williams, 2014). Results of Study 2 showed that the trajectories of behavior problems over the three years of data collection displayed a pattern of development that was homogenous across the entire included sample. In other words, 99% of children in the included sample belonged to one trajectory group, indicating that no subpopulations that reflect heterogeneous problem behavior trajectory problems were detected. Based on these analyses, it

was decided that a latent growth curve model analysis as carried out is the most appropriate for the sample and research questions at hand.

A second limitation of the choice of statistical modelling is that, structural equation models, including latent growth curve models, can only establish the degree to which an estimated model fits the data (Danner, Hagemann, & Fiedler, 2015). However, even for a perfectly fitting model, this does not assure that the model reflects reality. In fact, it may be that other model estimations fit the data equally well, and the actual mechanisms between the variables of interest may in fact be estimated by this model. Only experimental designs where children are randomly assigned to particular treatment groups are said to be able to establish true causal relationships between the variables of interest (Imai, Tingley, & Yamamoto, 2013). Although it is important to acknowledge limitations of the LGCM approach, this thesis also demonstrates many advantages of LGCM, including its flexibility, practicality, and value for modeling developmental processes within the SEM framework. Growth curve models offer a plethora of useful opportunities for investigating theory-driven hypotheses in ways previously unfeasible (Duncan et al., 2013). Despite the flexibility and strength of these methods, even greater caution must be taken to confirm that the estimated growth model reflects the appropriate developmental theory. Any disjoint that exists between the theoretical and statistical model only serves to undermine the ability to draw empirically informed conclusions about the theory under study. Despite these caveats, growth models represent a powerful methodology to help developmental scientists to continue propelling forward, and have a colossal amount to contribute to a wide range of research endeavors.

Another limitation of the analytical approach is that this study relied solely on caregiver reports of problem behavior, which means that possible rater effects on the scores of the behavior problems measure (CBCL) were not controlled for. Research has suggested that using caregiver ratings of child psychopathology may raise concerns due to caregivers' tendency of over-reporting children's behavior problems due to their individual characteristics, such as those with high levels of maternal depressive

symptoms and/or stress (Berg-Nielsen, Solheim, Belsky, & Wichstrom, 2012; Berg-Nielsen, Vikan, & Dahl, 2003). In a related vein, when reporting children's internalizing symptoms, children are typically more aware of their own inner emotional states (e.g., sadness or withdrawal) than their caregivers are (Seifer, Sameroff, Dickstein, Schiller, & Hayden, 2004). Furthermore, this study did not differentiate between a non-offending caregiver and a perpetrating caregiver. This distinction is important because it may affect the accuracy of the caregivers' report of the child's development and functioning. Previous research has demonstrated that perpetrating caregivers were more likely to over-report children's problem behaviors compared to non-offending caregivers (Lau, Valeri, McCarty, & Weisz, 2006). Future studies should consider using multiple informants (e.g., teachers) to address the issues caused by solely relying on caregiver reports. Along similar lines, the key variables of interest in the analyses- behavior problems, socioemotional skills, and daily living skills- were all reported by the same person (caregiver at Time 1). This means that higher correlations between the variables are more likely, which may bias the results to be more positive. This remains a limitation of the analyses. I now turn to examining the internal validity of the study using the Cambridge Quality Checklists (Murray et al., 2009). These propose a scoring system for risk and causal factors, which I utilize and adapt to appraise the identified correlates and factors of the thesis.

7.4 Internal validity: Appraising the study's conclusion

The Cambridge Quality Checklist presents a scoring system for risk factors (see Table 22 below). This checklist is scored such that each study feature is awarded either a score of one if the study has this feature or zero, if it does not.

Table 22. Cambridge Quality Checklist for Risk Correlates and Factors

Risk Correlate and factor Checklist (score out of 8)
Adequate sampling method
1: Total population sampling or random sampling
0: Convenience sampling or case-control sampling
Adequate response rates
1: Response and retention rates $\geq 70\%$ and differential attrition $\leq 10\%$
0: Response rate $< 70\%$ or retention rate $< 70\%$ or differential attrition $> 10\%$
Adequate sample size
1: Sample size ≥ 400
0: Sample size < 400
Good measure of correlate
1: Reliability coefficient $\geq .75$ and reasonable face validity or criterion or convergent validity coefficient $\geq .3$ or more than one instrument or information source used to assess correlate
0: None of the above
Good measure of outcome
1: Reliability coefficient $\geq .75$ and reasonable face validity or criterion or convergent validity coefficient $\geq .3$ or more than one instrument or information source used to assess outcome
0: None of the above
Data type
3: Longitudinal prospective and correlate precedes the outcome
2: Longitudinal retrospective and correlate precedes the outcome
1: Cross-sectional data or retrospective data

Note. From “Drawing conclusions about causes from systematic reviews of risk factors: The Cambridge Quality Checklists,” by J. Murray, D. P. Farrington, and M. P. Eisner, 2009, *Journal of Experimental Criminology*, 5, p. 8-11 (<https://doi.org/10.1007/s11292-008-9066-0>). Copyright 2021 by Springer Nature.

The sampling method was rated to be adequate because it was carried out in a way that was nationally representative of all children in out-of-home care in the United States who met the study criteria, which is an adequate method of sampling called total population sampling (Dolan, Smith, Casanueva, Ringeisen, & RTI International, 2011; Dowd et al., 2008). The sampling method of this study is also related to generalizability and external validity and is discussed further in Section 7.5 of this chapter. There were also adequate response rates for the NSCAW dataset as a whole, and the analytic sample had an even lower rate of missingness because only children with CBCL information at all three waves were selected for

inclusion. The sample size for the study was adequate ($n=513$). However, each model was run on a significantly smaller sample size due to the separate analyses according to age groups. Such models run on a smaller sample are at risk of low statistical power and Type II error (Baguley, 2004). The specificities of this issue are covered further in Chapter 5, Section 5.5.1. As for good measure of correlate and outcome, the instruments and assessments used in the NSCAW data and in this thesis utilized existing instruments. This not only resulted in the added benefit of continuity with other research, but also meant that these measures have gone through extensive validity and reliability testing already. In addition, the selection of such pre-existing assessment instruments meant that the measures went through an extensive iteration process that ensured it met specific criteria which was established at the outset. For instance, in cases where there were alternative measurement strategies to be considered, information reviewing the properties of these instruments was assembled to facilitate evaluation. Data from pretesting activities were also used to provide information about competing instruments. Finally, the data for the study was prospective and the protective/risk factor preceded the outcome variable temporally. Therefore, the total score for this analysis is 8 out of 8. Based on this analysis, Study 2 scores highly on this checklist, suggesting the findings on risk and protective factors for children in out-of-home care is robust despite its limitations. The Cambridge Quality Checklist also suggest avenues for assessing causality, as will be discussed in the following section.

7.4.1 Are caregiver involvement and responsibility skills causal protective factors?

Causal risk or protective factors are variables which can change and, when changed cause an increase or decrease in risk for the outcome (Muthen & Asparouhov, 2015). Causal inference refers to the ability to make assumptions and conclusions about the relationship of cause and effect between a set of variables. Recently, there has been a renewed focus for issues of causal inferences in the social sciences. However, it is unclear what kinds of approaches are most suitable for theoretical development on developmental processes, and the implications for developmental research have not been well-defined, either.

Kraemer and colleagues (2005) argue that experimental studies, more specifically referred to as randomized control trials (RCTs), are the ‘gold standard’ for identifying causal risk factors. Across the social sciences there is a general consensus that causality (including in risk and protective factor studies) is determined through robust experimentation, for example with randomized controlled trials (Kraemer et al., 2005; Murray et al., 2009). Some quasi-experimental and natural experiment designs have also been argued to support causal inferences (Cook, Campbell, & Shadish, 2002; Kim & Steiner, 2016). The process of randomization in RCTs ensures that the only difference between control and experiment groups is exposure to the treatment (cause) under study. However, although commonly referred to as the ‘golden standard’ for social research, many research questions for developmental and social science researchers are not amenable to experimental manipulation. For example, it is not possible to randomly assign individuals to relationships or families. Further, randomly assigning individuals to other social institutions such as schools, work, or communities is administratively prohibitive and very expensive. For instance, one might want to know the effects of maternal substance use on children’s development. Of course, it is not possible to randomly assign children to mothers with alcohol or drug problems. Similar concerns emerge during important decision-making processes by child welfare system workers on issues such as whether a child should stay with their biological family or be removed from their home. Presumably, this decision is made by the case workers and how they perceive what option is in the best interests of the child. However, a simple random assignment of the child to a particular setting would be unethical. Another issue is that experiments are highly dependent on their external validity. However, the sample of RCTs are focused populations where undetected and generally long-standing dynamics are perhaps obscured. In the same vein, treatment effects are not uniform across the population, but are minimized or magnified depending on the non-random characteristics of the sample of interest (Macmillan & Hannan, 2020).

‘Natural’ experiments have been suggested as an alternative with possibly more promise. The core proposition of a natural experiment is the arrangement of a circumstance or situation that imitates the foundational elements of an RCT. Natural experiments are implemented when individuals or groups are

classified into control and treatment groups by a factor that they typically cannot control. Natural experiments differ from RCTs in that allocation and exposure occur naturally, and is not controlled by the researcher. However, this does not mean that natural experiments should be taken as a replacement of existing approaches nor as a cure-all solution. Rather, they should be used as a complement to existing methods.

Causal inference has been a topic of steadily growing interest for developmental researchers. Many researchers construct their research questions around cause and effect. However, true and generalizable causal inference in developmental research may be difficult to achieve, given the fundamental idea that lives unfold within unique socio-historical contexts. Moreover, plenty of noncausal descriptive questions are hugely important to inform policy, such as how many children are experiencing domestic violence, for example (Moffitt, 2005). The concentration of attention to these types of issues has contributed to considerable refinement in the area of social science knowledge. Despite such refinement, there is still discussion of the types of analyses which seem to indicate causality, but actually cannot. Rather, the analyses that has been conducted is merely ‘descriptive,’ and no causal claims can be made for the regression coefficients being estimated or correlations under examination. On the one hand, the role of unconditional and conditional correlations between variables and descriptive analysis is important in social science research. Statistical tools can be used to deal with unknown confounders in situations when random assignment is impossible or impractical (Breugh, 2008). Epidemiological researchers have always made it clear that non-experimental studies are limited to demonstrating correlative associations between risk factors and outcomes (Bleske-Rechek, Morrison, & Heidtke, 2015). Structural equation models are often used as a method to explore causal pathways (Cole & Maxwell, 2003; Eisenhauer, Bowker, Grace, & Powell, 2015). Studies using this study design then often infer causality when their findings are statistically significant (see for example King et al., 2006). Still, analyses such as regression or other methods of estimating conditional means should be used with caution, because they can easily be misinterpreted to reflect causal relationships. To illustrate, most researchers speculate the possible causal mechanisms underlying a table of regression coefficients. Moreover, hypothesized mechanisms or preliminary causal

theory is almost always used to guide the choice of variables that are included in a regression model. Researchers should therefore practice caution when using statistical methods solely to describe, rather than ‘explain,’ variables that affect human behavior. Greater attention to mechanisms, theory, and the potential threats to exclusion restrictions is necessary to modify the attitude of research toward a more thoughtful and cautious approach.

The findings of this study are based on observation data, and therefore should not be interpreted as causal in nature. Nevertheless, Murray and colleagues (2009) propose a checklist to guide appraisal of non-experimental studies of risk factors (which is adapted in this thesis to appraise protective factors as well). The checklist assigns a score out of seven to studies based on their ability to draw causal conclusions, where a score of one indicates low evidence of causality and a score of seven indicates strong evidence of a causal relationship. The scale is reproduced in Table 23 below for readers.

Table 23. Cambridge Quality Checklist for Causal Risk Factors

Causal risk factor score (out of 7)	
1	Study without a comparison group No analysis of change
2	Inadequately controlled study No analysis of change
3	Study without a comparison group With analysis of change
4	Inadequately controlled study With analysis of change
5	Controlled non-experimental study No analysis of change
6	Controlled non-experimental study With analysis of change
7	Randomized experiment Targeting a risk factor

Note. From “Drawing conclusions about causes from systematic reviews of risk factors: The Cambridge Quality Checklists,” by J. Murray, D. P. Farrington, and M. P. Eisner, 2009, *Journal of Experimental Criminology*, 5, p. 15 (<https://doi.org/10.1007/s11292-008-9066-0>). Copyright 2021 by Springer Nature.

I scored the analyses of this thesis with a 4 out of 7, which indicates an inadequately controlled study with analysis of change. The present study investigated change over time and also controlled for some variables. However, there is likely to be substantial omitted variable bias (see Section 7.3.1), which refers to bias that occurs when a relevant variable is omitted from the model (Swamy, Chang, Mehta, & Tavlas, 2003). Indeed, past research has examined the role of other important variables such as socioeconomic status (Conger, Conger, & Martin, 2010), care system oscillation (Stott, 2012), genetics (Saudino, 2005), and parenting styles (Alizadeh, Abu Talib, Abdullah, & Mansor, 2011), which have also been found to play an important role in the development of behavior problems and socioemotional skills. A number of other time-varying and invariable variables may also confound this relationship.

On the other hand, research on socioemotional competence for children in the general population suggests that this relationship may be causal. For example, interventions which aim to change and improve

socioemotional competence have shown moderate effects on behavior problem outcomes (Hemmeter et al., 2006; Vinh, Strain, Davidon, & Smith, 2016; Webster-Stratton & Herman, 2010). Webster-Stratton, Reid, and Hammond (2001) also found evidence that socioemotional competence mediated the relationship between disadvantageous family environments and later behavior problems. In another systematic review, Menting, de Castro, and Matthys (2013) highlight that the hypothesized mechanism linking socioemotional competence to behavior problems is evidenced by research in the general population. This sheds light on the plausibility of a causal relationship between socioemotional skills and behavior problems of children in out-of-home care as well, which can be explored by future research.

This study therefore found correlations between various risk/protective variables and behavior problems outcomes that may or may not be causal, but certainly are not causal in the simple sense in which they have been estimated in this thesis (as average linear variables with error). The findings are consistent with the idea of causal processes which are suggested by theory, but are not proven by these data. As outlined in this discussion chapter, further experimental research should be carried out which includes data on the potential confounding variables suggested. The next section examines the external validity and generalizability of the study.

7.5 External validity and generalizability

In this section, I consider whether the study has external validity and the extent to which its findings can be generalized to children in other contexts. First of all, the generalizability of the findings is limited by the representativeness of the sample. This study included a sample of children who were referred to the child protective systems as victims of alleged abuse and neglect. Of these children, only those who had been in out-of-home care for approximately 12 months have been included for analysis. Therefore, study findings may not be generalized to the broader population that go beyond these characteristics.

The analytic sample of 513 children in this study was as followed: they were all subjects of child abuse or neglect investigations conducted by Child Protective Services in the United States, aged 3 to 16 at

Time 1, and in a long-term out-of-home placement for 8 to 18 months at the time of study recruitment (but not necessarily during the entirety of the three data collection time points). They were therefore not a random sample of children in out-of-home care. Assessing external validity means exploring whether the findings are generalizable or applicable to other populations or contexts (Oluwatayo, 2012). This is a key concern of this study as the findings aim to inform practice and policy internationally. The study sample consisted only of children between the ages of 3 and 16 who were in long-term out-of-home care for approximately 12 months (8 to 18 months) at the time of recruitment. Therefore, the study's findings may not be relevant for children in short-term out-of-home care as they were not included in this thesis. The research literature asserts that children in short and long-term out-of-home care have different experiences and characteristics due to their divergent care pathways and histories (Lawrence et al., 2006). Although the intention of long-term out-of-home care is for it to be permanent, the reality of the experience is many times not so (Biehal, Ellison, Baker, & Sinclair, 2009). Investigations of out-of-home care found that emotional difficulties and poor social functioning were significantly associated with the experience of multiple placements during longer stays in care (Lawrence et al., 2006). As such, it would be inappropriate to apply the findings sought from a sample of children in long-term out-of-home care to those who have only experienced short-term care episodes. In addition, this thesis makes no claims of generalizability to infants and toddlers younger than 3 years old in out-of-home care, as they have not been included in the study sample. Infants and toddlers in this age range account for a substantial percentage of public funding for psychiatric services and are at disproportionately high risk for psychopathology (Halfon, Zepeda, & Inkelas, 2002). Research also demonstrates that these younger infants and toddlers are more likely to stay much longer in out-of-home care than older children (Wulczyn, 2004). Just as age and the likelihood of entering out-of-home care is highly correlated, age is also strongly associated with the length of time children stay in placement, their type of exit (e.g., reunification or adoption), and the probability of reentering care after discharge. Infants are also more likely to be adopted than children of any other age (Wulczyn, Hislop, & Goerge, 2001). Infancy is a period during which the most complex and rapid development occurs (Shonkoff

& Phillips, 2000). As demonstrated, children between the ages of 0 and 3 are at a developmental period that is qualitatively very different from those of the included sample in this thesis, rendering generalizations to them to be inappropriate.

Secondly, as reviewed in this thesis, the effects of risk and protective factors appear to work differently for children of different developmental age groups. Analyses of state administrative data discloses a persistent and strong association between probability of involvement in the out-of-home care system and the age of a child (Wulczyn, Hislop, & Harden, 2002). Indeed, the out-of-home care population is very diverse and studying them as a homogeneous group may produce misleading results. Even in the present study, the parameter estimates in the latent growth curve models show variability in children's behavior trajectories depending on their age groups. Therefore, future studies seeking to replicate these findings should carefully consider the profile of their sample, perhaps by comparing age at entry to first out-of-home care placement, CBCL (or other assessment of mental health and behavior problems) scores, time in care, and other characteristics of the sample, as these may influence the outcomes or relationships between variables described in this study. Also, selecting a more homogeneous group to study, as in this study, is recommended.

Moreover, the 513 children in the study represented approximately 70% of all children who were in out-of-home care at Time 1 for about one year. Therefore, this is a non-negligible group of children in long-term out-of-home care. In the United States, 36% of children who receive out-of-home care services enter long-term out-of-home care (Cheng, 2010). Children in long-term out-of-home care therefore represent an important sample of the child welfare population. I argue that while the findings may not be applicable to other children in out-of-home care, particularly those in short-term out-of-home care and infants and toddlers under the age of three, they are still substantively important for children in long-term out-of-home care, a significantly large population group.

Comparability of child welfare-involved children in the US and UK

Another aspect of external validity which should be considered is that the analyses in Study 2 is based on a sample of children with histories of out-of-home care in the United States. Therefore, external validity should also consider whether the findings apply to other contexts internationally, including the UK. Most child welfare systems are based on a foundational set of principles relevant to public responsibility for vulnerable children (Berrick, Dickens, Poso, & Skiveness, 2017). Cultural, political, and language differences aside, developed child welfare systems appear to share many values across national boundaries. Such similarities include the mission to keep child welfare services strongly connected to families and communities and the commitment to develop personalized and effective service response systems that are mindful of cultural differences and conscious about the unique challenges of children who have to transition from varying forms of out-of-home care to interdependent or independent community living settings (Bellonci et al., 2018). In the US and UK, there is also the notion that existing service solutions and means of working with children and families are not operating as intended and new methods of conceptualizing services and problems need to be established (Bellonci et al., 2018). There are similarities between the child welfare systems in the United States and the UK. Both countries represent a risk-oriented approach to child welfare, but over the years have adopted some elements of the family service-oriented approach (Gilbert et al., 2011). Child welfare systems which take on a risk-oriented approach focuses on mitigating far-reaching risks on children's safety and health and has a high threshold for intervention, while the aims of the family service orientation emphasize harm prevention and the promotion of healthy childhood development (Juhasz & Skivenes, 2017).

To illustrate the integration of both risk and family service orientations, several states in the US have established a 'differential response' system, which responds appropriately to the varying levels of severity of child abuse reports (Cameron & Freymond, 2015). Many communities are using differential response as a way to enhance their child welfare systems to avoid straining relationships with families and increase their voluntary engagement in services (Loman & Siegel, 2015). Efforts to respond qualitatively differently depending on the nature and level of risk of the child have been made. Similarly, there has been

considerable investment in services that attempt to offer early support, work in partnership with caregivers, and maximize cultural and community continuity. Likewise, official policy aims in England emphasize the refocus of practice so that, wherever possible, family involvement and support is maximized (Holland & Crowley, 2013). It is also notable that in both the US and UK, neglect is the predominant child maltreatment category, with considerable declines in cases categorized as physical or sexual abuse (Christiansen & Anderssen, 2010). There are other similarities across the structure of the care system: the majority of children in out-of-home care live in family-based out-of-home care, many children are only in out-of-home care short-term, and children in out-of-home care experience similar outcomes in the US and UK (as well as other countries). Another important dimension in the analysis of out-of-home care placement rates involves the differences in age. The US and UK typically have younger children placed in out-of-home care, compared to the Nordic countries which tend to have older children in out-of-home care (Albers, Reilly, & Ritter, 1993). These findings are in alignment with the child protection orientation, making removals at a given risk level and based on a premise that young children are more vulnerable to risk than older children. Research evidence shows that teenage entrants generally have more difficulties and worse outcomes, as also reiterated by the findings of this thesis (Doyle, 2007). There has also been increasing interest in the use of kinship care for children accommodated in out-of-home care, particularly in the United States, and a much greater range of the types of providers, including the private and non-governmental sectors, as well as the state itself (Bell & Romano, 2015; Broad, 2004; Geen & Berrick, 2002). The US and UK both have clear policies stating that, if reunification with the birth parents is not possible, adoption is the next-best alternative (Coakley & Berrick, 2008). Both the UK and the US lead the world in non-relative adoption (Rushton, 2004). In both countries, the likelihood of adoption is much higher for young children than for older children, but non-infant adoption has been increasing. In the UK, infant adoption has declined, and has increasingly been used as a strategy to counteract neglect and abuse, with 71% of children found to be placed from local authority care (Department for Education and Skills, 2003). Similarly, in the US, the group that is most likely to be adopted is children who are removed at or near birth and placed with

their adoptive families when they were between zero and six months of age- this comprises about 40 percent of all the young children who are adopted (Wulczyn, 2003). However, in 2006, as many as one-third of all children younger than three who enter out-of-home care have left via adoption (Wulczyn, 2003).

Despite such similarities, there are also differences between the two countries as well. The United States showed a decline in the number of children in out-of-home care from 8/1000 children in 1997 to 6/1000 in 2007 (Gilbert et al., 2011). In contrast, England has had an increase in the number of children in out-of-home care from 4.5/1000 in 1994 to 5.5/1000 in 2009 (Gilbert et al., 2011). To understand the meaning of this change, it is important to note that the increase is accounted for not by a rise in admissions to care, which actually fell by a third, but by a slower rate of exit, with children remaining in out-of-home care for longer periods of time. However, in the United States, there is a comparatively higher rate of children who exit the system due to adoptions, whereas in England fewer children are adopted from the child welfare system (Coakley & Berrick, 2008). This sheds some light on the different dynamics of placement rates among the two countries. As exemplified in the Family First Prevention Services Act (FFPSA), the US approach leans heavily towards restricting access to certain types of care, particularly group residential care, through distinct standards for access, case review, and oversight (Baker, Wulczyn, & Dale, 2005). When residential care placement is recommended, it is strictly to follow the standards of nationally determined quality and stay time limited (Garcia, Pecora, Schnell, Burnson, Harris, & Finseth, 2020; Whittaker et al., 2016). In England, the road to change tends to lean much more towards the direction of ‘nudging’ the system for greater innovation through the development of novel designs of integrated service ‘packages,’ which are supported by resources for its development and dissemination (Hampson, Goldsmith, & Lefevre, 2021). Of course, such tentatively recognized differences should be viewed within the wider contextual differences of child welfare services funding and organization, basic social welfare provision, as well as the histories of residential care in each country, as illustrated in the US ‘therapeutic residential sector’ and the English ‘children’s home’ sector. Furthermore, these descriptions are not

mutually exclusive. English services are well represented with centralized planning for national standards, and the US is also full of creative and innovative service arrangements.

Research suggests that these differences do not make a significant difference to practice to the extent that the findings of this study would not apply to the UK context (Courtney et al., 2013). I therefore argue that there is little in the relationship between the identified protective factors and children's problem behavior development that is specific to the US context. At the same time, discussion of generalizability needs to recognize the issues of internal validity as well (internal validity is discussed in Section 7.4). If there are important missing variables in this study and a different study was conducted in the UK with different missing variables it would presumably find different answers about which protective factors were important. Along similar lines, caution should be taken so that internal validity is not maximized at the expense of external validity. To do so would result in the field consisting only of research with very narrowly defined findings lacking generalizability and to an accumulation of miscellaneous information that does not amount to any general knowledge. Such an approach is limiting in that it constricts the capacity to pursue larger questions and explain society-wide trends that drive much of social science research. A careful consideration of evidence from different studies is required to achieve the correct balance of strengths and weaknesses to arrive at a consensus. To be certain, it is reasonable to completely rule out some types of evidence if the risk or bias of their conclusion is too extreme. Nonetheless, there is a larger array of studies with different combinations of external and internal validity that should be given some positive attention when drawing and evaluating conclusions.

This approach voices the need for more research that aims to put together a broad range of findings of various studies and to synthesize literatures which take different methodological approaches. It is presumed that synthesis would be relatively easier in areas where a variety of approaches yield similar results, whereas synthesis should be most difficult in areas where a variety of approaches yield contradicting results. Informal evidence from other relevant fields, as well as formal theory, should also inform the

process of evaluation. It is likely that such systemic, contemplated, and synthesized approaches to research will yield greater progress in discovering answers than any single or group of studies could. As such, it is suggested that the study findings may not be generalizable to children under the age of 3 in out-of-home care, including those without histories of long-term out-of-home care, but that they are likely to be informative for other contexts in the US and UK.

7.6 Implications of the study findings

This study indicates that numerous variables are risk and protective factors for problem behavior outcomes and development for children in out-of-home care, and that these factors are specific to age and developmental stage. The main objective of this thesis was to identify such risk and protective factors. I claim that identifying risk and protective factors is important to fine-tune existing interventions or develop new ones to support the positive development of behavior for children in out-of-home care. Intervention theory suggests that programs should be underpinned by an evidence-based theory of change in order to maximize its potential to impact outcomes. Knowledge of risk and protective factors is therefore an integral part of the theory of change. In the following two sections, I first discuss the implications of these findings for future research. Then, I discuss the implications for practice and policy. As discussed above, the implications of the study may not be relevant for children in short-term (less than 8 months) out-of-home care as they were not included in this thesis.

7.6.1 Implications for research

More research is needed to understand the pathways from socioemotional skills to behavioral outcomes, including the mechanisms that may explain the relationship between past maltreatment experiences, socioemotional competence, and behavior problems identified in this thesis. Critically, it is important to test the influence of other variables on this relationship, as they may act as moderators or confounders. This is important because such variables may not be easily modifiable and therefore targeted in interventions. For example, if the child's socioeconomic status moderates the relationship to the extent that it confounds the relationship between socioemotional competence and behavior problems, programs

that aim to raise socioemotional competence for children may not be effective, perhaps for this very reason. If further studies can demonstrate that socioemotional skills are a protective factor for behavioral outcomes of children in out-of-home care, and as such a promising target for interventions, interventions should consider this as a program component. This addition should then be evaluated, which in turn will determine whether children's socioemotional skills is a causal protective factor.

Although this study found distinctive and meaningful risk and protective variables for behavior problems of maltreated children with histories of long-term out-of-home care, the findings need to be verified in future research and replicated with other samples. Moreover, future research should assess the external validity of the identified variables. For example, the external validity of risk and protective factors for problem behavior outcomes may be tested by examining if these variables relate to anti-social behaviors and delinquency in the appropriate age group.

As discussed in Section 7.3.2, no time-varying covariates were included in the statistical analysis models. Future studies may benefit from incorporating time-varying information and examining the effects of these time-varying covariates on children's problem behavior trajectories. For example, time-varying factors, such as placement changes (e.g., Newton et al., 2000) and maltreatment chronicity (e.g., Ethier, Lemelin, & Lacharite, 2004) have been suggested to have significant associations with behavior problems over time and should be included in future research.

Future research is also needed to more fully investigate maltreated children's early and continued behavioral development through later developmental stages (e.g., young adulthood). This study followed children from early childhood (age 3) to adolescence (18 years), leaving the infant and toddler years as well as the young adulthood years unexplored. Future research investigating heterogeneity in behavior trajectories of children in long-term out-of-home care should extend the assessment period to include these unexplored developmental periods. In addition, future research should examine heterogeneity in developmental trajectories of outcomes across multiple domains, including cognitive, language, emotional,

social, and school functioning. Parallel growth processes of child development in these domains may be another interesting area for future investigations (Wu, Witkiewitz, McMahon, Dodge, & Conduct Problems Prevention Research Group, 2010).

7.6.2 Implications for practice

Notwithstanding the limitations of the research and many unknowns in relation to behavior problems for children in out-of-home care, the study findings provide a number of implications for practice and policy (policy implications discussed in Section 7.6.3). Findings indicate that a number of individual and contextual variables are important for the positive behavioral development of children in out-of-home care. Based on the findings of this study, the following implications are suggested to help prevent negative behavior trajectories and foster more resilient development among children who have been investigated by child welfare services for maltreatment and have experienced long-term out-of-home care.

The findings of Study 2 emphasized that children in out-of-home care are composed of heterogeneous subgroups that followed distinctive problem behavior trajectory patterns and that these subgroups vary by age. Thus, it could be inappropriate to treat these children as a homogeneous group and overlook their unique and different experiences. Child welfare systems, and professionals and workers within them should therefore view children involved in out-of-home care as an age and developmentally specific population when making decisions and providing services. In addition, children's maltreatment experiences (e.g., type, level of harm, and timing), placement pathways (e.g., age at entry and type of care), individual characteristics (e.g., age, school engagement), and contextual characteristics (e.g., neighborhood context) should be thoroughly assessed. Child welfare workers should obtain in-depth information at the time of investigation acknowledging that different features of a child's experience may differently influence the child's behavioral outcomes over time. However, in many cases it could also be that nuanced contextual information may be unavailable and child welfare workers are placed in a situation when they are presented with very little information and have to make quick safeguarding decisions. Such issues are related to the subject of data and information sharing between agencies which is often cited as a problem in serious case

reviews. Decision making in public child welfare agencies is typically facilitated or constrained by the management and structure of the program (Crea, 2010). These decision-making approaches are usually implemented at an agency-wide level, and are mainly distinguished to the degree to which they seek explicit participation from family members, professionals, and individuals from the community in the decision-making process. The actuarial assessment process is typically carried out by an individual caseworker who addresses a checklist of strictly defined factors; however, it is highly unlikely that this checklist can capture the unique circumstances of each family (Shlonsky & Wagner, 2005). Given the depth and complexity of issues typically experienced by families involved with child welfare services, more sources of information and a wider perspective are needed in addition to actuarial assessments to propel a decision-making process that explores a variety of placement options and balances risk and protective factors. It is therefore important to emphasize the need on information sharing between professionals to improve risk and need assessment and monitor children's development (Munro, 2007). Interagency cooperation may improve services and the decision-making process in multiple different ways, such as by providing and enhancing access to caseworkers with more complete and timely information about child and family progress (Bai, Wells, & Hillemeier, 2009).

According to the CBCL cut-off, approximately 42.7% and 7.6% of the study sample displayed clinical (scores above 64) and borderline clinical (scores between 60 to 63) range behavior problems at baseline, respectively, warranting clinical attention. Therefore, more intensive and targeted interventions should be delivered to these groups of children with heightened risks. To reduce risks, intervention curricula could focus on children's socioemotional skills, level of school engagement, neighborhood community environment, assertive behavior, and child-caregiver relationships while also considering the child's age to prevent the development of negative behavioral outcomes among children who have been involved in long-term out-of-home care, as identified by the results of this study.

In addition, intervention strategies should not only focus on out-of-home care-involved children but also on their caregivers, as child-perceived caregiver involvement is found to be an important protective factor. Study 2 found that children who perceived their caregivers to be more involved were less likely to exhibit higher behavior problems three years later. These findings highlight the importance of interventions to address the types of behavior problems prevalent in the adolescent population, such as depression and substance abuse. Fortunately, unlike parents in the general population, out-of-home caregivers have mandated training courses they must attend (Festinger & Baker, 2013). Avenues therefore exist to promote awareness among caregivers of the impact they have on children and to encourage them to raise their involvement for children in out-of-home care. In the past, group and/or school-based social skills training programs have gained empirical evidence for effectiveness in enhancing children's social skills and reducing behavior problems (e.g., Caprara et al., 2014; DiPerna, Lei, Bellinger, & Cheng, 2015; Gresham, 2015). These interventions, although not specifically designed for maltreated and out-of-home care-involved children, may be helpful in reducing behavior problems and promoting prosocial skills. There also exist some evidence-based parenting interventions for out-of-home caregivers that have a specific focus on behavior (Fisher, Chamberlain, & Leve, 2009; Vanschoonlandt, Vanderfaeillie, Van Holen, & De Maeyer, 2012), but there does not appear to be much prominence given the potential influence of children's socioemotional skills. Future interventions should be informed by research and where possible provide guidance for out-of-home caregivers on effective strategies for parental involvement, including around the potential fostering of socioemotional skills. Caregivers in out-of-home care may not know children well enough to understand their needs and how to respond to them, and children in out-of-home care may present a range of problem behaviors which require special attention and thoughtful support strategies. Caregivers may also be side-lined by social workers or schools, leaving them feeling disempowered and unable to support children appropriately. Practitioners should carefully consider how to support out-of-home caregivers to be more involved in the positive behavioral management of out-of-home care involved children.

In this light, it is also important to distinguish between the different relationships that are usually established between caregivers in family-based care and those working within residential settings. In residential care settings, the two main methods residential facilities care for youth are via the ‘child care worker’ model and the ‘houseparent’ model. The houseparent model supports the need for a ‘family-like’ environment within residential care facilities, and creates this environment through the maintenance of live-in social workers who are referred to as house parents. House parents strive to provide a nurturing and intimate environment that imitates the biological family and provides children a sense of stability and belonging. Alternatively, within a child care worker model, staff work in rotating shifts to provide supervision for children. Child care workers often help in carrying out specific intervention programs, and primarily engage in managing the behavior of the child. Child care workers tend to have a high turnover rate, are poorly paid, and are younger than house parents (Berrick, 1993). High turnover among child care workers has been identified as a factor that constricts the efficacy of residential care programs. Child care workers may be discouraged from making a long-term commitment by a lack of career ladders and low pay. Research found that, compared to child care workers, house parents tended to exhibit less turnover and provided more continuity (Jones, Landsverk, & Roberts, 2007). Continuity may allow workers to develop a relationship that helps to understand, identify, and address each child’s particular set of needs and strengths. Workers who maintain persistent contact with children have a better chance of responding to their needs in a timely manner, and are thus more likely to be perceived by children as responsive. Based on these distinctly different characteristics associated with residential care and family-based out-of-home care, it may be useful for intervention efforts to have tailored programs for children and their caregivers according to their placement types.

7.6.3. Implications for policy

The need for timely and frequent screening

The first implication for policy is concerned with the need for timely and frequent screening of developmentally appropriate behavior. The findings of the study suggest that there may be developmentally

critical periods during which children respond better to certain risk and protective factors, as well as display varying patterns of development. It is therefore important to apply timely and frequent screening, assessment and monitoring of behavioral development in order to identify children who may be more at risk of behavioral maladjustment. There has been a steady rise of concerns about poor identification of mental health and behavior problems in the out-of-home care system by several organizations' published guidelines (Burns, Phillips, Wagner, Barth, Kolko, Campbell, & Landsverk, 2004; Petrenko, Culhane, Garrido, & Taussig, 2011). According to a recent study, only one-third of child welfare agencies in the US use formal substance abuse screening and assessment tools at child protective service investigations (Chuang, Wells, Bellettiere, & Cross, 2013). Another study which used a national probability sample of child welfare agencies in the United States to investigate policies for comprehensive mental health evaluations by medical professionals for children entering out-of-home care found that half of all agencies surveyed did not require systematic, universal mental health evaluations of children entering out-of-home care (Leslie, Hurlburt, Landsverk, Rolls, Wood, & Kelleher, 2003). With no policy or limited policy agencies, children cannot be systematically screened for mental health concerns such as symptoms of emotional or behavioral problems, suicide risk, or impaired functioning. Following timely screening, early and targeted interventions should be provided to children who are exposed to greater risk. In the United States, the introduction of the Title IV-E waivers in the 1990s aimed to generate new information about innovative child welfare practices (James Bell Associates, 2021). Waivers allowed flexibility to state and tribal jurisdictions to utilize federal funds in implementing support services that increases permanency, safety, and well-being for children. A number of demonstrations were implemented between 1996 and 2006 and 2012 and 2019 by 23 and 27 jurisdictions, respectively (James Bell Associates, 2021). Waivers showed that meticulous evaluation of innovative child welfare practices should be encouraged, and that they contribute to the groundwork of new evidence base of child welfare systems and programs. Following timely and frequent screening for serious behavior problems, there is a need for high-quality, effective interventions. To meet these needs, knowledge brokers in the field of child welfare promote rigorous

standards for evaluating interventions to some extent; for example, in assessing the evidence-base for child welfare interventions; both the California Evidence-Based Clearinghouse for Child Welfare and the National Resource Center for Community-Base Child Abuse Prevention grade interventions based on the strength of the research done to test the efficacy of the interventions (Cartwright & Marcellesi, 2015). Federal policy guidance in the US takes a similar view, casting evidence-based interventions as those that show measurable improvements in the outcomes they are designed to affect, though falling short of defining standards for measurement or required degrees of improvement (Administration for Children and Families, 2012). In this light, legislation in the US enables the use of funds for prevention services, such as substance abuse treatment and prevention programs, evidence-based mental health programs, kinship navigator programs, and in-home parent skills-based programs.

Policies on fostering

The findings are also relevant for the development of policies on fostering. Current guidance on out-of-home care services in the UK and US clearly places a responsibility locally and regionally (local authorities and state/county level) as well as nationally on out-of-home caregivers to support the behavioral well-being of children in out-of-home care (Leve, Harold, Chamberlain, Landsverk, Fisher, & Vostanis, 2012; Minnis, Everett, Pelosi, Dunn, & Knapp, 2006; National Institute of Health and Clinical Excellence, 2010). The delegation of authority to foster caregivers, though subsequently withdrawn, provides a statutory guidance on entrusting decision making to caregivers of children in out-of-home care within the English context. The key points of this delegation states that the authority for out-of-home care-involved children's day-to-day decision making should be delegated to the child's caregiver(s), unless there is a valid reason not to do so. In addition, it states that local authorities should each have a published policy statement that lays out their plan in approaching the delegation of authority to out-of-home caregivers and residential workers caring for children the local authority is responsible for. The FFPSA in the US has a number of provisions to reduce unnecessary utilization of residential care, build communities which hold the capacities

to support children and families, and improve services that support children to remain at home with their families (Garcia et al., 2020).

There are two important points here; the first of which is the focus on matching. The findings on the relationship between higher child-perceived caregiver involvement may inform out-of-home care policies on recruitment and approval of out-of-home caregivers, placement decisions in particular with regard to the matching of children and caregivers, and finally supervision of out-of-home caregivers by social workers. The literature around children and poor matching demonstrates that caregivers (and some social workers) often feel that children are placed without sufficient information, although they acknowledged that such information was not always available (Plumridge & Sebba, 2016). In addition, a systematic review on out-of-home care matching found a large amount of evidence that child-caregiver matches were many times made in a crisis or rush, which meant that decisions concerning children's new homes were made with limited time available (Ott, Dean, Martin, Mann, Albers, & Chakraborty, 2021). Child-caregiver matches were often made based on caregiver availability, rather than information-based decisions for best fit. When matches were made in a rush, limited information about children and caregivers were exchanged with each other beforehand, with insufficient time to make plans and arrangements for the child's arrival into the home. Both out-of-home caregivers and the children thought it was important to have information shared before they arrived. This helped out-of-home caregivers prepare for a child's arrival and helped them feel less anxious about the move. This is an issue when it leads to placements that were felt not to be a good match. In an interview, several caregivers reported that they would have 'thought twice' about accepting the placement of the child if they had had more accurate and timely information (Plumridge & Sebba, 2016). New caregivers were particularly vulnerable to this, suggesting that they had not learnt how to ensure a good match or felt that turning down potential placements would reflect badly on them. These findings, coupled with those of resilience research (Brown, George, Sintzel, & Arnault, 2009; Zeijlmans, Lopez, Grietens, & Knorth, 2017), suggest that a thoughtful approach to matching the right caregiver to each child entering care may maximize the protective effect of positive parenting on

children's well-being and outcomes. In doing so, being in out-of-home care may increase the chances of the fostering relationship mitigating for early childhood adversities, as hypothesized by resilience research. Broader child welfare systems and the associated foster providers must identify and select prospective out-of-home caregivers who understand, or are amenable to training on, the importance of behavioral development for children in out-of-home care and the influence that their involvement may have on children's future developmental success. Matching policies and practices should consider matching children to caregivers who can confidently cater to their behavioral needs and have the capacity to be actively involved in the children's lives.

The second important point is concerned with behavioral well-being and the role of external agencies, such as child and adolescent mental health services- in particular the pressures on fostering households as a result of the lack of mental health services and support. Children in both non-kinship and kinship out-of-home placements spend more time with their caregivers than with professionals such as teachers or caseworkers; they are therefore more likely to be exposed to the values, actions, and influence of caregivers. Out-of-home caregivers receive training programs that may later be applied to their practice to benefit the children that they care for. As such, out-of-home caregivers may take on a core role to drive new attempts to transfer learnt information into their practice. Caregivers are therefore very important components to drive implementations and innovations. Yet, research has identified a dearth of evidence on the efficacy and impact of out-of-home caregiver training programs on children's outcomes or caregiver practice. Other research has also found that even when out-of-home caregivers report high satisfaction of the training they receive, the degree to which learning is transferred into practice is low (McDermid, Trivedi, Holmes, & Boddy, 2021). Bronfenbrenner's ecological framework therefore suggests that caregivers, situated in the microsystem, are likely to exert a greater influence on children than school and local authority professionals (in the exosystem). However, by working collaboratively (in the mesosystem), caregivers and professionals are likely to achieve more for the children that they care for. Supervising social workers are required to support out-of-home caregivers to meet the needs, including behavioral, of the children they

care for. However, many out-of-home caregivers report feeling ill-equipped to provide the specialist support that they require (Mallette, Almond, & Leonard, 2020). More detailed guidance and training are therefore needed to enable supervising social workers to empower out-of-home caregivers to be more effectively involved in the behavior of the children they care for, as well as understand the role that socioemotional competence may play. For any child social work practitioner or out-of-home caregiver, to engage with a new program, they need to have the confidence that the changes in practice they decide to make will be supported by the wider context, in addition to seeing how that program will improve their own practice. Research suggests that the degree to which social and practice pedagogy can be entrenched within different contexts is affected by regulatory framework and the culture of the wider child welfare system. Receptiveness therefore depend on multiple factors: the individual and the perceived and actual engagement with the approach within the child welfare system and across the whole organization. An important element to ensure receptiveness to training interventions has been found to be assisted via ensurance of congruence of approaches in all sectors of the system, and identification of areas of flexibility in the system to accommodate new approaches. While the present study was specific to children with out-of-home care involvement, findings from the evidence identified in the systematic literature review in Study 1 (Chapter 3) indicates that children need the support of key adults, not necessarily out-of-home caregivers. This points to the role that other stakeholders can play.

Need for child-level data on socioemotional and behavioral development

Finally, there is a critical need for more data on socioemotional and behavioral measures, particularly in the United Kingdom. In child welfare, empirical questions frequently relate to policy changes, such as changes in state (e.g., Missouri's two-track legislation; Loman, 2005) or federal (e.g., welfare reform) law. Given that most public child welfare agencies are tightly structured by laws and guidelines, evaluations of these become principal tasks for child welfare researchers. Evaluating policy changes requires descriptive data and longitudinal tracking of individual service utilization patterns, both of which are major strengths of administrative data. The present study was only made possible because a large dataset

of children in out-of-home care which had data on socioemotional and behavioral constructs were made available to analyze. I was not able to identify such a dataset in the United Kingdom (see *Appendix C*). Prospective longitudinal data is required to examine the course of children's problem behavior and developmental trajectories and to identify risk and protective factors for behavioral outcomes (Warshaw, Dolan, & Keller, 2000). While large datasets exist within England¹², they either do not record data on socioemotional variables, or do not have large enough samples of children in out-of-home care (DataCare project, *in press*). Administrative datasets in the England have a reliance on the Strengths and Difficulties Questionnaire (SDQ; Goodman, 1997), but only for children in out-of-home care for more than 12 months. More data should assist future research to examine the impact of socioemotional competence on children and inform the development of effective interventions for children and their families. Both national and local level data collection is now integrated as normal practice in children's services departments. Policy initiatives such as *Quality Protects* have increased attention on assessment of planning, accountability, and outcomes based on cost-effective service provision (Rushton & Dance, 2002). *Care Matters* (DfES, 2007) emphasizes the importance of quality monitoring data for commissioning effective strategies within children's services (McDermid, 2008). Data collection and collation has become a critical agenda for professionals providing services to children at risk of child maltreatment and in out-of-home care. Many local authorities have specified departments for the acquisition of data to support the planning, monitoring, and commissioning of services, and for national returns, although many of these teams have been decimated since the change in government and austerity measures (McDermid, 2008). In light of the recent focus on evaluation and monitoring, the collection of child level data has become a prioritized issue and provides local authorities with valuable information through which analyses can be conducted (Malomo & Sena, 2017). However, the reality is that the momentum from these initiatives (e.g., *Quality Protects*, *Care Matters*, etc.) have been lost, especially following the change in government in 2010. Despite this, there is

¹² There are four sets of data within the United Kingdom and they all differ (DataCare project, *in press*).

a focus on the completion of statutory datasets in England, and the Department for Education (DfE) recognizes the unique value of such datasets as a longitudinal source of data for research and policy evaluation. They are also devoted to improving the content and continuity of data collection (Boyne, 2002). Children Act 2004 sets out the foundational work to remove legal obstacles to information sharing. Section 10 of the Act gives children's services the authority and responsibility to plan for ways to promote cooperation between themselves and other related partner agencies to improve children's well-being within the developmental domains of: emotional well-being; mental and physical health; recreation, education, and training; protection from abuse and neglect; economic and social well-being; and their contribution to society. Section 12 requires children's services to establish assessment of databases and information sharing of databases covering all children served by the authority and living in the area. The Children Looked-After (CLA) is a national dataset held by the DfE, which contains individual-level information on all children in out-of-home care (looked-after) and recent care leavers in England. Data collection has been ongoing since 1992 via an online census of local authorities. Data collection was initially mandated for all looked-after children in England in the year ending on 31 March 1992. However, between 1998 and 2003, data collection was constricted to children with a date of birth divisible by three (representing about one-third of the sample). In 2004, it returned to include all looked-after children. The CLA contains detailed information about the care histories of looked-after children, such as the start and end dates of each out-of-home care episode. Outcome data which was limited to the activity of children in out-of-home care at age 16 (i.e., in further education, taking exams, working, etc.) was first collected in 1999. This outcome data has been expanded since 2009 to include child-level information on health-related outcomes such as immunizations, health checks, and the Strengths and Difficulties Questionnaire scores. However, outcome data are only collected for 'relevant and eligible' care leavers, defined by current DfE guidance as a young person who was looked after for at least 13 weeks after the age of 14 (Department for Education, 2015). As illustrated, outcome data is collected only for specific groups of care leavers and looked-after children, but linkages to other non-DfE datasets (related to health or justice, for example) cannot be facilitated as names are not

collected (McGrath-Lone, Harron, Dearden, Nasim, & Gilbert, 2016). The restriction of data collection between 1998 and 2003 also means that the power of the longitudinal dataset is limited, especially when examining variation by local authorities or for relatively rare placements or outcomes. The main limitation of the CLA is that, as an administrative dataset, it does not contain detailed information about the support and services received by looked-after children (e.g., parental contact, placement with siblings, interventions, etc.) or the baseline characteristics of children entering out-of-home care. Despite the wide range of child-level data that remains across agencies that work with children in out-of-home care, data is sometimes lacking in detail and frequently variable. It is also difficult to extract from case management systems. Local authorities used procured case management systems to collect their data, where information about each case is entered by an allocated case worker (i.e., social worker) (Emmott, Jay, Woodman, 2019).

There exists a number of case management systems for children's services, which means that internal validation processes and collection methods are likely to vary between local authorities (Emmott et al., 2019; Preston, Godar, Lefevre, Boddy, & Firmin, 2021). One of the potential benefits of the increased use of administrative data lies in the degree to which this kind of data is innately facilitative of researcher-practitioner-policy maker interactions. Indeed, administrative data pushes all parties toward a greater policy-practice-research synthesis because of the inevitable interdependence that this form of data demands. When the demand for synthesis is combined with the tendency of these databases to become longstanding resources and therefore generate longer term relationships, it is believed that administrative data can help reduce isolation among child maltreatment professionals (Drake & Jonson-Reid, 1999). At present, considerable difficulties exist concerning this data, which may require significant work to obtain and organize the data in order to conduct routine analyses. Difficulties regarding both the application of electronic recording systems and changing contexts of child welfare provisions have been identified, and are at an early stage. As this process moves forward, new possibilities and availabilities of child level data may open up.

Implementation of research to policy

Lastly, although there is growing evidence about the effectiveness of out-of-home care systems in different countries, practitioners and policy makers that wish to implement what works in other countries must take caution to recognize the different contextual features of the out-of-home care population (Thoburn & Courtney, 2011). In England, the key policy document from 2016 ‘Putting Children First’ sets out the government’s reform program for children’s social care, which includes developing the social work profession through assessment and accreditation, supporting innovation, establishing a new What Works Centre for Children’s Social Care, and exploring new governance and accountability arrangements (Department for Education, 2016). The fundamental aims put forth by this policy document is for local areas to have the freedom and flexibility to integrate context and understand ‘what works’ for various children in their communities. It asserts that services need to be implemented after consideration of the characteristics of the local context and the complex and varying needs of individual children and families, but also to the same consistently high standards. The many variables (affecting children in need of an out-of-home care placement, their caregivers, and the residential and therapeutic facilities) that impact children’s lives as they develop within or pass through the child welfare and out-of-home care system have yielded the utilization of a wide range of outcome and process research methodologies.

Although there exists an extensive knowledge base to inform the decision-making process for children in out-of-home care, the findings are nuanced, with different outcomes for different groups of children receiving different services. Consequently, commissioners and policy-makers should take caution not to over-simplify the findings about outcomes and processes for children who may need to be placed with an alternate caregiver away from home.

This study identified several risk and protective factors associated with children’s behavioral problems over the course of three years. Of the three age groups, adolescents who entered care at an older age showed more difficulty as a whole compared to the middle and early childhood groups. Tailored

attention which accommodate the needs of such children should be given to those who enter the care system at an older age. On the other hand, this emphasis on child welfare workers to think and plan for children as individuals is nothing new, and many child welfare workers would argue that this is how they work already (Bartelink, Van Yperen, & Ingrid, 2015; Cash, 2001). As such, there is an important distinction between the strategic and operational uses of data, evidence, and information. The findings should also be positioned within the complex and nuanced systems in which workers operate. That is, even if social workers and policy makers have all of the information set out by this thesis and approach children as individuals recognizing the heterogeneity of the group, it is difficult for the system to provide what has been identified (Wulczyn, Alpert, Monahan-Price, Huhr, Palinkas, & Pinsoneault, 2015). Essentially, it is important to recognize that it is not entirely straightforward to identify research findings and then expect them to be ‘passively’ integrated into practice and policy. Often, professionals balance research evidence with other relevant information and priorities born out of their professional orientations, political and financial considerations, personal experience, and personal judgment. Palinkas and colleagues (2014), for example, point to the influence of local needs and client characteristics when evaluating the generalizability and relevance of research. Nevertheless, this thesis contributes to a base of comprehensive synthesis of evidence which help decision-makers to make well-informed choices.

7.7 Summary of the chapter

Chapter 7 ties together the findings from the statistical findings and contextualizes it within the wider literature. For each research question, I summarize the findings and place it in the context of existing literature. I also compare the children in the study sample to children in different population groups, and make inferences and provide explanations relevant to the findings. I also review the risk and protective variables of problem behavior development tested for each of the three age groups. I place these different variables in the context of the developmental stage of each age group and analyze why these variables may be important at each relevant developmental period. Overall, the findings of Study 2 contribute to a better understanding of problem behavior trajectories for children who have been in long-term out-of-home care

and identify some variables that may be associated with positive or negative change over time. Then, the internal validity, strengths, and limitations of the study are discussed. Limitations of the statistical approach in the thesis are highlighted, which included limitations of growth curve models and establishing power for each model. Next, external validity and generalizability of the thesis is explored. The chapter then concludes with a discussion of the implications of the findings and future directions for research, practice, and policy.

Chapter 8. Conclusion

Chapter 8 brings this thesis to a close. To do so, the findings from both Study One and Study Two are briefly summarized and put together as to how the two studies answer the research questions of the thesis as a whole. Then, the thesis is concluded as its proposed directions for future research and contributions to knowledge are discussed.

8.1 Brief Summary of Study One and Two findings

The main goals for this thesis was to identify risk and protective factors for the behavioral outcomes of children in out-of-home care, and ultimately contribute to the ongoing discussion of variables which could be targeted in interventions. A growing body of evidence has demonstrated that children in out-of-home care experience behavioral and mental health difficulties, and that this is associated with a high rate of later peer rejection, conduct problems, delinquency, and substance abuse outcomes (McWey et al., 2010a; Mrug et al., 2012; Zima, Bussing, Freeman, Yang, Belin, & Forness, 2000). Currently existing interventions that aim to support the positive behavioral adjustment of children in out-of-home care have yet to be evaluated under rigorous standards, and have shown inconsistent results (Hambrick et al., 2016). If interventions are to be implemented more efficiently and effectively, it is crucial to identify risk and protective factors for behavioral maladjustment of children in out-of-home care. Such knowledge also holds the potential to contribute to policy and practice movements.

To accomplish these goals, two complementary studies have been conducted for this thesis. Study 1 consists of a narrative systematic review of the risk and protective factors for behavioral outcomes for children in out-of-home care. This review included 146 studies and identified over 200 factors among many spheres of the ecological model (Bronfenbrenner, 1979). Some consistent findings were found concerning maltreatment experience and prior levels of behavior problems. In total, the included studies came together to show that experience of maltreatment as well as higher baseline levels of behavior problems is a risk factor for positive behavioral adjustment. Evidence was otherwise inconsistent with respect to the other

factors that were reviewed. These results highlight the diversity of the experiences children in out-of-home care live through, and also reflects the diversity of the samples, methodologies, and study designs of the existing research. No study examined the effects of socioemotional skills on later behavior problems, which was a key variable in the general population for mediating behavioral maladjustment (e.g.: Dunlap et al., 2006; Hemmeter et al., 2006; Fox, Dunlap, Hemmeter, Joseph, & Strain, 2003). In conclusion, it is recommended that methodologies have to be meticulously studied within a small and well-defined population group, in order to determine whether variables are correlates or factors.

Study Two is a continuation and deeper analysis of the research questions that have been explored by Study One. This study examined the relationship between several potential risk and protective variables and problem behavior outcomes of children in out-of-home care. Secondary data analysis was used to discover that a number of variables were positively and negatively associated with behavioral change over time, and that these variables differed for children at particular developmental stages and ages. The study also found that a number of variables at Time 1 were associated with behavior problems at Time 1 only; they did not predict behavioral changes across the three years of the study period. Lastly, a structural equation model of a moderated mediation path analysis model between recent incident(s) of abuse, child-perceived caregiver involvement, responsibility skills, and problem behavior outcomes three years later found a significant effect of caregiver involvement and responsibility skills on later rates of behavior problems, despite an incident of minor, severe, and very severe abuse. That is, both responsibility skills and child-perceived caregiver involvement skills predicted problem behavior scores three years later, even after controlling for prior incident of maltreatment. Incident(s) of maltreatment did not predict both child-perceived caregiver involvement and responsibility skills.

The findings from Study One and Two contribute to a better understanding of the risk and protective factors concerning behavioral maladjustment and adjustment for children in out-of-home care. In many ways, Study Two adds to the findings from Study One by defining the characteristics of a small subgroup

of children represented in the child welfare population, and examining variables that might mitigate the adverse effects of child maltreatment on behavioral maladjustment. Further, it fills gaps in the literature by introducing socioemotional skills as a new variable to be examined within the longitudinal framework. As expected, Study Two was not able to examine all of the variables that have been identified in the systematic review. Nevertheless, the limitations of this study point to areas of investigation for future research to carry out. For example, placement changes or different types of care (kinship, non-kinship, or residential care) was not examined in Study Two. Any placement or caregiver changes between each data collection point were not recorded by the data collectors, so these variables are absent from the model. Such variables may have a critical part in understanding the mechanisms and pathways that underlie the development of behavior problems. For example, placement history may confound the relationship between child-perceived caregiver involvement and children's behavior problems. Finally, although many of the findings from the analyses of Study Two reiterate what was found in Study One, it was unexpected that post-traumatic stress symptoms did not have any statistically significant effects on the relationship between incident of abuse and responsibility skills, as well as incident of abuse and child-perceived caregiver involvement. The two studies therefore suggest further avenues of research.

8.2 Contribution to research and literature base

Three main contributions to knowledge are made by this thesis. Firstly, Study One is the first study to systematically examine all empirical and longitudinal research studies which have investigated risk and protective factors for problem behavior outcomes for children in out-of-home care. In doing so, a comprehensive overview of the current state of evidence is presented. The systematic review also highlighted a significant gap in research on the effects of socioemotional skills, particularly when contrasted to the volume of research on the same topic for children in the general population. Given the findings of this study and others in the general population, this points to the urgent need for research to fill this gap for children in out-of-home care.

Secondly, the thesis contributes to the body of knowledge on risk and protective factors by demonstrating that out-of-home care setting, school engagement, poor neighborhood community environment, assertive behavior, and child-perceived caregiver involvement were risk and protective variables for behavior problems of children in out-of-home care. In particular, a substantial and novel contribution to knowledge is made concerning the effects of responsibility skills and the involvement of caregivers in the positive behavioral development of children in out-of-home care. This relationship remained true for responsibility skills and child-perceived caregiver involvement even after prior incident of physical maltreatment was accounted for. This thesis is the first study to show this among this specified population group as far as I can confirm.

Lastly, this thesis adds to the growing literature on research which utilizes the risk and protective framework. This framework has been used widely among social work and child welfare researchers, and has revolutionized the fields of many disciplines including child development (Kerns & Brumariu, 2014), public health (Strine et al., 2008), and criminology (Case & Haines, 2013) through the adoption of the risk factor framework and prevention paradigm. The multiple and varying models used in this thesis also reflect the adaptability of the framework, by accommodating numerous methodological tools that can be used to discover risk and protective factors. The risk and protective factor framework connects domains of prevention, research, and practice, and therefore engages key stakeholders of child welfare such as practitioners, researchers, and policy makers. This thesis shows the ways that the framework can be utilized for practice, research, and policy, and demonstrates the applicability of the framework to research on the behavior of children in out-of-home care.

8.3 Directions for future research

The implications of the thesis for future researchers, practitioners, and policy makers have previously been discussed in the discussion chapter of Study Two. As such, this section outlines the suggestions for future possible work that could build on the research presented in this thesis.

The active and thriving nature of research on the underlying mechanisms of problem behavior for children in out-of-home care implies that it will be beneficial to update the systematic review in Study One in the coming years. In the future, however, it is recommended that researchers narrow the focus of the included studies, such as by focusing on a single risk or protective variable, or by limiting the methodological inclusion criteria (e.g., constrict to studies that used the CBCL scores to measure problem behavior outcomes). This may result in a more homogeneous set of included studies, potentially permitting meta-analyses to be carried out as well. Systematic reviews of risk and protective factors are still a developing field of literature, and robust research methods to tackle these tasks are in progress. Finally, subsequent reviews should incorporate findings from qualitative and/or mixed-methods research to understand the perspectives of children.

Study Two also gives rise to recommendations for future research. Future research should aim to understand how to promote socioemotional skills in out-of-home care, since exposure to violence and maltreatment has been identified to be a significant risk factor in the development of socioemotional skills by past research (Chesmore, Weiler, Trump, Landers, & Taussig, 2017). Children with maltreatment experience so severe to the extent that removal from their families and homes is required are at even greater risk for socioemotional difficulties due to their high likelihood of exposure to additional interconnected adverse events. Although many cross-sectional studies have tried to measure and compare socioemotional problems among children in different types of care in the past (Fusco & Cahalane, 2015), studies that aimed to understand the effects of socioemotional skills on later outcomes of problem behavior could not be identified. This gap stood out in acute contrast to the large literature base on socioemotional skills conducted with children in the general population. This literature has described, theorized, and analyzed the measurements of socioemotional skills, and how it operates to improve problem behavior outcomes (Claessens, 2012; Juffer, Bakermans-Kranenburg, & Van Ijzendoorn, 2005; Keller, 2018; Squires, Potter, & Bricker, 1995). In the future, research should examine the degree to which existing socioemotional interventions in the general population (e.g.: Ohl, Fox, & Mitchell, 2013; Ritblatt, 2016; Webster-Stratton,

Rinaldi, & Reid, 2011), may be relevant for children in out-of-home care, and if it would be plausible to expand these to directly apply to these children or if a new framework should be developed. Better quality data on socioemotional skills and behavioral problems should also be collected or identified to replicate the findings of this thesis and others. Until this work is carried out, the need for such interventions and screening efforts will remain insufficiently understood, and interventions and research in this area may remain underdeveloped in this field of study despite its potential for being a key factor for positive behavioral adjustment. More generally, child welfare researchers should continue to conduct applied research activities. A research agenda should be developed that aims to better understand the effects of intervention strategies on child outcomes. Program developers and policy makers can benefit from good quality research as they make decisions that affect the services available to this high-risk population.

Lastly, future researchers should engage in efforts to develop datasets that collect data on out-of-home caregivers (Narey & Owers, 2018). Indeed, one of the key limitations of the NSCAW data was that there was no caregiver information on whether there were caregiver changes or how many caregivers children experienced during the entirety of the data collection period. The findings in regards to child-perceived caregiver involvement from Study 2 and its important effect on future behavioral adjustment also points to the need for better caregiver data in order to understand what types of caregivers are contributing to this effect. It should also be noted that it is important for such datasets to contain high quality data. For example, validated and sensitive measures should be used, and researchers and professionals in the field should be involved in the development and design of such initiatives. On a daily basis, out-of-home care families are providers for front-line services. As Fanshel and Shinn (1978) observed, “We can think of no greater influence on the well-being of foster children while they are in care than those who directly minister to their needs” (p. 496). Given the pivotal role of out-of-home care families and the findings which stressed the importance of child-perceived caregiver involvement, a better understanding of aspects of the family that might ameliorate or prevent future emotional and behavioral difficulties, as well as aspects of the family that might exacerbate difficulties is needed. There is a constant need for longitudinal studies with large

samples, and the best solution to this need are large administrative datasets. Although numerous large-scale research projects on out-of-home children and their development using primary data have been carried out, this data will become outdated in time and difficult to access. Deficiency of longitudinal research means that aspects of the out-of-home care family that intensifies children's poor functioning, ameliorate existing difficulties, and prevent adjustment problems from developing, is unclear (Orme & Buehler, 2001). The effects of out-of-home care children's behavior on out-of-home care family functioning, parenting, and marital quality have also yet to be examined at depth. Political and welfare agency goals to support the improvement of life chances and development of secure attachments for this vulnerable group can only be achieved if authorities collect routine information about their out-of-home caregivers, the placement that they can provide, and the means in which they are utilized. At the national level such data is necessary to inform programs to ensure that authorities are able to meet the needs of vulnerable children at-risk that they hold responsibility for, and improve and reform the out-of-home caregiver workforce (Poursanidou, Gatehouse, & Ward, 2005). As such, datasets which collect data at regular intervals will be able to contribute as an ongoing data source for future research studies.

8.4 Closing remarks

The analyses carried out by this thesis is one of the first to systematically examine the factors associated with problem behavior of children in out-of-home care, and examine through statistical analysis how some of the identified variables are associated with problem behavior. This research also contains in-depth examination of the problem behaviors of children following an investigation for alleged maltreatment and time in out-of-home care. Changes in behaviors and factors associated with these changes have also been examined. One recurring theme of the results is that behavior problems are generally associated with higher levels of child, caregiver, and context-related risk factors. The findings illuminated individual and contextual factors which put children at risk of maladjustive problem behavior outcomes. It also highlighted the potential for out-of-home caregivers to be actively involved in the children's lives and enhance their chances for positive behavioral adjustment. The analyses indicated that caregiver's involvement that was

perceived by the child played an important role in promoting better behavioral outcomes even in the presence of past maltreatment.

The analyses in research questions 2 and 3 of Study 2 demonstrated that a number of variables for children in out-of-home care could be protective factors for behavioral outcomes. In theory, protective factors are defined as variables that predict positive outcomes in the presence of risk. Yet, by nature of involvement in out-of-home care and child protective services, the children in this study are presumed to have experienced some level of adverse experiences. In other words, out-of-home care is an indication for past adversity and stressful life events (Frenkel, Donzella, Frenn, Rousseau, Fox, & Gunnar, 2020). Such experiences vary in severity and duration for each individual child, but it is true that children are placed in out-of-home care only when they are judged to be at risk of significant abuse and/or neglect. Furthermore, a large body of evidence has demonstrated that children exposed to maltreatment and involved with out-of-home care are at significant risk of poor behavioral and mental health outcomes (Chamberlain, Leve, & Smith, 2006; Chamberlain, Price, Leve, Laurent, Landsverk, & Reid, 2008; Clausen, Landsverk, Ganger, Chadwick, & Litrownik, 1998). As such, children in out-of-home care represent a high-risk group. On these grounds, it is argued that this thesis identifies protective factors that are in fact a risk-based protective factor for the behavior problems of children in out-of-home care. Such claims imply that the identified protective factors may buffer the adverse effects experienced by these children on behavioral outcomes, although most likely not in isolation. Although the findings of this thesis are limited by the quality and scope of the data available, it contains results that are important especially if they can be replicated by future researchers. Hopefully, it will be able to inform future policy, research, and practice, and in turn improve the behavioral development of children in out-of-home care.

Overall, the findings contribute to a better understanding of problem behavior trajectories for children with histories of long-term out-of-home care and identify some variables that may be associated with positive and negative change over time. Since this thesis is an observational rather than an

experimental study, causal claims are not made between any of the identified risk and protective variables and behavior problem development. This study sheds light on some new variables that can be studied further in the future, and offers guidance for the particular age groups that may be more susceptible to certain risk and protective factors. Moreover, the contributions of this thesis go beyond the previous studies which have used the NSCAW data by being the first study to examine several risk and protective variables relevant to each age group, with a particular focus on the effects of socioemotional skills, among children who have experienced long-term out-of-home care. However, while this study lends some support to the use of an ecological framework to select certain variables for examination, it is far from a comprehensive ecological investigation. Other theoretically important aspects of the microsystem which were not included, such as relationships of children with their peers, should be expected to also influence children's behavior. Furthermore, this study does not fully incorporate many of the wider influences on children's behavior at the macrosystem levels that shape the adjacent microsystem.

8.5 Summary of the chapter

This chapter synthesizes findings from Study 1 (systematic review) and 2 (secondary data analysis), then outlines the contributions to knowledge of the thesis. Overall, the findings of Study 1 indicated that children's longitudinal behavior development is associated with a wide variety of individual and contextual factors. Some commonly reviewed variables in the included studies were interpersonal relationships, deviant peer affiliation, relational permanence, attachment to the new family, school functioning, age at initial placement, out-of-home placement, and risk experience. Based on the findings of Study 1, the associations between identified variables and longitudinal problem behavior development in Study 2 were tested and interesting associations between the identified risk and protective variables and later behavior problems were found. The chapter closes with some directions for future research which are suggested based on the findings of both Study 1 and 2.

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Appendix A. STROBE Checklist

Chart 1	Item No.	Recommendation							
Study			Aarons et al. (2010)	Ayotte et al. (2016)	Ayotte et al. (2017)	Baptista et al. (2018)	Barber et al. (2003)	Barboza et al. (2017)	Barrett et al. (2014)
Title and abstract	1	(a) Indicate the study's design with a commonly used term in the title or the abstract	Yes	Yes	Yes	Yes	Yes	Yes	Yes
		(b) Provide in the abstract an informative and balanced summary of what was done and what was found	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Introduction									
Background	2	Explain the scientific background and rationale for the investigation being reported	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Objectives	3	State specific objectives, including prespecified hypotheses	No in introduction. But yes in abstract.	Study purpose: yes; hypothesis is: no.	Yes for both.	Yes	Yes	Yes	Yes
Methods									
Study design	4	Present key elements of study design early in the paper	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Participants	6	(a) Give the eligibility criteria, and the sources and methods of selection of participants. Describe methods of follow-up	Yes	Yes	Yes	No	Yes	Yes	Yes
		(b) For matched studies, give matching criteria and number of exposed and unexposed	Not a matched study	Not a matched study	Not a matched study	Not a matched study	Not a matched study	Not a matched study	Yes
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable.	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Data source	8	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group.	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bias	9	Describe any efforts to address potential sources of bias	No	No	No	Yes	Yes	Yes	No
Study size	10	Explain how the study size was arrived at	Yes	Yes	Yes	No	Yes	Yes	Yes

Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Statistical methods	12	(a) Describe all statistical methods, including those used to control for confounding	Yes	Yes	Yes	Yes	Yes	Yes	Yes
		(b) Describe any methods used to examine subgroups and interactions	Yes for subgroups, no interaction effects	Yes for subgroups, no interaction effects	No for subgroups, Yes for interaction effects	Yes for subgroups, no for interaction effects	Yes for subgroups and interaction effects	No subgroups or interaction effects	No for subgroups and interaction effects
		(c) Explain how missing data were addressed	Yes (Only sample with data on all variable were included).	No	No	No	Yes	Yes	No
		(d) If applicable, explain how loss to follow-up was addressed	Yes	No	No	No	Yes	No	Not applicable (because it is administrative records with data available at both time points of follow-up).
		(e) Describe any sensitivity analyses	No	No	No	No	No	No	No
Results									
Participants	13	(a) Report numbers of individuals at each stage of study - e.g. numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analyzed	Yes	Yes	Yes	No	Yes	Yes	Yes

		(b) Give reasons for non-participation at each stage	Yes (reasons for not being included in the analytic sample)	Yes	Yes	No	No	No	Not applicable.
		(c) Consider use of a flow diagram	No	No	No	No	Yes	No	No
Descriptive data	14	(a) Give characteristics of study participants (e.g. Demographic, clinical, social) and information on exposures and potential confounders	Yes	Yes	Yes	Yes	Yes	Yes	Yes
		(b) Indicate number of participants with missing data for each variable of interest	Yes	No	No	No	No	No	Yes
		(c) Summarize follow-up time (e.g., average and total amount)	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Outcome	15	Report number of outcome events or summary measures over time	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Main results	16	(a) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (e.g., 95% confidence interval). Make clear which confounders were adjusted for and why they were included	Yes	Yes	Yes	Yes	Yes	Yes	Yes
		(b) Report category boundaries when continuous variables were categorized	Yes - age was categorized	Continuous variables were not categorized	Continuous variables were not categorized	Continuous variables were not categorized	Continuous variables were not categorized	Continuous variables were not categorized	Continuous variables were not categorized
		(c) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	Not relevant	Not relevant	Not relevant	Not relevant	Not relevant	Not relevant	Not relevant
Other analyses	17	Report other analyses done- e.g. analyses of subgroups and interactions, and sensitivity analyses	Yes - age and gender subgroups	Yes	Yes	Yes	Yes	Yes	Yes
Discussion									
Key results	18	Summarize key results with reference to study objectives	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias.	Yes	Yes	Yes	Yes	No	Yes	Yes
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of	Yes	Yes	Yes	Yes	Yes	Yes	Yes

		analyses, results from similar studies, and other relevant evidence.							
Generalizability	21	Discuss the generalizability (external validity) of the study results	No	Yes	No	Yes	No	No	No
Other information									
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	Yes	Yes	Yes	No	No	No	Yes
Chart 2	Item No.	Recommendation							
Study			Barth et al. (2007)	Bastiaansen et al. (2014)	Bell et al. (2015).	Bellamy (2008)	Bellamy et al. (2010).	Bender & Losel (1997).	Blakely et al. (2017).
Title and abstract	1	(a) Indicate the study's design with a commonly used term in the title or the abstract	Yes	Yes	Yes	Yes	Yes	Yes	Yes
		(b) Provide in the abstract an informative and balanced summary of what was done and what was found	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Introduction									
Background	2	Explain the scientific background and rationale for the investigation being reported	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Objectives	3	State specific objectives, including prespecified hypotheses	Yes	Yes	Yes	Yes	No	No	Yes
Methods									
Study design	4	Present key elements of study design early in the paper	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Participants	6	(a) Give the eligibility criteria, and the sources and methods of selection of participants. Describe methods of follow-up	Yes	Yes	Yes	Yes	Yes	No	Yes
		(b) For matched studies, give matching criteria and number of exposed and unexposed	Yes	Not a matched study	Yes	Yes	Yes	Not a matched study	Not a matched study
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable.	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Data source	8	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group.	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bias	9	Describe any efforts to address potential sources of bias	No, but acknowledged	Yes	No	Yes	Yes	No	Yes

			where bias could happen.						
Study size	10	Explain how the study size was arrived at	Yes	Yes	Yes	Yes	Yes	No	Yes
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Statistical methods	12	(a) Describe all statistical methods, including those used to control for confounding	Yes	Yes	Yes	Yes	Yes	Yes	Yes
		(b) Describe any methods used to examine subgroups and interactions	Yes for subgroups, No for interaction effects	No for subgroups or interaction effects	Yes for subgroups, no for interaction effects	Yes for subgroups, no for interaction effects	Yes for subgroups, no for interaction effects	Yes for subgroups and interaction effects	No for subgroups, yes for interaction effects
		(c) Explain how missing data were addressed	Yes	Yes	Yes	Yes	Yes	No	No
		(d) If applicable, explain how loss to follow-up was addressed	Yes	Yes	Yes	No	No	No	No
		(e) Describe any sensitivity analyses	No	No	No	No	No	No	No
Results									
Participants	13	(a) Report numbers of individuals at each stage of study - e.g. numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analyzed	Yes	Yes	Yes	Yes	Yes	Yes	Yes
		(b) Give reasons for non-participation at each stage	No	No	No	No	No	Yes	No
		(c) Consider use of a flow diagram	No	No	No	No	No	No	No
Descriptive data	14	(a) Give characteristics of study participants (e.g. Demographic, clinical, social) and information on exposures and potential confounders	Yes	Yes	Yes	Yes	Yes	Yes	Yes
		(b) Indicate number of participants with missing data for each variable of interest	No	No	No	Yes	Yes	No	No
		(c) Summarize follow-up time (e.g., average and total amount)	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Outcome	15	Report number of outcome events or summary measures over time	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Main results	16	(a) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (e.g., 95% confidence interval). Make clear which confounders were adjusted for and why they were included	Estimate s were all adjusted as IDR (Incident density ratio)	Yes	Yes	Yes	Yes	Yes	Yes

			but the CI were given						
		(b) Report category boundaries when continuous variables were categorized	Continuous variables were not categorized	Yes – residential care was categorized as either day-time or night-time.	Yes-caregiver years of fostering	Continuous variables were not categorized	Continuous variables were not categorized	Continuous variables were not categorized	Continuous variables were not categorized
		(c) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	Not relevant	Not relevant	Not relevant	Not relevant	Not relevant	Not relevant	Not relevant
Other analyses	17	Report other analyses done- e.g. analyses of subgroups and interactions, and sensitivity analyses	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Discussion									
Key results	18	Summarize key results with reference to study objectives	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias.	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence.	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Generalizability	21	Discuss the generalizability (external validity) of the study results	Yes	No	No	Yes	No	Yes	Yes
Other information									
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	No	No	No	Yes	Yes	No	Yes
Chart 3	Item No.	Recommendation							
Study			Brown et al (2015).	Bulat (2010).	Cameron et al. (2011).	Cantos et al. (2010).	Chamberlain et al. (2007).	Chamberland et al (2015).	Chavira et al. (2010).
Title and abstract	1	(a) Indicate the study's design with a commonly used term in the title or the abstract	Yes	Yes	Yes	Yes	Yes	Yes	Yes
		(b) Provide in the abstract an informative and balanced summary of what was done and what was found	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Introduction									
Background	2	Explain the scientific background and rationale for the investigation being reported	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Objectives	3	State specific objectives, including prespecified hypotheses	No	No	No	No	No	Yes	No
Methods									
Study design	4	Present key elements of study design early in the paper	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Participants	6	(a) Give the eligibility criteria, and the sources and methods of selection of participants. Describe methods of follow-up	Yes	No	No	No	Yes	Yes	Yes
		(b) For matched studies, give matching criteria and number of exposed and unexposed	Not a matched study	Not a matched study	Not a matched study	Not a matched study	Yes	Not a matched study	Not a matched study
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable.	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Data source	8	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group.	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bias	9	Describe any efforts to address potential sources of bias	No	No	No	No	No	No	No
Study size	10	Explain how the study size was arrived at	Yes	Yes	Yes	No	Yes	Yes	Yes
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Statistical methods	12	(a) Describe all statistical methods, including those used to control for confounding	Yes	Yes	Yes	Yes	Yes	Yes	Yes
		(b) Describe any methods used to examine subgroups and interactions	No subgroups or interactions examined	Yes for subgroups, no for interactions examined	No subgroup or interaction effects examined	No subgroup or interaction effects examined	No subgroup or interaction effects examined	No subgroups or interactions examined	No subgroups or interactions examined
		(c) Explain how missing data were addressed	Yes	No	No	No	Yes	No	No
		(d) If applicable, explain how loss to follow-up was addressed	Yes	No	No	No	No	No	No
		(e) Describe any sensitivity analyses	No	No	No	No	No	No	No
Results									
Participants	13	(a) Report numbers of individuals at each stage of study - e.g. numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analyzed	Yes	Yes	Yes	No	No	No	No

		(b) Give reasons for non-participation at each stage	No	Yes	No	No	No	No	No
		(c) Consider use of a flow diagram	No	No	No	No	Yes	No	No
Descriptive data	14	(a) Give characteristics of study participants (e.g. Demographic, clinical, social) and information on exposures and potential confounders	Yes	Yes	Yes	Yes	No	Yes	Yes
		(b) Indicate number of participants with missing data for each variable of interest	Yes	No	No	No	No	No	Yes
		(c) Summarize follow-up time (e.g., average and total amount)	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Outcome	15	Report number of outcome events or summary measures over time	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Main results	16	(a) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (e.g., 95% confidence interval). Make clear which confounders were adjusted for and why they were included	Yes	Yes	Yes	Yes	Yes	Yes	Yes
		(b) Report category boundaries when continuous variables were categorized	Continuous variable were not categorized	Continuous variables were not categorized	Continuous variables were not categorized	Continuous variables were not categorized	Continuous variables were not categorized	Continuous variables were not categorized	Continuous variables were not categorized
		(c) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	Not relevant	Not relevant	Not relevant	Not relevant	Not relevant	Not relevant	Not relevant
Other analyses	17	Report other analyses done- e.g. analyses of subgroups and interactions, and sensitivity analyses	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Discussion									
Key results	18	Summarize key results with reference to study objectives	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias.	Yes	Yes	No	Yes	Yes	Yes	Yes
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence.	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Generalizability	21	Discuss the generalizability (external validity) of the study results	No	Yes	No	Yes	Yes	Yes	Yes
Other information									
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	No	No	No	No	No	No	Yes
Chart 4	Item No.	Recommendation							

Study			Chow et al (2014).	Conn et al (2015).	Cuthbert et al. (2011).	Cutuli et al (2016).	D'Oosterlinck et al (2008).	Dregan et al (2011).	Eddy et al (2004).
Title and abstract	1	(a) Indicate the study's design with a commonly used term in the title or the abstract	Yes	Yes	Yes	Yes	Yes	Yes	Yes
		(b) Provide in the abstract an informative and balanced summary of what was done and what was found	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Introduction									
Background	2	Explain the scientific background and rationale for the investigation being reported	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Objectives	3	State specific objectives, including prespecified hypotheses	No	Yes	No	Yes	No	No	No
Methods									
Study design	4	Present key elements of study design early in the paper	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Participants	6	(a) Give the eligibility criteria, and the sources and methods of selection of participants. Describe methods of follow-up	Yes	Yes	Yes	Yes	Yes	Yes	No
		(b) For matched studies, give matching criteria and number of exposed and unexposed	Not a matched study.	Not a matched study.	Not a matched study.	Not a matched study.	Yes	Not a matched study	Not a matched study.
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable.	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Data source	8	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group.	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bias	9	Describe any efforts to address potential sources of bias	No	No	No	Yes	Yes	No	No
Study size	10	Explain how the study size was arrived at	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Statistical methods	12	(a) Describe all statistical methods, including those used to control for confounding	Yes	Yes	Yes	Yes	Yes	Yes	Yes
		(b) Describe any methods used to examine subgroups and interactions	No for subgroups, yes for interactions	Yes for subgroups, no for interactions.	No subgroup or interaction effects	No subgroup or interaction effects	Yes	No subgroup or interaction effects	No subgroup or interaction effects

			on effects.		examine d.	examine d.		examine d.	examine d.
		(c) Explain how missing data were addressed	No	Yes	No	No	No	Yes	Yes
		(d) If applicable, explain how loss to follow-up was addressed	No	No	No	No	No	No	No
		(e) Describe any sensitivity analyses	No	No	No	No	No	No	No
Results									
Participants	13	(a) Report numbers of individuals at each stage of study - e.g. numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analyzed	No	Yes	Yes	No	Yes	Yes	No
		(b) Give reasons for non-participation at each stage	No	No	Yes	No	No	No	No
		(c) Consider use of a flow diagram	No	No	No	No	No	No	No
Descriptive data	14	(a) Give characteristics of study participants (e.g. Demographic, clinical, social) and information on exposures and potential confounders	Yes	Yes	Yes	Yes	Yes	Yes	Yes
		(b) Indicate number of participants with missing data for each variable of interest	No	No	No	No	No	No	No
		(c) Summarize follow-up time (e.g., average and total amount)	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Outcome	15	Report number of outcome events or summary measures over time	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Main results	16	(a) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included	Yes	Yes	Yes	Yes	Yes	Yes	Yes
		(b) Report category boundaries when continuous variables were categorized	Continuous variables were not categorized.	Continuous variables were not categorized.	Continuous variables were not categorized.	Continuous variables were not categorized.	Continuous variables were not categorized.	Continuous variables were not categorized.	Continuous variables were not categorized.
		(c) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	Not relevant	Not relevant	Not relevant	Not relevant	Not relevant	Not relevant	Not relevant
Other analyses	17	Report other analyses done- e.g. analyses of subgroups and interactions, and sensitivity analyses	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Discussion									
Key results	18	Summarize key results with reference to study objectives	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias.	Yes	Yes	Yes	Yes	Yes	Yes	No

Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence.	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Generalizability	21	Discuss the generalizability (external validity) of the study results	Yes	No	No	Yes	Yes	No	No
Other information									
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	Yes	No	Yes	No	No	No	Yes
Chart 5	Item No.	Recommendation							
Study			Eltink et al (2018).	Farmer et al (2003).	Fernandez (2008a).	Fernandez (2008b).	Garcia et al (2015).	Garrido et al (2011).	Goeman et al (2018).
Title and abstract	1	(a) Indicate the study's design with a commonly used term in the title or the abstract	Yes	Yes	Yes	Yes	Yes	Yes	Yes
		(b) Provide in the abstract an informative and balanced summary of what was done and what was found	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Introduction									
Background	2	Explain the scientific background and rationale for the investigation being reported	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Objectives	3	State specific objectives, including prespecified hypotheses	Yes	Yes	No	No	Yes	No	Yes
Methods									
Study design	4	Present key elements of study design early in the paper	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Participants	6	(a) Give the eligibility criteria, and the sources and methods of selection of participants. Describe methods of follow-up	No	Yes	Yes	Yes	Yes	Yes	Yes
		(b) For matched studies, give matching criteria and number of exposed and unexposed	Not a matched study.	Not a matched study.	Yes	Yes	Not a matched study.	Not a matched study.	Not a matched study.
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable.	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Data source	8	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group.	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bias	9	Describe any efforts to address potential sources of bias	No	No	No	No	No	No	No
Study size	10	Explain how the study size was arrived at	No	Yes	No	No	No	No	Yes

		(c) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	Not relevant	Not relevant	Not relevant	Not relevant	Not relevant	Not relevant	Not relevant
Other analyses	17	Report other analyses done- e.g. analyses of subgroups and interactions, and sensitivity analyses	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Discussion									
Key results	18	Summarize key results with reference to study objectives	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias.	Yes	No	No	Yes	Yes	Yes	Yes
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence.	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Generalizability	21	Discuss the generalizability (external validity) of the study results	Yes	No	No	No	No	No	No
Other information									
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	No	No	Yes	Yes	Yes	Yes	No
Chart 6	Item No.	Recommendation							
Study			Goodkin d et al (2013).	Grogan-Kaylor et al (2008).	Habersaat et al (2018).	Hansson et al (2012).	Harold et al (2013).	Havnen et al (2014).	Hebert et al (2016).
Title and abstract	1	(a) Indicate the study's design with a commonly used term in the title or the abstract	Yes	Yes	Yes	Yes	Yes	Yes	Yes
		(b) Provide in the abstract an informative and balanced summary of what was done and what was found	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Introduction									
Background	2	Explain the scientific background and rationale for the investigation being reported	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Objectives	3	State specific objectives, including prespecified hypotheses	Yes	No	Yes	No	Yes	Yes	Yes
Methods									
Study design	4	Present key elements of study design early in the paper	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Participants	6	(a) Give the eligibility criteria, and the sources and methods of selection of participants. Describe methods of follow-up	Yes	Yes	Yes	Yes	Yes	Yes	Yes

		(b) For matched studies, give matching criteria and number of exposed and unexposed	Not a matched study.	Not a matched study.	Not a matched study.	Yes	Yes	Not a matched study.	Not a matched study.
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable.	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Data source	8	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group.	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bias	9	Describe any efforts to address potential sources of bias	Yes	Yes	Yes	No	No	No	No
Study size	10	Explain how the study size was arrived at	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Statistical methods	12	(a) Describe all statistical methods, including those used to control for confounding	Yes	Yes	Yes	Yes	Yes	Yes	Yes
		(b) Describe any methods used to examine subgroups and interactions	Yes	No	No for subgroups, yes for interaction effects.	No for subgroups, yes for interaction effects	No for subgroups, Yes for interaction effects	No subgroups or interaction effects were examined.	No subgroups or interaction effects were examined.
		(c) Explain how missing data were addressed	Yes	No	Yes	Yes	Yes	Yes	No
		(d) If applicable, explain how loss to follow-up was addressed	No	No	No	Yes	No	No	No
		(e) Describe any sensitivity analyses	No	No	No	No	No	No	No
Results									
Participants	13	(a) Report numbers of individuals at each stage of study - e.g. numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analyzed	No	Yes	Yes	Yes	Yes	Yes	Yes
		(b) Give reasons for non-participation at each stage	No	No	No	No	No	No	Yes
		(c) Consider use of a flow diagram	No	No	No	Yes	Yes	No	No
Descriptive data	14	(a) Give characteristics of study participants (e.g. Demographic, clinical, social) and information on exposures and potential confounders	Yes	Yes	Yes	Yes	Yes	Yes	Yes
		(b) Indicate number of participants with missing data for each variable of interest	No	No	No	No	No	No	No
		(c) Summarize follow-up time (e.g., average and total amount)	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Outcome	15	Report number of outcome events or summary measures over time	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Main results	16	(a) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (e.g., 95% confidence interval). Make clear which confounders were adjusted for and why they were included	Yes	Yes	Yes	Yes	Yes	Yes	Yes
		(b) Report category boundaries when continuous variables were categorized	Continuous variable were not categorized.	Continuous variables were not categorized.	Continuous variables were not categorized.	Continuous variables were not categorized.	Continuous variables were not categorized.	Continuous variables were not categorized.	Continuous variables were not categorized.
		(c) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	Not relevant	Not relevant	Not relevant	Not relevant	Not relevant	Not relevant	Not relevant
Other analyses	17	Report other analyses done- e.g. analyses of subgroups and interactions, and sensitivity analyses	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Discussion									
Key results	18	Summarize key results with reference to study objectives	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias.	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence.	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Generalizability	21	Discuss the generalizability (external validity) of the study results	Yes	No	Yes	No	Yes	Yes	Yes
Other information									
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	Yes	No	No	Yes	Yes	No	Yes
Chart 7	Item No.	Recommendation							
Study			Hiller et al (2018).	Hindt et al (2019).	Holstead et al (2010).	Huang et al (2016).	Huefner et al (2009).	Huefner et al (2012).	Humphreys et al (2015).
Title and abstract	1	(a) Indicate the study's design with a commonly used term in the title or the abstract	Yes	Yes	Yes	Yes	Yes	Yes	Yes
		(b) Provide in the abstract an informative and balanced summary of what was done and what was found	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Introduction									
Background	2	Explain the scientific background and rationale for the investigation being reported	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Objectives	3	State specific objectives, including prespecified hypotheses	No	No	Yes	No	No	No	Yes
Methods									
Study design	4	Present key elements of study design early in the paper	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Participants	6	(a) Give the eligibility criteria, and the sources and methods of selection of participants. Describe methods of follow-up	Yes	Yes	Yes	Yes	Yes	Yes	Yes
		(b) For matched studies, give matching criteria and number of exposed and unexposed	Not a matched study.	Not a matched study.	Yes	Not a matched study.	Not a matched study.	Not a matched study.	Not a matched study.
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable.	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Data source	8	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group.	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bias	9	Describe any efforts to address potential sources of bias	No	Yes	No	No	No	No	Yes
Study size	10	Explain how the study size was arrived at	Yes	Yes	No	Yes	Yes	No	Yes
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Statistical methods	12	(a) Describe all statistical methods, including those used to control for confounding	Yes	Yes	Yes	Yes	Yes	Yes	Yes
		(b) Describe any methods used to examine subgroups and interactions	No subgroups or interactions were examined.	No for subgroups, yes for interactions.	No subgroups or interactions were examined.	No subgroups or interactions were examined.	No subgroups or interactions were examined.	No subgroups or interactions were examined.	Yes for subgroups, but no for interactions.
		(c) Explain how missing data were addressed	Yes	Yes	No	No	Yes	No	No
		(d) If applicable, explain how loss to follow-up was addressed	No	No	No	No	No	No	No
		(e) Describe any sensitivity analyses	No	No	No	No	No	No	No
Results									
Participants	13	(a) Report numbers of individuals at each stage of study - e.g. numbers potentially eligible, examined for	Yes	Yes	No	No	No	No	Yes

		eligibility, confirmed eligible, included in the study, completing follow-up, and analyzed							
		(b) Give reasons for non-participation at each stage	No	No	No	No	No	No	Yes
		(c) Consider use of a flow diagram	No	No	No	No	No	No	Yes
Descriptive data	14	(a) Give characteristics of study participants (e.g. Demographic, clinical, social) and information on exposures and potential confounders	Yes	Yes	Yes	Yes	Yes	Yes	Yes
		(b) Indicate number of participants with missing data for each variable of interest	Yes	Yes	No	No	No	No	
		(c) Summarize follow-up time (e.g., average and total amount)	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Outcome	15	Report number of outcome events or summary measures over time	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Main results	16	(a) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (e.g., 95% confidence interval). Make clear which confounders were adjusted for and why they were included	Yes	Yes	No	Yes	Yes	Yes	Yes
		(b) Report category boundaries when continuous variables were categorized	Continuous variable were not categorized.	Continuous variable were not categorized.	Continuous variable were not categorized.	Continuous variable were not categorized.	Continuous variable were not categorized.	Continuous variable were not categorized.	Continuous variable were not categorized.
		(c) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	Not relevant	Not relevant	Not relevant	Not relevant	Not relevant	Not relevant	Not relevant
Other analyses	17	Report other analyses done- e.g. analyses of subgroups and interactions, and sensitivity analyses	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Discussion									
Key results	18	Summarize key results with reference to study objectives	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias.	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence.	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Generalizability	21	Discuss the generalizability (external validity) of the study results	Yes	Yes	No	Yes	Yes	Yes	No
Other information									
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	No	Indicated that no funding	No	No	No	No	Yes

				was received.					
Chart 8	Item No.	Recommendation							
Study			Hurlburt et al (2010).	Hussey et al (2002).	Hussey et al (2005).	Izzo et al (2016).	Jacobsen et al (2013).	Jacobsen et al (2018).	James (2004).
Title and abstract	1	(a) Indicate the study's design with a commonly used term in the title or the abstract	Yes	Yes	Yes	Yes	Yes	Yes	Yes
		(b) Provide in the abstract an informative and balanced summary of what was done and what was found	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Introduction									
Background	2	Explain the scientific background and rationale for the investigation being reported	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Objectives	3	State specific objectives, including prespecified hypotheses	No	No	No	Yes	No	Yes	No
Methods									
Study design	4	Present key elements of study design early in the paper	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Participants	6	(a) Give the eligibility criteria, and the sources and methods of selection of participants. Describe methods of follow-up	Yes	No	Yes	Yes	Yes	No	Yes
		(b) For matched studies, give matching criteria and number of exposed and unexposed	Not a matched study.	Yes	Not a matched study.	Not a matched study	Yes	Not a matched study	Not a matched study
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable.	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Data source	8	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group.	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bias	9	Describe any efforts to address potential sources of bias	No	No	Yes	No	No	No	No
Study size	10	Explain how the study size was arrived at	No	No	Yes	No	Yes	Yes	Yes
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Statistical methods	12	(a) Describe all statistical methods, including those used to control for confounding	Yes	Yes	Yes	Yes	Yes	Yes	Yes
		(b) Describe any methods used to examine subgroups and interactions	No subgroups or interactions	Yes for subgroups, no for interactions	No subgroups or interactions	No subgroups or interactions	No subgroups or interactions	No subgroups or interactions	No subgroups or interactions

			on effects examine d.	on effects	on effects examine d.	on effects examine d.	on effects examine d.	on effects examine d.	on effects examine d.
		(c) Explain how missing data were addressed	No	No	No	No	Yes	No	Yes
		(d) If applicable, explain how loss to follow-up was addressed	No	No	No	No	No	No	No
		(e) Describe any sensitivity analyses	No	No	No	No	No	No	No
Results									
Participants	13	(a) Report numbers of individuals at each stage of study - e.g. numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analyzed	No	No	No	No	No	Yes	No
		(b) Give reasons for non-participation at each stage	No	No	No	No	No	Yes	No
		(c) Consider use of a flow diagram	No	No	No	No	No	No	No
Descriptive data	14	(a) Give characteristics of study participants (e.g. Demographic, clinical, social) and information on exposures and potential confounders	Yes	Yes	Yes	Yes	Yes	Yes	Yes
		(b) Indicate number of participants with missing data for each variable of interest	No	No	No	No	No	No	No
		(c) Summarize follow-up time (e.g., average and total amount)	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Outcome	15	Report number of outcome events or summary measures over time	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Main results	16	(a) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (e.g., 95% confidence interval). Make clear which confounders were adjusted for and why they were included	Yes	Yes	Yes	Yes	Yes	Yes	Yes
		(b) Report category boundaries when continuous variables were categorized	Continu ous variable were not categori zed.	Continuo us variable were not categoriz ed.	Continuo us variable were not categoriz ed.	Continuo us variable were not categoriz ed.	Continuo us variable were not categoriz ed.	Continuo us variable were not categoriz ed.	Continuo us variable were not categoriz ed.
		(c) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	Not relevant	Not relevant	Not relevant	Not relevant	Not relevant	Not relevant	Not relevant
Other analyses	17	Report other analyses done- e.g. analyses of subgroups and interactions, and sensitivity analyses	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Discussion									
Key results	18	Summarize key results with reference to study objectives	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias.	Yes	No	Yes	Yes	Yes	Yes	Yes

Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence.	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Generalizability	21	Discuss the generalizability (external validity) of the study results	No	Yes	Yes	No	Yes	Yes	Yes
Other information									
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	No	Yes	No	Yes	Yes	Yes	No
Chart 9	Item No.	Recommendation							
Study			James et al (2012).	Jonson-Reid et al. (2000).	Kang et al (2017).	Kerr et al (2014).	Kiesel et al (2017).	Lanier et al (2017).	Lau et al (2003).
Title and abstract	1	(a) Indicate the study's design with a commonly used term in the title or the abstract	Yes	Yes	Yes	Yes	Yes	Yes	Yes
		(b) Provide in the abstract an informative and balanced summary of what was done and what was found	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Introduction									
Background	2	Explain the scientific background and rationale for the investigation being reported	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Objectives	3	State specific objectives, including prespecified hypotheses	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Methods									
Study design	4	Present key elements of study design early in the paper	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Participants	6	(a) Give the eligibility criteria, and the sources and methods of selection of participants. Describe methods of follow-up	Yes	Yes	Yes	Yes	Yes	Yes	Yes
		(b) For matched studies, give matching criteria and number of exposed and unexposed	Not a matched study.	Yes	Not a matched study.	Yes	Not a matched study.	Not a matched study.	Not a matched study.
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable.	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Data source	8	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group.	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bias	9	Describe any efforts to address potential sources of bias	Yes	Yes	No	No	No	Yes	No

Study size	10	Explain how the study size was arrived at	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Statistical methods	12	(a) Describe all statistical methods, including those used to control for confounding	No	No	No	No	No	No	No
		(b) Describe any methods used to examine subgroups and interactions	No subgroups or interactions effects examined.	No subgroups or interactions effects examined.	No for subgroups, yes for interactions effects.	No for subgroups, yes for interactions effects.	No subgroups or interactions effects examined.	Yes for subgroups, No for interactions effects.	Yes for subgroups, yes for interactions effects.
		(c) Explain how missing data were addressed	No	Yes	Yes	Yes	No	Yes	No
		(d) If applicable, explain how loss to follow-up was addressed	No	No	Yes	Yes	No	No	No
		(e) Describe any sensitivity analyses	Not relevant	Not relevant	Not relevant	Not relevant	Not relevant	Not relevant	Not relevant
Results									
Participants	13	(a) Report numbers of individuals at each stage of study - eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analyzed	No	No	No	Yes- as online supplement.	Yes	No	No
		(b) Give reasons for non-participation at each stage	No	No	No	No	No	No	No
		(c) Consider use of a flow diagram	No	No	No	Yes- as online supplement.	No	No	No
Descriptive data	14	(a) Give characteristics of study participants (e.g. Demographic, clinical, social) and information on exposures and potential confounders	Yes	Yes	Yes	Yes	Yes	Yes	Yes
		(b) Indicate number of participants with missing data for each variable of interest	No	No	No	Yes	No	No	No
		(c) Summarize follow-up time (e.g., average and total amount)	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Outcome	15	Report number of outcome events or summary measures over time	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Main results	16	(a) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (e.g., 95% confidence interval). Make clear which confounders were adjusted for and why they were included	Yes	Yes	Yes	Yes	Yes	Yes	Yes

		(b) Report category boundaries when continuous variables were categorized	Continuous variable were not categorized.	Continuous variable were not categorized.	Continuous variable were not categorized.	Continuous variable were not categorized.	Continuous variable were not categorized.	Continuous variable were not categorized.	Continuous variable were not categorized.
		(c) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	Not relevant	Not relevant	Not relevant	Not relevant	Not relevant	Not relevant	Not relevant
Other analyses	17	Report other analyses done- e.g. analyses of subgroups and interactions, and sensitivity analyses	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Discussion									
Key results	18	Summarize key results with reference to study objectives	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias.	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence.	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Generalizability	21	Discuss the generalizability (external validity) of the study results	No	No	No	Yes	Yes	Yes	No
Other information									
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	Yes	No	Yes	Yes	No	Yes	Yes
Chart 10	Item No.	Recommendation							
Study			Leathers (2006).	Leathers et al (2011).	Lee et al (2009).	Leloux-Opmeer et al (2018).	Leon et al (2016).	Liddle et al (2018).	Linacres et al (2010).
Title and abstract	1	(a) Indicate the study's design with a commonly used term in the title or the abstract	Yes	Yes	Yes	Yes	Yes	Yes	Yes
		(b) Provide in the abstract an informative and balanced summary of what was done and what was found	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Introduction									
Background	2	Explain the scientific background and rationale for the investigation being reported	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Objectives	3	State specific objectives, including prespecified hypotheses	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Methods									
Study design	4	Present key elements of study design early in the paper	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Participants	6	(a) Give the eligibility criteria, and the sources and methods of selection of participants. Describe methods of follow-up	Yes	Yes	Yes	Yes	Yes	Yes	Yes
		(b) For matched studies, give matching criteria and number of exposed and unexposed	Not a matched study.	Yes	Not a matched study.	Not a matched study.	Not a matched study.	Yes	Not a matched study.
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable.	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Data source	8	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group.	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bias	9	Describe any efforts to address potential sources of bias	No	Yes	Yes	No	Yes	Yes	No
Study size	10	Explain how the study size was arrived at	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Statistical methods	12	(a) Describe all statistical methods, including those used to control for confounding	Yes	Yes	Yes	Yes	Yes	Yes	Yes
		(b) Describe any methods used to examine subgroups and interactions	No subgroups or interactions examined.	No subgroups or interactions examined.	Yes for subgroups, no for interactions.	Yes	No for subgroups, yes for interactions.	No subgroups or interactions examined.	No subgroups or interactions examined.
		(c) Explain how missing data were addressed	Yes	Yes	Yes	No	No	Yes	No
		(d) If applicable, explain how loss to follow-up was addressed	No	Yes	Yes	No	No	No	No
		(e) Describe any sensitivity analyses	No	No	No	No	No	No	No
Results									
Participants	13	(a) Report numbers of individuals at each stage of study - e.g. numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analyzed	No	No	No	Yes	No	Yes	Yes
		(b) Give reasons for non-participation at each stage	No	No	No	No	No	Yes	Yes
		(c) Consider use of a flow diagram	No	No	No	Yes	No	Yes	Yes

Descriptive data	14	(a) Give characteristics of study participants (e.g. Demographic, clinical, social) and information on exposures and potential confounders	Yes	Yes	Yes	Yes	Yes	Yes	Yes
		(b) Indicate number of participants with missing data for each variable of interest	No	No	No	Yes	Yes	No	No
		(c) Summarize follow-up time (e.g., average and total amount)	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Outcome	15	Report number of outcome events or summary measures over time	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Main results	16	(a) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (e.g., 95% confidence interval). Make clear which confounders were adjusted for and why they were included	Yes	Yes	Yes	Yes	Yes	Yes	Yes
		(b) Report category boundaries when continuous variables were categorized	Continuous variable were not categorized.	Continuous variable were not categorized.	Continuous variable were not categorized.	Continuous variable were not categorized.	Continuous variable were not categorized.	Continuous variable were not categorized.	Continuous variable were not categorized.
		(c) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	Not relevant	Not relevant	Not relevant	Not relevant	Not relevant	Not relevant	Not relevant
Other analyses	17	Report other analyses done- e.g. analyses of subgroups and interactions, and sensitivity analyses	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Discussion									
Key results	18	Summarize key results with reference to study objectives	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias.	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence.	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Generalizability	21	Discuss the generalizability (external validity) of the study results	Yes	Yes	No	No	No	Yes	Yes
Other information									
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	Yes	Yes	Yes	Yes	No	No	Yes
Chart 11	Item No.	Recommendation							
Study			Lohaus et al (2018).	Lyons et al (2001).	Lyons et al (2009).	Maaskant et al (2018).	Maltby et al (2018).	McCrae et al (2010).	McGuire et al (2018).

Title and abstract	1	(a) Indicate the study's design with a commonly used term in the title or the abstract	Yes	Yes	Yes	Yes	Yes	Yes	Yes
		(b) Provide in the abstract an informative and balanced summary of what was done and what was found	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Introduction									
Background	2	Explain the scientific background and rationale for the investigation being reported	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Objectives	3	State specific objectives, including prespecified hypotheses	Yes	No	No	Yes	Yes	Yes	Yes
Methods									
Study design	4	Present key elements of study design early in the paper	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Participants	6	(a) Give the eligibility criteria, and the sources and methods of selection of participants. Describe methods of follow-up	Yes	No	Yes	Yes	Yes	Yes	Yes
		(b) For matched studies, give matching criteria and number of exposed and unexposed	Yes	Not a matched study.	Not a matched study.	Yes	Not a matched study	Yes	Not a matched study.
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable.	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Data source	8	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group.	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bias	9	Describe any efforts to address potential sources of bias	No	No	No	Yes	No	No	Yes
Study size	10	Explain how the study size was arrived at	Yes	No	No	Yes	Yes	Yes	Yes
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Statistical methods	12	(a) Describe all statistical methods, including those used to control for confounding	Yes	Yes	Yes	Yes	Yes	Yes	Yes
		(b) Describe any methods used to examine subgroups and interactions	No subgroups or interaction effects examined.	Yes for subgroups, no for interaction effects.	Yes for subgroups, no for interaction effects.	No for subgroups, yes for interaction effects.	Yes for subgroups, no for interaction effects.	Yes for subgroups, no for interaction effects.	No subgroups or interaction effects examined.
		(c) Explain how missing data were addressed	No	No	No	No	Yes	Yes	Yes

		(d) If applicable, explain how loss to follow-up was addressed	No	No	No	No	No	No	No
		(e) Describe any sensitivity analyses	No	No	No	No	No	No	No
Results									
Participants	13	(a) Report numbers of individuals at each stage of study - e.g. numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analyzed	No	No	No	Yes	Yes	Yes	No
		(b) Give reasons for non-participation at each stage	No	No	No	Yes	No	No	No
		(c) Consider use of a flow diagram	No	No	No	Yes	No	No	No
Descriptive data	14	(a) Give characteristics of study participants (e.g. Demographic, clinical, social) and information on exposures and potential confounders	Yes	Yes	Yes	Yes	Yes	Yes	Yes
		(b) Indicate number of participants with missing data for each variable of interest	No	No	No	No	No	Yes	No
		(c) Summarize follow-up time (e.g., average and total amount)	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Outcome	15	Report number of outcome events or summary measures over time	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Main results	16	(a) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (e.g., 95% confidence interval). Make clear which confounders were adjusted for and why they were included	Yes	Yes	Yes	Yes	Yes	Yes	Yes
		(b) Report category boundaries when continuous variables were categorized	Continuous variable were not categorized.	Continuous variable were not categorized.	Continuous variable were not categorized.	Continuous variable were not categorized.	Continuous variable were not categorized.	Continuous variable were not categorized.	Continuous variable were not categorized.
		(c) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	Not relevant	Not relevant	Not relevant	Not relevant	Not relevant	Not relevant	Not relevant
Other analyses	17	Report other analyses done- e.g. analyses of subgroups and interactions, and sensitivity analyses	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Discussion									
Key results	18	Summarize key results with reference to study objectives	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias.	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence.	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Generalizability	21	Discuss the generalizability (external validity) of the study results	No	No	No	No	No	Yes	No
Other information									
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	Yes	No	No	Yes	Yes	No	Yes
Chart 12	Item No.	Recommendation							
Study			McLaughlin et al (2012).	McWey et al (2010a).	McWey et al (2010b).	Merritt et al (2015).	Munson et al (2009).	Munson et al (2010).	Narendorf et al (2016).
Title and abstract	1	(a) Indicate the study's design with a commonly used term in the title or the abstract	Yes	Yes	Yes	Yes	Yes	Yes	Yes
		(b) Provide in the abstract an informative and balanced summary of what was done and what was found	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Introduction									
Background	2	Explain the scientific background and rationale for the investigation being reported	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Objectives	3	State specific objectives, including prespecified hypotheses	No	Yes	Yes	Yes	Yes	Yes	Yes
Methods									
Study design	4	Present key elements of study design early in the paper	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Participants	6	(a) Give the eligibility criteria, and the sources and methods of selection of participants. Describe methods of follow-up	Yes	Yes	Yes	Yes	Yes	Yes	Yes
		(b) For matched studies, give matching criteria and number of exposed and unexposed	Yes	Not a matched study.	Not a matched study.	Not a matched study.	Not a matched study.	Not a matched study.	Not a matched study.
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable.	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Data source	8	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group.	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bias	9	Describe any efforts to address potential sources of bias	No	No	Yes	Yes	Yes	No	No
Study size	10	Explain how the study size was arrived at	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Other analyses	17	Report other analyses done- e.g. analyses of subgroups and interactions, and sensitivity analyses							
Discussion									
Key results	18	Summarize key results with reference to study objectives	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias.	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence.	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Generalizability	21	Discuss the generalizability (external validity) of the study results	Yes	No	Yes	No	Yes	Yes	No
Other information									
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	Yes	Yes	No	No	Yes	Yes	Yes
Chart 13	Item No.	Recommendation							
Study			Newton et al (2000).	Nijhof et al (2013).	Noftle et al (2011).	O'Brien et al (2016).	Pears et al (2012a).	Pears et al (2012b).	Pears et al (2013).
Title and abstract	1	(a) Indicate the study's design with a commonly used term in the title or the abstract	Yes	Yes	Yes	Yes	Yes	Yes	Yes
		(b) Provide in the abstract an informative and balanced summary of what was done and what was found	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Introduction									
Background	2	Explain the scientific background and rationale for the investigation being reported	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Objectives	3	State specific objectives, including prespecified hypotheses	Yes	No	Yes	No	Yes	Yes	Yes
Methods									
Study design	4	Present key elements of study design early in the paper	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Participants	6	(a) Give the eligibility criteria, and the sources and methods of selection of participants. Describe methods of follow-up	Yes	Yes	Yes	Yes	Yes	Yes	Yes
		(b) For matched studies, give matching criteria and number of exposed and unexposed	Not a matched study.	Not a matched study.	Not a matched study.	Not a matched study.	Yes	Yes	Yes

Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable.	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Data source	8	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group.	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bias	9	Describe any efforts to address potential sources of bias	No	No	No	Yes	No	No	No
Study size	10	Explain how the study size was arrived at	Yes	Yes	No	Yes	Yes	Yes	Yes
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Statistical methods	12	(a) Describe all statistical methods, including those used to control for confounding	Yes	Yes	Yes	Yes	Yes	Yes	Yes
		(b) Describe any methods used to examine subgroups and interactions	Yes for subgroups, no for interaction effects.	Yes for subgroups, no for interaction effects.	No subgroups or interaction effects examined.	Yes for subgroups, no for interaction effects.	No subgroups or interaction effects were examined.	No subgroups or interaction effects were examined.	No subgroups or interaction effects were examined.
		(c) Explain how missing data were addressed	No	Yes	Yes	Yes	Yes	Yes	Yes
		(d) If applicable, explain how loss to follow-up was addressed	No	Yes	No	No	No	No	No
		(e) Describe any sensitivity analyses	No	No	No	No	No	No	No
Results									
Participants	13	(a) Report numbers of individuals at each stage of study - eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analyzed	Yes	Yes	No	Yes	Yes	Yes	Yes
		(b) Give reasons for non-participation at each stage	Yes	No	No	No	No	No	No
		(c) Consider use of a flow diagram	No	No	No	No	No	No	No
Descriptive data	14	(a) Give characteristics of study participants (e.g. Demographic, clinical, social) and information on exposures and potential confounders	Yes	Yes	Yes	Yes	Yes	Yes	Yes
		(b) Indicate number of participants with missing data for each variable of interest	No	No	No	Yes	No	No	No
		(c) Summarize follow-up time (e.g., average and total amount)	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Outcome	15	Report number of outcome events or summary measures over time	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Main results	16	(a) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (e.g., 95% confidence interval). Make clear which confounders were adjusted for and why they were included	Yes	Yes	Yes	Yes	Yes	Yes	Yes
		(b) Report category boundaries when continuous variables were categorized	Continuous variable were not categorized.	Continuous variable were not categorized.	Continuous variable were not categorized.	Continuous variable were not categorized.	Continuous variable were not categorized.	Continuous variable were not categorized.	Continuous variable were not categorized.
		(c) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	Not relevant	Not relevant	Not relevant	Not relevant	Not relevant	Not relevant	Not relevant
Other analyses	17	Report other analyses done- eg analyses of subgroups and interactions, and sensitivity analyses	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Discussion									
Key results	18	Summarize key results with reference to study objectives	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias.	No	Yes	No	Yes	Yes	Yes	Yes
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence.	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Generalizability	21	Discuss the generalizability (external validity) of the study results	No	No	No	No	No	No	Yes
Other information									
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	No	No	No	No	Yes	Yes	Yes
Chart 14	Item No.	Recommendation							
Study			Pears et al (2016).	Perry et al (2017).	Poulton et al (2014).	Preyde et al (2009).	Preyde et al (2011).	Preyde et al (2012).	Proctor et al (2010).
Title and abstract	1	(a) Indicate the study's design with a commonly used term in the title or the abstract	Yes	Yes	Yes	Yes	Yes	Yes	Yes
		(b) Provide in the abstract an informative and balanced summary of what was done and what was found	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Introduction									
Background	2	Explain the scientific background and rationale for the investigation being reported	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Objectives	3	State specific objectives, including prespecified hypotheses	Yes	Yes	Yes	Yes	No	No	Yes

Methods									
Study design	4	Present key elements of study design early in the paper	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Participants	6	(a) Give the eligibility criteria, and the sources and methods of selection of participants. Describe methods of follow-up	Yes	Yes	Yes	No	Yes	Yes	Yes
		(b) For matched studies, give matching criteria and number of exposed and unexposed	Yes	Not a matched study.	Yes	Not a matched study	Not a matched study	Not a matched study	Not a matched study
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable.	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Data source	8	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group.	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bias	9	Describe any efforts to address potential sources of bias	Yes	No	No	No	Yes	No	No
Study size	10	Explain how the study size was arrived at	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Statistical methods	12	(a) Describe all statistical methods, including those used to control for confounding	Yes	Yes	Yes	Yes	Yes	Yes	Yes
		(b) Describe any methods used to examine subgroups and interactions	No subgroups or interactions examined.	Yes	No subgroups or interactions examined.	No subgroups or interactions examined.	No subgroups or interactions examined.	No subgroups or interactions examined.	Yes for subgroups, no for interactions.
		(c) Explain how missing data were addressed	Yes	Yes	Yes	No	No	Yes	Yes
		(d) If applicable, explain how loss to follow-up was addressed	Yes	Yes	No	No	No	No	No
		(e) Describe any sensitivity analyses	No	No	No	No	No	No	No
Results									
Participants	13	(a) Report numbers of individuals at each stage of study - eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analyzed	Yes	Yes	Yes	Yes	Yes	Yes	No
		(b) Give reasons for non-participation at each stage	No	Yes	Yes	No	No	No	No
		(c) Consider use of a flow diagram	No	No	Yes	No	No	No	No

Descriptive data	14	(a) Give characteristics of study participants (e.g. Demographic, clinical, social) and information on exposures and potential confounders	Yes	Yes	Yes	Yes	Yes	Yes	Yes
		(b) Indicate number of participants with missing data for each variable of interest	No	Yes	No	Yes	Yes	Yes	No
		(c) Summarize follow-up time (e.g., average and total amount)	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Outcome	15	Report number of outcome events or summary measures over time	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Main results	16	(a) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (e.g., 95% confidence interval). Make clear which confounders were adjusted for and why they were included	Yes	Yes	Yes	Yes	Yes	Yes	Yes
		(b) Report category boundaries when continuous variables were categorized	Continuous variable were not categorized.	Continuous variable were not categorized.	Continuous variable were not categorized.	Continuous variable were not categorized.	Continuous variable were not categorized.	Continuous variable were not categorized.	Continuous variable were not categorized.
		(c) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	Not relevant	Not relevant	Not relevant	Not relevant	Not relevant	Not relevant	Not relevant
Other analyses	17	Report other analyses done- e.g. analyses of subgroups and interactions, and sensitivity analyses	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Discussion									
Key results	18	Summarize key results with reference to study objectives	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias.	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence.	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Generalizability	21	Discuss the generalizability (external validity) of the study results	Yes	No	No	No	No	No	No
Other information									
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	Yes	Yes	No	No	Yes	Yes	Yes
Chart 15	Item No.	Recommendation							
Study			Pullman (2011).	Pullman et al (2018).	Rayburn et al (2016).	Ringeisen et al (2009).	Robst et al (2011).	Rose et al (2017).	Rosenthal et al (2010).

Title and abstract	1	(a) Indicate the study's design with a commonly used term in the title or the abstract	Yes	Yes	Yes	Yes	Yes	Yes	Yes
		(b) Provide in the abstract an informative and balanced summary of what was done and what was found	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Introduction									
Background	2	Explain the scientific background and rationale for the investigation being reported	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Objectives	3	State specific objectives, including prespecified hypotheses	No	No	Yes	Yes	No	Yes	Yes
Methods									
Study design	4	Present key elements of study design early in the paper	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Participants	6	(a) Give the eligibility criteria, and the sources and methods of selection of participants. Describe methods of follow-up	Yes	Yes	Yes	Yes	Yes	Yes	Yes
		(b) For matched studies, give matching criteria and number of exposed and unexposed	Not a matched study.	Not a matched study.	Not a matched study.	Not a matched study.	Not a matched study.	Not a matched study.	Not a matched study.
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable.	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Data source	8	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group.	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bias	9	Describe any efforts to address potential sources of bias	Yes	No	No	No	No	Yes	No
Study size	10	Explain how the study size was arrived at	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Statistical methods	12	(a) Describe all statistical methods, including those used to control for confounding	Yes	Yes	Yes	Yes	Yes	Yes	Yes
		(b) Describe any methods used to examine subgroups and interactions	No subgroups or interactions examined.	Yes for subgroups, no for interactions.	No subgroups or interactions examined.	No subgroups or interactions examined.	No subgroups or interactions examined.	Yes for subgroups, no for interactions.	No subgroups or interactions examined.
		(c) Explain how missing data were addressed	Yes	No	No	No	No	Yes	Yes

		(d) If applicable, explain how loss to follow-up was addressed	No	No	No	No	No	No	No
		(e) Describe any sensitivity analyses	No	No	No	No	No	No	No
Results									
Participants	13	(a) Report numbers of individuals at each stage of study - e.g. numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analyzed	No	Yes	Yes	Yes	No	No	Yes
		(b) Give reasons for non-participation at each stage	No	No	No	No	No	No	No
		(c) Consider use of a flow diagram	No	No	No	No	No	No	No
Descriptive data	14	(a) Give characteristics of study participants (e.g. Demographic, clinical, social) and information on exposures and potential confounders	Yes	Yes	Yes	Yes	Yes	Yes	Yes
		(b) Indicate number of participants with missing data for each variable of interest	No	Yes	No	No	No	No	No
		(c) Summarize follow-up time (e.g., average and total amount)	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Outcome	15	Report number of outcome events or summary measures over time	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Main results	16	(a) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (e.g., 95% confidence interval). Make clear which confounders were adjusted for and why they were included	Yes	Yes	Yes	Yes	Yes	Yes	Yes
		(b) Report category boundaries when continuous variables were categorized	Continuous variable were not categorized.	Continuous variable were not categorized.	Continuous variable were not categorized.	Continuous variable were not categorized.	Continuous variable were not categorized.	Continuous variable were not categorized.	Continuous variable were not categorized.
		(c) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	Not relevant	Not relevant	Not relevant	Not relevant	Not relevant	Not relevant	Not relevant
Other analyses	17	Report other analyses done- e.g. analyses of subgroups and interactions, and sensitivity analyses	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Discussion									
Key results	18	Summarize key results with reference to study objectives	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias.	Yes	Yes	Yes	Yes	No	Yes	Yes
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence.	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Generalizability	21	Discuss the generalizability (external validity) of the study results	Yes	No	No	No	No	No	Yes
Other information									
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	Yes	Yes	No	Yes	Yes	Yes	No
Chart 16	Item No.	Recommendation							
Study			Rubin et al (2007).	Rufa et al (2016).	Ruff et al (2016).	Rushton et al (2003).	Ryan et al (2005).	Ryan et al (2007).	Ryan et al (2010).
Title and abstract	1	(a) Indicate the study's design with a commonly used term in the title or the abstract	Yes	Yes	Yes	Yes	Yes	Yes	Yes
		(b) Provide in the abstract an informative and balanced summary of what was done and what was found	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Introduction									
Background	2	Explain the scientific background and rationale for the investigation being reported	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Objectives	3	State specific objectives, including prespecified hypotheses	No	Yes	Yes	No	Yes	Yes	No
Methods									
Study design	4	Present key elements of study design early in the paper	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	Yes	Yes	No	Yes	Yes	No	Yes
Participants	6	(a) Give the eligibility criteria, and the sources and methods of selection of participants. Describe methods of follow-up	Yes	Yes	No	Yes	Yes	Yes	Yes
		(b) For matched studies, give matching criteria and number of exposed and unexposed	Not a matched study.	Not a matched study	Not a matched study.	Not a matched study	Not a matched study.	Not a matched study.	Yes
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable.	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Data source	8	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group.	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bias	9	Describe any efforts to address potential sources of bias	No	No	No	Yes	No	No	Yes
Study size	10	Explain how the study size was arrived at	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable.	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Data source	8	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group.	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bias	9	Describe any efforts to address potential sources of bias	No	No	No	Yes	No	No	No
Study size	10	Explain how the study size was arrived at	Yes	Yes	Yes	No	Yes	No	Yes
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Statistical methods	12	(a) Describe all statistical methods, including those used to control for confounding	Yes	Yes	Yes	Yes	Yes	Yes	Yes
		(b) Describe any methods used to examine subgroups and interactions	Yes for subgroups, no for interaction effects.	Yes	Yes for subgroups, no for interaction effects.	Yes for subgroups, no for interaction effects.	No subgroups or interaction effects examined.	Yes	Yes for subgroups, no for interaction effects.
		(c) Explain how missing data were addressed	No	No	No	No	Yes	No	No
		(d) If applicable, explain how loss to follow-up was addressed	No loss to follow up.	No	No	No	No	No	No
		(e) Describe any sensitivity analyses	No	No	No	No	No	No	No
Results									
Participants	13	(a) Report numbers of individuals at each stage of study - e.g. numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analyzed	Yes	Yes	Yes	No	Yes	No	Yes
		(b) Give reasons for non-participation at each stage	No	No	No	No	No	No	No
		(c) Consider use of a flow diagram	No	No	No	No	No	No	No
Descriptive data	14	(a) Give characteristics of study participants (e.g. Demographic, clinical, social) and information on exposures and potential confounders	Yes	Yes	Yes	Yes	Yes	Yes	Yes
		(b) Indicate number of participants with missing data for each variable of interest	No	No	No	No	No	No	No
		(c) Summarize follow-up time (e.g., average and total amount)	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Outcome	15	Report number of outcome events or summary measures over time	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Main results	16	(a) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (e.g., 95% confidence interval). Make clear which confounders were adjusted for and why they were included	Yes	Yes	Yes	Yes	Yes	Yes	Yes
		(b) Report category boundaries when continuous variables were categorized	Continuous variable were not categorized.	Continuous variable were not categorized.	Continuous variable were not categorized.	Continuous variable were not categorized.	Continuous variable were not categorized.	Continuous variable were not categorized.	Continuous variable were not categorized.
		(c) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	Not relevant	Not relevant	Not relevant	Not relevant	Not relevant	Not relevant	Not relevant
Other analyses	17	Report other analyses done- e.g. analyses of subgroups and interactions, and sensitivity analyses	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Discussion									
Key results	18	Summarize key results with reference to study objectives	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias.	Yes	Yes	Yes	Yes	No	Yes	Yes
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence.	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Generalizability	21	Discuss the generalizability (external validity) of the study results	No	No	No	No	No	Yes	No
Other information									
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	No	Yes	No	No	Yes	No	No
Chart 18	Item No.	Recommendation							
Study			Sinclair et al (2016).	Stiles et al (2019).	Stoner et al (2015).	Strickler et al (2016).	Sullivan et al (2010).	Symanzik et al (2019).	Tarren-Sweeney et al (2017).
Title and abstract	1	(a) Indicate the study's design with a commonly used term in the title or the abstract	Yes	Yes	Yes	Yes	Yes	Yes	Yes
		(b) Provide in the abstract an informative and balanced summary of what was done and what was found	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Introduction									
Background	2	Explain the scientific background and rationale for the investigation being reported	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Objectives	3	State specific objectives, including prespecified hypotheses	Yes	Yes	Yes	Yes	Yes	No	No
Methods									
Study design	4	Present key elements of study design early in the paper	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Participants	6	(a) Give the eligibility criteria, and the sources and methods of selection of participants. Describe methods of follow-up	Yes	Yes	Yes	Yes	Yes	Yes	Yes
		(b) For matched studies, give matching criteria and number of exposed and unexposed	Not a matched study.	Not a matched study.	Not a matched study.	Not a matched study.	Not a matched study.	Yes	Not a matched study.
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable.	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Data source	8	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group.	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bias	9	Describe any efforts to address potential sources of bias	No	No	No	Yes	No	No	No
Study size	10	Explain how the study size was arrived at	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Statistical methods	12	(a) Describe all statistical methods, including those used to control for confounding	Yes	Yes	Yes	Yes	Yes	Yes	Yes
		(b) Describe any methods used to examine subgroups and interactions	Yes for subgroups, no for interaction effects.	No subgroups or interaction effects examined.	No subgroups or interaction effects examined.	Yes for subgroups, no for interaction effects.	Yes for subgroups, no for interaction effects.	Yes	Yes for subgroups, no for interaction effects.
		(c) Explain how missing data were addressed	No	Yes	No	Yes	No	Yes	No
		(d) If applicable, explain how loss to follow-up was addressed	No	No	No	No	No	Yes	No
		(e) Describe any sensitivity analyses	No	No	No	No	No	No	No
Results									
Participants	13	(a) Report numbers of individuals at each stage of study - e.g. numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analyzed	Yes	Yes	No	Yes	Yes	Yes	Yes

		(b) Give reasons for non-participation at each stage	No	No	No	No	No	Yes	No
		(c) Consider use of a flow diagram	No	No	No	No	No	No	No
Descriptive data	14	(a) Give characteristics of study participants (e.g. Demographic, clinical, social) and information on exposures and potential confounders	Yes	Yes	Yes	Yes	Yes	Yes	Yes
		(b) Indicate number of participants with missing data for each variable of interest	No	No	No	No	No	No	No
		(c) Summarize follow-up time (e.g., average and total amount)	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Outcome	15	Report number of outcome events or summary measures over time	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Main results	16	(a) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (e.g., 95% confidence interval). Make clear which confounders were adjusted for and why they were included	Yes	Yes	Yes	Yes	Yes	Yes	Yes
		(b) Report category boundaries when continuous variables were categorized	Continuous variable were not categorized.	Continuous variable were not categorized.	Continuous variable were not categorized.	Continuous variable were not categorized.	Continuous variable were not categorized.	Continuous variable were not categorized.	Continuous variable were not categorized.
		(c) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	Not relevant	Not relevant	Not relevant	Not relevant	Not relevant	Not relevant	Not relevant
Other analyses	17	Report other analyses done- e.g. analyses of subgroups and interactions, and sensitivity analyses	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Discussion									
Key results	18	Summarize key results with reference to study objectives	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias.	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence.	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Generalizability	21	Discuss the generalizability (external validity) of the study results	No	No	No	No	No	Yes	Yes
Other information									
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	Yes	No	No	No	No	Yes	Yes
Chart 19	Item No.	Recommendation							

Study			Taussig et al (2001).	Taussig et al (2002).	Uretsky et al (2017).	Van Alphen et al (2017).	Van Duin et al (2017).	Vanderfaeille et al (2016).	Vidal et al (2019).
Title and abstract	1	(a) Indicate the study's design with a commonly used term in the title or the abstract	Yes	Yes	Yes	Yes	Yes	Yes	Yes
		(b) Provide in the abstract an informative and balanced summary of what was done and what was found	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Introduction									
Background	2	Explain the scientific background and rationale for the investigation being reported	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Objectives	3	State specific objectives, including prespecified hypotheses	No	Yes	No	No	Yes	No	Yes
Methods									
Study design	4	Present key elements of study design early in the paper	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	Yes	Yes	Yes	No	Yes	Yes	Yes
Participants	6	(a) Give the eligibility criteria, and the sources and methods of selection of participants. Describe methods of follow-up	Yes	Yes	Yes	Yes	Yes	Yes	Yes
		(b) For matched studies, give matching criteria and number of exposed and unexposed	Not a matched study.	Not a matched study.	Not a matched study.	Not a matched study.	Yes	Not a matched study.	Yes
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable.	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Data source	8	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group.	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bias	9	Describe any efforts to address potential sources of bias	No	No	No	No	No	No	Yes
Study size	10	Explain how the study size was arrived at	Yes	Yes	Yes	No	Yes	Yes	Yes
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Statistical methods	12	(a) Describe all statistical methods, including those used to control for confounding	Yes	Yes	Yes	Yes	Yes	Yes	Yes
		(b) Describe any methods used to examine subgroups and interactions	Yes	No subgroup or interaction effects	Yes for subgroups, no for interaction effects.	No subgroup or interaction effects	Yes for subgroups, no for interaction effects.	No subgroup or interaction effects	Yes for subgroups, no for interaction effects.

				examine d.		examine d.		examine d.	
		(c) Explain how missing data were addressed	No	Yes	Yes	No	No	No	No
		(d) If applicable, explain how loss to follow-up was addressed	No	No	No	No	No	No	No
		(e) Describe any sensitivity analyses	No	No	No	No	No	No	No
Results									
Participants	13	(a) Report numbers of individuals at each stage of study - eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analyzed	No	Yes	No	No	Yes	No	Yes
		(b) Give reasons for non-participation at each stage	No	No	No	No	No	No	Yes
		(c) Consider use of a flow diagram	No	Yes	No	No	No	No	No
Descriptive data	14	(a) Give characteristics of study participants (e.g. Demographic, clinical, social) and information on exposures and potential confounders	Yes	Yes	Yes	Yes	Yes	Yes	Yes
		(b) Indicate number of participants with missing data for each variable of interest	No	No	No	No	No	No	No
		(c) Summarize follow-up time (e.g., average and total amount)	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Outcome	15	Report number of outcome events or summary measures over time	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Main results	16	(a) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (e.g., 95% confidence interval). Make clear which confounders were adjusted for and why they were included	Yes	Yes	Yes	Yes	Yes	Yes	Yes
		(b) Report category boundaries when continuous variables were categorized	Continu ous variable were not categori zed.	Continuo us variable were not categoriz ed.	Continuo us variable were not categoriz ed.	Continuo us variable were not categoriz ed.	Continuo us variable were not categoriz ed.	Continuo us variable were not categoriz ed.	Continuo us variable were not categoriz ed.
		(c) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	Not relevant	Not relevant	Not relevant	Not relevant	Not relevant	Not relevant	Not relevant
Other analyses	17	Report other analyses done- e.g. analyses of subgroups and interactions, and sensitivity analyses	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Discussion									
Key results	18	Summarize key results with reference to study objectives	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias.	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence.	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Generalizability	21	Discuss the generalizability (external validity) of the study results	Yes	Yes	No	Yes	Yes	Yes	Yes
Other information									
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	No	Yes	Yes	Yes	Yes	No	Yes
Chart 20	Item No.	Recommendation							
Study			Villodas et al (2015).	Vis et al (2016).	Wade et al (2018).	Williams -Butler (2018).	Williams -Butler et al (2018).	Wu et al (2015).	Wu (2017).
Title and abstract	1	(a) Indicate the study's design with a commonly used term in the title or the abstract	Yes	Yes	Yes	Yes	Yes	Yes	Yes
		(b) Provide in the abstract an informative and balanced summary of what was done and what was found	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Introduction									
Background	2	Explain the scientific background and rationale for the investigation being reported	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Objectives	3	State specific objectives, including prespecified hypotheses	No	No	Yes	Yes	Yes	Yes	Yes
Methods									
Study design	4	Present key elements of study design early in the paper	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Participants	6	(a) Give the eligibility criteria, and the sources and methods of selection of participants. Describe methods of follow-up	Yes	Yes	Yes	Yes	Yes	Yes	Yes
		(b) For matched studies, give matching criteria and number of exposed and unexposed	Not a matched study.	Not a matched study.	Yes	Not a matched study.	Not a matched study.	Not a matched study.	Not a matched study.
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable.	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Data source	8	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group.	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bias	9	Describe any efforts to address potential sources of bias	No	No	No	No	No	Yes	Yes
Study size	10	Explain how the study size was arrived at	No	Yes	Yes	Yes	No	Yes	Yes

[illegible]

		(c) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	Not relevant	Not relevant	Not relevant	Not relevant	Not relevant	Not relevant	Not relevant
Other analyses	17	Report other analyses done- e.g. analyses of subgroups and interactions, and sensitivity analyses	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Discussion									
Key results	18	Summarize key results with reference to study objectives	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias.	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence.	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Generalizability	21	Discuss the generalizability (external validity) of the study results	Yes	No	Yes	Yes	No	Yes	No
Other information									
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	Yes	No	No	Indicated no funding was received.	No	No	No
Chart 21	Item No.	Recommendation							
Study			Yampolskaya et al (2012).	Yampolskaya et al (2019).	Yoon (2017).	Yoon et al. (2017).	Yoon (2018).	Zimmerman et al (2000).	
Title and abstract	1	(a) Indicate the study's design with a commonly used term in the title or the abstract	Yes	Yes	Yes	Yes	Yes	Yes	
		(b) Provide in the abstract an informative and balanced summary of what was done and what was found	Yes	Yes	Yes	Yes	Yes	Yes	
Introduction									
Background	2	Explain the scientific background and rationale for the investigation being reported	Yes	Yes	Yes	Yes	Yes	Yes	
Objectives	3	State specific objectives, including prespecified hypotheses	No	No	No	No	Yes	No	
Methods									
Study design	4	Present key elements of study design early in the paper	Yes	Yes	Yes	Yes	Yes	Yes	
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	Yes	Yes	Yes	Yes	Yes	Yes	
Participants	6	(a) Give the eligibility criteria, and the sources and methods of selection of participants. Describe methods of follow-up	Yes	Yes	Yes	Yes	Yes	Yes	

		(b) For matched studies, give matching criteria and number of exposed and unexposed	Not a matched study.	Not a matched study.	Not a matched study.	Not a matched study.	Not a matched study.	Not a matched study.	
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable.	Yes	Yes	Yes	Yes	Yes	Yes	
Data source	8	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group.	Yes	Yes	Yes	Yes	Yes	Yes	
Bias	9	Describe any efforts to address potential sources of bias	Yes	No	Yes	Yes	Yes	Yes	
Study size	10	Explain how the study size was arrived at	Yes	Yes	Yes	Yes	Yes	No	
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	Yes	Yes	Yes	Yes	Yes	Yes	
Statistical methods	12	(a) Describe all statistical methods, including those used to control for confounding	Yes	Yes	Yes	Yes	Yes	Yes	
		(b) Describe any methods used to examine subgroups and interactions	No subgroups or interactions examined.	Yes for subgroups, no for interactions.	No subgroups or interactions examined.	No subgroups or interactions examined.	No subgroups or interactions examined.	No subgroups or interactions examined.	
		(c) Explain how missing data were addressed	No	Yes	Yes	Yes	Yes	No	
		(d) If applicable, explain how loss to follow-up was addressed	No	No	No	No	No	No	
		(e) Describe any sensitivity analyses	No	No	No	No	No	No	
Results									
Participants	13	(a) Report numbers of individuals at each stage of study - eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analyzed	No	Yes	No	No	No	No	
		(b) Give reasons for non-participation at each stage	No	No	No	No	No	No	
		(c) Consider use of a flow diagram	No	No	No	No	No	No	
Descriptive data	14	(a) Give characteristics of study participants (e.g. Demographic, clinical, social) and information on exposures and potential confounders	Yes	Yes	Yes	Yes	Yes	Yes	
		(b) Indicate number of participants with missing data for each variable of interest	No	No	No	No	No	Yes	
		(c) Summarize follow-up time (e.g., average and total amount)	Yes	Yes	Yes	Yes	Yes	Yes	

Outcome	15	Report number of outcome events or summary measures over time	Yes	Yes	Yes	Yes	Yes	Yes	
Main results	16	(a) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (e.g., 95% confidence interval). Make clear which confounders were adjusted for and why they were included	Yes	Yes	Yes	Yes	Yes	Yes	
		(b) Report category boundaries when continuous variables were categorized	Continuous variables were not categorized.	Continuous variables were not categorized.	Continuous variables were not categorized.	Continuous variables were not categorized.	Continuous variables were not categorized.	Continuous variables were not categorized.	
		(c) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	Not relevant	Not relevant	Not relevant.	Not relevant.	Not relevant.	Not relevant	
Other analyses	17	Report other analyses done- e.g. analyses of subgroups and interactions, and sensitivity analyses	Yes	Yes	Yes	Yes	Yes	Yes	
Discussion									
Key results	18	Summarize key results with reference to study objectives	Yes	Yes	Yes	Yes	Yes	Yes	
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias.	Yes	Yes	Yes	Yes	Yes	Yes	
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence.	Yes	Yes	Yes	Yes	Yes	Yes	
Generalizability	21	Discuss the generalizability (external validity) of the study results	No	No	Yes	No	Yes	Yes	
Other information									
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	No	No	Yes	No	Yes	No	

Appendix B. Data extraction for Study 1

Study authors, year & location	Title	Analytic sample	Sample representativeness	Type(s) of analysis	Independent variables	Effects of independent variables on outcome (only adjusted effects are reported unless otherwise stated)
Aarons et al. (2010). USA	Disentangling the relationship between behavior problems and placement change in child welfare: a multi-level cross-lag modeling approach	422 youth aged 2-15 years in out-of-home care for the entire 36 month study period.	Nationally representative for the full population of children and families entering the child welfare system	Multilevel cross-lag path analyses	age, gender, number of placements, prior levels of behavioral problems	Model 1 (Overall model): CBCL ext/int T1 -> CBCL ext/int T3 (.609 ***/.561 ***), CBCL ext/int T3 -> CBCL ext/int T4 (.705***/.599***), CBCL ext/int T1 -> Placement change T1-3 (.265 **/.351***), Placement change T1-3 -> CBCL ext/int T3: (.147 **/.045), CBCL ext/int T3 -> placement change T3-4 (.228***/.153**), Placement change T3-4 -> CBCL ext/int T4 (.055/.093)
Ayotte et al. (2016). Canada	How the working alliance with adolescent girls in residential care predicts the trajectories of their behavior problems	218 adolescent girls (mean age 15.13 yrs) living in residential centers	Study sample represents adolescent girls placed in residential centers due to behavioral difficulties in Quebec, Canada.	Growth mixture modelling, multinomial logistic regression analysis	working alliance reported by adolescent girls and their counselors	Outcome: Behavior problems: [3 classes: Intercept, Slope]: 1. Decreasing problems (49%): I: 22.71***, S: -2.16***, 2. Low/stable problems (35%): I: 19.86***, S: .26 ns, 3. High/increasing problems (16%): I: 28.73***, S: 1.20*
Ayotte et al. (2017). Canada	The association between the working alliance with adolescent girls in residential care and their trauma-related symptoms in emerging adulthood	130 adolescent girls (mean age 14.98) living in residential centers	Study sample represents adolescent girls placed in residential centers due to behavioral difficulties in Quebec, Canada.	Hierarchical multiple regression	working alliance, pre-treatment anxiety symptoms, pre-treatment depression symptoms, pre-treatment posttraumatic stress symptoms, pre-treatment sexual concerns, pre-treatment dissociation symptoms, pre-treatment anger symptoms, age, residential center	Predictors of depression, insecure attachment, impaired self-reference, anxious arousal, intrusive experiences, defensive avoidance, dissociation (B): [Depression]: Pre-treatment anxiety symptoms: .18, Pre-treatment depression symptoms: .43**, Pre-treatment posttraumatic stress symptoms: .16, Pre-treatment sexual concerns: .05, Pre-treatment dissociation symptoms: -.18,

						Pre-treatment anger symptoms: -.26*, Age: .01, Residential center: .12, Working alliance: .19*
Baptista et al. (2018). Portugal	Early maltreatment and current quality of relational care predict socioemotional problems among institutionalized infants	50 infants and toddlers in institutional care (mean age 7.46 months old at baseline)	The sample represents infants and toddlers in residential institutions in Portugal (institutionalized due to child abandonment, neglect, and severely limited socioeconomic resources, parent mental health, or intellectual disability).	logistic regression	child maltreatment prior to institutionalization, child developmental functioning (i.e., cognitive, language, and motor development) at admission to the institution and at the following months, quality of caregiver-child interaction	<u>Outcome: Presence of socioemotional disturbances (b, OR, 95%CI):</u> Child maltreatment: $b=1.80^*$, OR: 6.05, 95% CI (.27, 6.99), Caregiver sensitivity 6 months of institutionalization: $b=-.82^*$, OR: .44, 95% CI (-2.87, -.25), Motor development at admission to institution: $b=-.02$, OR: .98, 95% CI: (-.10, .08], Motor development at 3 months of institutionalization: $b=-.03$, OR: .97, 95% CI: (-.17, .03)
Barber et al. (2003). Australia	Placement stability and the psychosocial well-being of children in foster care	Entire cohort: 235 children referred into out-of-home care ($m=10.8$ yrs, range: 4-17 years); Children who remained throughout the entire study period: 130 children in foster care	Sample represents children and adolescents who were newly referred to out-of-home care or referred for a change of placement.	repeated measures ANOVA, Fisher least significant difference test	placement stability, group, time	<u>Outcome: Trend analysis for Psychosocial adjustment:</u> [Conduct]: Overall negative linear trend: $F(1,112)=8.93^{**}$, Time effects: $F(1,101)=12.45$, $p<.001$ Group effects: $F(2,101)=5.97$, $p<.01$ Group x Time: $F(2,101)=5.33$, $p<.01$
Barboza et al. (2017). USA	Trajectories of post-traumatic stress and externalizing psychopathology among maltreated foster care youth: a	280 children (8-15 years) who experienced maltreatment	Nationally representative for the full population of children and families entering	univariate growth curve, parallel process modeling (PPM)	initial level of PTS symptoms, witnessing violence in the community, childhood maltreatment, externalizing symptoms	<u>Outcome: Post-Traumatic stress:</u> PTS (I: 48.08**, S: -.410*), PTS severity was significantly associated with externalizing symptom severity ($\beta=.229^*$), Intercept of externalizing symptoms significantly

	parallel process latent growth curve model		the child welfare system			predicted the slope of PTS symptoms ($\beta=.040^*$), Increasing levels of violence exposure ($\beta=1.8^{***}$) was associated with higher initial levels of PTS symptoms at baseline. <u>Outcome: Externalizing symptoms:</u> Externalizing symptoms (I: 60.13**, S: -.598**) Sexually ($\beta=6.6^{***}$) and physically ($\beta=5.5^{***}$) abused youth had higher levels of externalizing symptoms at baseline compared to neglected youth. Being male ($\beta=-1.0$, $p<.09$) moderately associated with slower decreases in externalizing symptoms over time.
Barrett et al. (2014). USA	Delinquency and Recidivism: A Multicohort, Matched-Control Study of the Role of Early Adverse Experiences, Mental Health Problems, and Disabilities	The sample is a matched-control group design, of which the delinquent group comprised 99,602 youth, and 99,602 controls, matched by age, race, and gender.	The sample represents youth in the juvenile justice system in South Carolina, USA	Logistic regression	free lunch, foster care, maltreatment (CPS), aggression, other mental symptoms, emotional-behavioral disorder, learning disability, gender, race, age at first referral, severity at first referral	<u>Outcome: Delinquent Status (N=96,565) (β, Adjusted Odds Ratio-Entry, Adjusted Odds Ratio-Final equation):</u> Free lunch: B=.21, AOR-E: 1.56**, AOR-F: 1.23**, Foster care: B=.30, AOR-E: 2.77**, AOR-F: 1.35**, Maltreatment (CPS): B=.93, AOR-E: 3.59**, AOR-F: 2.54**, DSM-IV aggression: B=2.24, AOR-E: 9.90**, AOR-F: 9.36**, DSM-IV other: B=1.17, AOR-E: 3.42**, AOR-F: 3.24**, Emotional-behavioral disorder: B=.58, AOR-E: 1.78**, AOR-F: 1.78**, Learning disability: B=.24, AOR-E: 1.27**, AOR-F: 1.23** <u>Outcome: Recidivism (N=96,565) (β, Adjusted Odds Ratio-Entry, Adjusted Odds Ratio-Final equation):</u> Gender: B= -.30, AOR-E: .72**, AOR-F: .74** Race: B=.04, AOR-E: 1.34**, AOR-F: 1.04** Free lunch: B=.48, AOR-E: 2.05**, AOR-F: 1.62**,

						Foster care: B=.06, AOR-E: 1.69**, AOR-F: 1.06**, Maltreatment (CPS): B=.47, AOR-E: 2.22**, AOR-F: 1.60**, DSM-IV aggression: B=1.25, AOR-E: 3.86**, AOR-F: 3.49**, DSM-IV other: B=.69, AOR-E: 2.09**, AOR-F: 1.99**, Emotional-behavioral disorder: B=.34, AOR-E: 1.62**, AOR-F: 1.41**, Learning disability: B=.10, AOR-E: 1.12**, AOR-F: 1.10**, Age at first referral: B=-.23, AOR-E: .74**, AOR-F: .74**, Severity at first referral: B=-.05, AOR-E: .95*, AOR-F: .95*
Barth et al. (2007). USA	Predictors of placement moves among children with and without emotional and behavioral disorders	362 for children with emotional and behavioral difficulties and 363 for children without (ages 7 to 14).	Nationally representative for the full population of children and families entering the child welfare system and in out-of-home care at baseline (NSCAW Research Group, 2002).	logistic regression	age, race, gender, first placement, special needs, criminal court appearance, child has depression, child has psychological trauma, child expects reunification, child lives with siblings	<u>Outcome: Predictors of placement moves among children in foster care with emotional and behavioral problems (Incident Density Ratio, 95%CI):</u> Age: IDR: 1.26, CI: (.93, 1.70), Race: IDR: 1.01, CI: .80, 1.27), Gender: IDR: .95, CI: (.72, 1.25), First placement: IDR: .91, CI: (.66, 1.67), Special needs: IDR: 1.27, CI: (.90, 1.81), Criminal court appearance: IDR: 1.00, CI: (.43, 1.14), Child has depression: IDR: 1.32*, CI: (1.01, 1.73), Child has psychological trauma: IDR: .85, CI: (.68, 1.07), Child expects reunification: IDR: 1.18, CI: (.95, 1.45), Child lives with siblings: IDR: 1.47**, CI: (1.10, 1.95)
Bastiaansen et al. (2014). Netherlands	Group care worker interventions and child problem behavior in residential youth care:	128 children (5-12 years) in youth residential care	Sample represents children who were in residential youth care in	Latent growth curve modeling, cross-lagged models	group care worker interventions, residential treatment, children's age, gender	<u>Latent growth curve (conditional model with predictors):</u> [1. Controlling model] Type of treatment (.30**): higher initial levels of controlling in day-and-night care than in day care,

	Course and bidirectional associations		Nijmegen, the Netherlands.			Gender (-.27*): lower initial levels of controlling toward girls than boys [2. Externalizing problems model] Type of treatment (.39**): higher initial levels of externalizing problems in day-and-night care than in day care, Gender (-.34**): lower initial levels of externalizing for girls than for boys [3. Internalizing model] Age (.34*): older children reportedly had higher initial levels of internalizing problems
Bell et al. (2015). Canada	Profiles and predictors of behavioral resilience among children in child welfare	313 children examined for conduct problems and 312 children for emotional problems in foster or kinship placements (m= 7.5 years)	The sample represents children who are living in out-of-home care in Ontario, Canada.	Latent Class Analysis, multino mial logistic regression	child gender, age at first placement, number of placements, caregiver training, placement type (foster family or kinship care), adverse life experiences, foster family predictors, foster caregiver years of experience	<u>Outcome: Conduct problems:</u> 4 groups: 1. No conduct problems group (14.4%), 2. Low & stable conduct problems group (49.8%), 3. Moderate & stable conduct problems group (26.8%), 4. Moderate-high and descending conduct problems group (8.9%) <u>Outcome: Emotional problems:</u> 4 groups: 1. No emotional problems group (14.7%), 2. Low & stable emotional problems group (43.9%), 3. Moderate & ascending emotional problems group (33.7%), 4. Moderate-high & descending emotional problems group (7.7%)
Bellamy (2008). USA	Behavioral problems following reunification of children in long term foster care	604 children in long term foster care (m= 7.75 years)	Nationally representative for the full population of children and families entering the child welfare system, in long term	logistic regression	baseline CBCL total score, reunified for 18 months or longer, risks (mental health, no high school degree, domestic violence in last year, changes in living situation, neighborhood problems, government assistance), demographics and case history (age, male, black, physical abuse, sexual abuse)	<u>Outcome: CBCL Internalizing:</u> Baseline CBCL total score: OR: 1.09, $p=.06$, CI: (1.00, 1.19), Reunified for 18 months or longer: OR: .45, $p=.32$, CI: (.09, 2.17), Mental health risk: OR: .92*, $p=.04$, CI: (.85, .99),

			foster care, and had been investigated for maltreatment (NSCAW Research Group, 2002).			No high school degree: OR: 2.66, $p=.31$, CI: (.40, 17.85), Domestic violence in last year: OR: .35, $p=.29$, CI: (.05, 2.53), Changes in living situation: OR: .39, $p=.06$, CI: (.14, 1.05), Neighborhood problems: OR: 1.34, $p=.75$, CI: (.21, 8.49), Government assistance: OR: 1.61, $p=.60$, CI: (3.84, .10), Age: OR: 1.11, $p=.20$, CI: (.94, 1.32), Male: OR: 5.90*, $p=.04$, CI: (1.11, 31.22), Black: OR: .32, $p=.13$, CI: (.07, 1.41), Physical abuse: OR: .53, $p=.59$, CI: (.05, 5.51), Sexual abuse: OR: .09*, $p=.05$, CI: (.01, 1.01)
Bellamy et al. (2010). USA	A national study of the impact of outpatient mental health services for children in long term foster care	439 children (mean age 7.62) who have experienced long term foster care	Nationally representative for the full population of children and families entering the child welfare system, in long term foster care, and had been investigated for maltreatment (NSCAW Research Group, 2002).	Multiple propensity score models	treatment (outpatient mental health use), baseline covariates: externalizing CBCL scores baseline, internalizing CBCL score baseline, caseworker perceived need for care, child black, child Hispanic, child white, child gender, child age, government support, caregiver high school education, maltreatment harm, kin care, days in current placement, physical abuse, sexual abuse, neglect	<u>Outcome: Externalizing symptoms:</u> Outpatient mental health use: $b=2.85(2.25)$, Externalizing CBCL scores baseline: $b=.51^{***}(.09)$, Internalizing CBCL score baseline: $b=.00(.09)$, Caseworker perceived need for care: $b=.17(1.95)$, Child Black: $b=.15(3.18)$, Child Hispanic: $b=-1.42(3.48)$, Child White: $b=2.18(3.34)$, Child gender (male=1): $b=-1.42(1.68)$, Child age: $b=.24(.22)$, Government support: $b=.34(2.01)$, Caregiver high school education: $b=1.87(2.33)$, Maltreatment harm: $b=-.60(1.00)$, Kin care: $b=-2.23(1.71)$, Days in current placement: $b=.00(.00)$, Physical abuse: $b=4.67(2.88)$, Sexual abuse: $b=-.01(3.69)$, Neglect: $b=2.44(2.34)$ <u>Outcome: Internalizing symptoms:</u> Outpatient mental health use: $b=1.87(1.93)$, Externalizing CBCL scores baseline: $b=-.05(.12)$,

						Internalizing CBCL score baseline: $b=.52^{***}(.11)$, Caseworker perceived need for care: $b=2.79(2.24)$, Child Black: $b=1.50(3.20)$, Child Hispanic: $b=-1.50(3.20)$, Child White: $b=3.02(3.65)$, Child gender (male=1): $b=-1.12(1.82)$, Child age: $b=-.08(.28)$, Government support: $b=-1.12(2.74)$, Caregiver high school education: $b=1.63(2.62)$, Maltreatment harm: $b=-.06(1.23)$, Kin care: $b=2.58(1.84)$, Days in current placement: $b=.00(.00)$, Physical abuse: $b=1.49(3.45)$, Sexual abuse: $b=3.13(4.27)$, Neglect: $b=2.90(2.77)$
Bender & Losel. (1997). German y	Protective and risk effects of peer relations and social support on antisocial behavior in adolescents from multi-problem milieus	100 high-risk adolescents in residential care (boys' mean age: 15.46[1.07], girls' mean age: 15.65[1.12])	This sample represents children in residential care in north-west Germany.	hierarchical regression analyses	baseline externalizing symptoms, clique membership, having one good friend, having a heterosexual friend, number of good friends, satisfaction with social support, frequency of social support, net size of residential center	<u>Outcome: Externalizing symptoms (for boys):</u> Externalizing T1 ($\beta=.21$), Clique membership ($\beta=.14$), Externalizing X Clique membership ($\beta=.39^*$), One good friend ($\beta=.10$), Externalizing X One good friend ($\beta=.09$), Heterosexual friend ($\beta=.16$), Externalizing X Heterosexual friend ($\beta=-.24$), Number of good friends ($\beta=-.01$), Externalizing X Number of good friends ($\beta=.17$), Satisfaction with social support ($\beta=-.13$), Externalizing X Satisfaction with social support ($\beta=.32^*$), Frequency of social support ($\beta=-.14$), Externalizing X Frequency of social support ($\beta=-.11$), Netsize ($\beta=.09$), Externalizing X Netsize ($\beta=.14$) <u>Outcome: Externalizing symptoms T1 (for girls):</u> Externalizing T1 ($\beta=.00$), Clique membership ($\beta=.11$),

						Externalizing X Clique membership ($\beta=.53^*$), One good friend ($\beta=.02$), Externalizing X One good friend ($\beta=-.08$), Heterosexual friend ($\beta=-.24$), Externalizing X Heterosexual friend ($\beta=-.56^*$), Number of good friends ($\beta=.36^*$), Externalizing X Number of good friends ($\beta=.02$), Satisfaction with social support ($\beta=-.18$), Externalizing X Satisfaction with social support ($\beta=.39^*$), Frequency of social support ($\beta=.12$), Externalizing X Frequency of social support ($\beta=.12$), Netsize ($\beta=.08$), Externalizing X Netsize ($\beta=.50^{**}$)
Blakely et al. (2017). USA	Foster care children's kinship involvement and behavioral risks: a longitudinal study	336 youth (ages 6-13) who entered the Illinois child welfare system between 2011 and 2014	This sample is representative of children receiving child welfare services in Cook and Will county, Illinois, USA	three-level Hierarchical Generalized Linear Model	age, gender, race/ethnicity, kinship involvement, Child and Adolescent Needs and Strengths (CANS) individual strengths, CANS trauma experiences, CANS kinship involvement x strengths, CANS kinship involvement x trauma experiences, CANS individual strengths x trauma experiences	Outcome: Behavioral risks: Age: $\beta=-.020^{*}(.010)$, $p=.034$, 95%CI: (.961, .988), Gender (female): $\beta=-.081^{*}(.038)$, $p=.033$, CI: (.856, .993), Race/ethnicity (African-American): $\beta=.001(.040)$, $p=.993$, CI: (.925, 1.082), Kinship involvement: $\beta=-.082^{**}(.031)$, $p=.009$, CI: (.867, .979), CANS individual strengths: $\beta=.003(.023)$, $p=.891$, CI: (.959, 1.050), CANS trauma experiences: $\beta=.024(.022)$, $p=.265$, CI: (.982, 1.069), CANS kinship involvement x strengths: $\beta=.002(.024)$, $p=.928$, CI: (.955, 1.051), CANS kinship involvement x trauma experiences: $\beta=.005(.026)$, $p=.838$, CI: (.955, 1.059), CANS individual strengths x trauma experiences: $\beta=-.054^{***}(.016)$, $p=.001$, CI: (.918, .979)
Brown et al. (2015). USA	Behavioral health needs and service use among those	732 older youth in foster care who were	The sample represents older foster adolescent	binary logistic regression	Out-of-home care involvement	Behavioral trends over time in the prevalence of behavioral health needs:

	who've aged-out of foster care	in out-of-home care for at least one year immediately before discharge.	s in Iowa and Wisconsin, USA.			[With any symptoms of substance dependence/antisocial behavior/PTSD symptoms/depressive symptoms: n(%)]: Wave 1: 501(68.4%) Wave 2: 321(53.2%) Wave 3: 235(39.8%) Wave 4: 236(39.2%) t= W1≠ W2, W3, W4*** t= W2≠ W3, W4***
Bulat (2010). Croatia	A longitudinal study of depressiveness in children in public care	1. first analysis sample: 375 children from children's homes and foster families; 2. second analysis sample: 139 children who participated in both measurement parts of the research	Sample is representative of children in children's homes and foster families in the entire Republic of Croatia	t-tests, hierarchical regression analysis, canonical discriminant analysis	age, gender, type of placement in public out-of-home care, age at which the child was placed in public care, number of children per room in public care, stressors in family life in last five years, delinquent behavior, aggressive behavior, attention disorders, coping: emotional outbursts, self-esteem, somatic problems, social problems, thinking problems, instrumental social support, withdrawal, daily stress, social support to self-esteem, self-image, coping: seeking social support, coping: problem solving, coping: avoidance	<u>Outcome: Psychosocial factors that contributed to the decrease in depression:</u> Delinquent behavior***, Aggressive behavior***, Attention disorders***, Coping: Emotional outbursts***, Self-esteem***, Somatic problems***, Social problems***, Thinking problems***, Instrumental social support***, Withdrawal***, Daily stress: $p=.002$, Social support to self-esteem: $p=.003$, Self-image: $p=.004$, Stressors in the family life: $p=.301$, Coping: Seeking social support: $p=.195$, Coping: Problem solving: $p=.373$, Coping: Avoidance: $p=.634$
Cameroon et al. (2011). Canada	Community adaptation of youth accessing residential programs or a home-based alternative: Contact with the law and delinquent activities	105 youth who graduated from residential treatment programs and 104 youth who graduated from intensive children's mental health programming.	The sample represents male adolescents graduating from residential and intensive children's mental health programming in Ontario, Canada.	t-tests, chi-square tests, logistic regression, backward stepwise regression	school/work functioning, community (reflects delinquent acts), substance abuse, moods/emotions (primarily anxiety and depression)	<u>Predictors of trouble with the law β(SE):</u> [Best overall predictor model]: Law contact prior to admission: 1.257(.384)***, CAFAS school/work functioning: .500(.201)*, Male: 1.288(.493)***, Age at admission: .149(.072)*
Cantos et al. (2010). USA	Therapy outcome with children in foster care: a	138 children at four different private,	Sample represents children in foster care	t-tests, ANOVA, MANOVA	therapy time	<u>T-test: Therapist ratings:</u> [T1vs.T2 (4 mths diff.)]: Risk behaviors: $T=3.68$ ***, $p<.0004$,

	longitudinal study	voluntary foster care agencies (referred for therapy because they were experiencing emotional or behavioral difficulty (m= 8.98 years, range: 4-17 years)	in New York City			Symptoms: T=3.25**, $p<.002$, Total acuity score: T=4.16***, $p<.0001$, Suicidal ideation or gesture: T=2.18*, $p<.03$, Aggressive behavior toward people: T=3.02**, $p<.004$, Aggressive behavior towards objects: T=2.314*, $p<.04$, Reality assessment: T=2.64**, $p<.01$, Depression: T= 2.68**, $p<.009$, Anxiety: T=2.61**, $p<.01$, Sleep disruption: T= 2.19*, $p<.03$, Sexualized behavior activity: T=2.40*, $p<.02$ [T1vsT7 (19 mth diff.)]: No significant differences. Effects faded out by 19 month follow-up. ANOVA: The group of children who were still in therapy after 9 months were rated by their therapists at intake as exhibiting more aggressive behavior toward objects, $F(1,99)=5.45^*$, $p<.02$, than the foster children who did not improve at some time during therapy and those that terminated before the first 3 month assessment.
Chambers et al. (2007). USA	Multidimensional treatment foster care for girls in the juvenile justice system: 2 year follow up of a randomized clinical trial	81 girls (13-17 years) with serious and chronic delinquency randomly assigned to the experimental (MTFC; n=37) or control condition	The sample represents girls in Oregon who are placed in out-of-home care due to problems with chronic delinquency.	latent variable growth model, structural equation modeling	MTFC treatment vs group care	<u>Latent SEM: 2-year maintenance effects of MTFC on girls' delinquency compared to GC (β):</u> Random assignment to MTFC -> Post treatment delinquency assessment at 24 months (-.36**), Age of girl -> Post treatment delinquency assessment at 24 months (-.36**), Delinquency assessment baseline -> Post treatment delinquency assessment at 24 months (.58*), Delinquency assessment baseline -> criminal

		(GC; n=44).				referrals (.53), days in lock up (.52), Elliot general delinquency (.38), Post treatment delinquency assessment at 24 months -> criminal referrals (.56), Days in lock up (.65), Elliot general delinquency (.42)
Chambers et al. (2015). Canada	Predictors of development of vulnerable children receiving child welfare services	185 children recruited from child preventive (n= 81, m=50 months, SD= 29 months) and child protective services (n= 103, m=49, SD=34 months)	Sample represents children under 9 in Quebec, Canada exposed to multiple individual, family, and community risk factors for child maltreatment. During recruitment, four regions were selected from rural, urban, and semi-urban settings.	bivariate analyses, multivariate analyses, multiple regressions	socioeconomic risk, parental stress (total scale), the HOME, the CAPI, and the CAPI interaction factor x formal support	<u>Predictors of socioemotional development (T2):</u> Parental stress total ($\beta=-.52^{***}$), Quality of the home environment ($\beta=.06$), Parental potential for abuse ($\beta=.11$), Abuse x Formal support reported by the parents ($\beta=-.14$)
Chavira et al. (2010). USA	Suicidal behavior among youth in five public sectors of care	1057 youth (ages 11-18) recruited from five public sectors of care (i.e. child welfare, juvenile justice, special education services, alcohol and drug services, and county mental health) in San Diego, California	The sample represents youth who were involved in one or more of five San Diego County public sectors of care (alcohol and drug (AD), child welfare (CW), juvenile justice (JJ), mental health (MH), and public school services for youth with	multivariate logistic regression models	gender, child's age at baseline, special education, juvenile justice, depression, disruptive disorder, smoking most days of the week, social support from mother, social support from father, physical abuse, sexual abuse	<u>Outcome: Baseline predictors of 'suicidal behavior' at 2-year follow up OR(95%I), p-value:</u> Gender: 2.168(1.42, 4.83), $p=.002$, Child's age at baseline: 1.229(.78, 1.93), $p=.372$, Special education: 3.769 (2.07, 6.88), $p=.001$, Juvenile justice: 1.289(.63, 2.63), $p=.485$, Depression: 2.703(1.18, 6.19), $p=.019$, Disruptive disorder: 1.656(.96, 2.87), $p=.072$, Smoking most days of the week: 1.146(.62, 2.12), $p=.664$, Social support from mother: .987(.96, 1.01), $p=.291$, Social support from father: .996(.98, 1.02), $p=.730$, Physical abuse: 1.042(.99, 1.10), $p=.134$,

			serious emotional disturbance (SED).			Sexual abuse: 1.032(.97, 1.09), $p=.303$, Overall model: $F= 65.58$, $p=.001$
Chow et al. (2014). USA	Youth in group home care: Youth characteristics and predictors of later functioning	180 youth (m=14.86 years) from 29 randomly selected group homes	Sample represents youth in group homes in a mid-Atlantic state in the USA.	independent samples t-tests, repeated measures regression, robust regression analyses	age, gender, ethnicity, time in out-of-home care	<u>Outcome: Behavioral and Emotional needs:</u> Gender: No gender differences in means were detected, Ethnicity: African American youth on average were rated as having greater behavioral and emotional needs than Caucasian American youth ($t(173)=-2.08^*$, $p=.04$), Caucasian American youth on average were rated as having greater risk behaviors than African American youth ($t(173)=-2.18$, $p=.03$)
Conn et al. (2015).	Mental health outcomes among child welfare investigated children: In-home versus out-of-home care	Final sample: 749 children (345 in-home with parent training (age=8.4 years[3.4]) and 404 in stable OOH care (age=9.4 years[5.3])), [range : 1.5-18 years]	Nationally representative for the full population of children and families entering the child welfare system (NSCAW Research Group, 2002).	bivariate analyses, conditional logistic regression	age, race, risk factors (cumulative "risk score"), adverse childhood experiences (ACEs), placement characteristics	[Mental health outcomes among children in stable OOH placements]: Mental health problems were cut in half from 26% at baseline to 13% at follow-up ($p=.003$). Conversely, among pre-school aged children, mental health problems increased from 8% at baseline to 13% at follow-up ($p=.008$).
Cuthbert et al. (2011). Canada	Symptom persistence in seriously emotionally disordered children: Findings of a two-year follow-up after residential treatment	225 children and youth aged 6 to 17 years (m= 12.06 years, SD=2.46) with complex mental health difficulties admitted to residential treatment at a tertiary care facility.	The sample represents children and youth admitted to a tertiary care mental health facility with high levels of clinical need and risk for permanent school and home breakdowns.	logistic regression	gender, age at first diagnosis, attention/impulsivity/hyperactivity, conduct, internalizing symptoms, behavior, mood, substance use, maltreatment, externalizing symptoms, age at entry, conduct and anxiety, conduct and mood, anxiety and mood	<u>Predicting conduct disorder at two years post discharge (Wald's χ^2, p-value, OR):</u> Male: .35, $p=.556$, OR: 1.31, Age at first diagnosis: 3.42, $p=.064$, OR: .88, Conduct: 10.38, $p=.001$, OR: 1.02, Internalizing symptoms: .62, $p=.432$, OR: 1.01, Behavior: .15, $p=.698$, OR: .99, Mood: .43, $p=.512$, OR: .99, Substance use: 4.68, $p=.031$, OR: 1.07, Maltreatment: .62, $p=.433$, OR: 1.35

						<u>Predicting police involvement (Wald's χ^2, p-value, OR):</u> Male: 2.58, $p=.457$, OR: .21, Age at first diagnosis: .26, $p=.613$, OR: .96, Externalizing: .54, $p=.463$, OR: 1.01, Internalizing: .98, $p=.321$, OR: 1.01, Behavior: .16, $p=.694$, OR: .99, Mood: 2.58, $p=.108$, OR: .97, Substance use: 6.31, $p=.012$, OR: 1.1, Maltreatment: 1.65, $p=.198$, OR: .621 <u>Predicting conduct problems at two-years post-discharge: Comorbid mental health variables (Wald's χ^2, p-value, OR):</u> Female: .67, $p=.414$, OR: 2.42, Age at entry: 2.83, $p=.093$, OR: .89, Attention/Impulsivity/Hyperactivity/Conduct: 7.59, $p=.006$, OR: 3.32, Conduct and Anxiety: 1.81, $p=.179$, OR: 2.4, Conduct and Mood: .88, $p=.35$, OR: .67, Anxiety and Mood: 2.10, $p=.147$, OR: .36, Behavior: .01, $p=.914$, OR: 1, Mood: .22, $p=.641$, OR: .99, Substance use: 4.96, $p=.026$, OR: 1.07, Maltreatment: .48, $p=.0489$, OR: .77
Cutuli et al. (2016). USA	From foster care to juvenile justice: Exploring characteristics of youth in three cities	Children placed in foster care in Cook County (Chicago; N=26,003), Cuyahoga County (Cleveland, N=10,284), and New	The sample represents children who are placed in foster care in three major American cities (Cook County, Chicago/Cuyahoga	multivariate analysis, cox proportional hazard models	gender, age, race/ethnicity, living arrangement, and foster care spell	<u>Outcome: juvenile justice involvement) Hazard ratios for child and placement characteristics by age of first out-of-home placement (HR):</u> [Age 0-1 year]: Cook: Male: 4.597***, Hispanic: .306**, White: .210***, Congregate care: 2.364*, Kinship care: 1.064, Home/Out-of-care: .537*,

		York City (N=13,065)	County, Cleveland/ New York City, New York)			Foster care spell: 1.465** Cuyahoga: Male: 1.985***, Hispanic: .726, White: .492***, Congregate: 2.482*, Kinship: .387, Home/Out-of-Care: .387, Foster care spell: 1.287*** NYC: Male: 2.117***, Hispanic: .604***, White: .361**, Other race/ethnicity: .302*, Missing race/ethnicity: .415***, Congregate care: 1.641, Kinship care: 1.610***, Home/out of care: .575**, Foster care spell: 2.400***
D'Oosterlinck et al. (2008). Belgium	Implementation and effect of life space crisis intervention in special schools with residential treatment for students with emotional and behavioral disorders (EBD)	31 matched students referred to special schools with residential treatment because of severe behavioral problems	The sample represents youth placed in residential treatment centers for behavioral problems in East-Flanders, Belgium.	general linear model with repeated measures	LSCI (Life Space Crisis Intervention) - a cognitive, behavioral, psychodynamic intervention program	Pretest/Posttest mean scores m(sd) pretest/posttest: [Total anxiety subscale]: Control group: 50.6(12.2)/53.0(12.1), Experimental group: 53.4(13.0)/50.5(13.3), $p=.075$
Dregan et al. (2011). UK	Do adult emotional and behavioral outcomes vary as a function of diverse childhood experiences of the public care system?	431 members with a public care experience and 10,530 members without a public care experience	Sample represents a UK-based nationally representative sample of adults who have ever been in public care	multivariate logistic estimation models	Out-of-home care experience	Outcome: Adult emotional and behavioral outcomes for Public care vs. No public care groups (OR [95% CI]): Depression: 1.73*** (1.34, 2.24), Life dissatisfaction: 1.47*** (1.18, 1.82), Self-efficacy: 1.97*** (1.47, 2.65), Alcohol problems: 1.24 (.88, 1.75), Smoking: 1.71*** (1.39, 2.10), Drug abuse: 1.27 (.89, 1.78), Criminal convictions: 2.16*** (1.67, 2.78)
Eddy et al. (2004). USA	The prevention of violent behavior by chronic and serious male juvenile offenders: A 2-	79 adolescent males (M=14.9 years, SD=1.3), range=	The sample represents chronic and serious adolescent offenders living in a	generalized estimating equations (GEE)	MTFC, time, age at placement, age at 1st arrest, prior arrests, prior delinquency, intercept	Outcome: Official criminal referrals for violent offenses and self-reported violence b (Robust Z): [Official violent referrals]:

	year follow up of a randomized clinical trial	12-17 years) involved in the juvenile justice system. The youth were randomly assigned to the group care (GC) (n=42) or multidimensional treatment foster care (MTFC) (n=37) groups.	medium-sized urban area in the Pacific Northwest of the U.S. referred to the study by the local county juvenile court screening committee and were slated for out-of-home placements. The committee did not refer youth with serious substance abuse problems or youth deemed an extreme threat to the community.			Group (1=MTFC): $-.81^*(-1.94)$, Time: $.11(.65)$, Age at placement: $.20(1.00)$, Age at 1st arrest: $.05(.42)$, Prior arrests: $.05^{**}(2.40)$, Intercept: -5.53 [Self-reported violence]: Group (1=MTFC): $-1.11^{***}(-4.07)$, Time: $.19(1.22)$, Age at placement: $.04(-.30)$, Age at 1st arrest: $.01(.06)$, Prior delinquency: $.001^{**}(2.90)$, Intercept: 3.02
Eltink et al. (2018). The Netherlands	Stability and change of adolescents' aggressive behavior in residential youth care	198 adolescents in residential youth care (average age of the boys (n=130) was 16.2 years (SD=1.83) and the average age of the girls (n=68) was 15.8 years (SD=1.17)).	Sample is said to be representative of juvenile youth. (Convenience sample of all juveniles who were available at the time to participate in the study.)	hierarchical multiple regression analyses	public care, placement patterns	Outcome (Direct aggression): [Static individual characteristics ($p<.10$): Sex: $\beta = -.04$, Age: $\beta = .15$, [Baseline aggression***]: Direct aggression: $\beta = .70$, Indirect aggression: $\beta = .03$, [Short versus long stay* ($\beta = -.10$)], [Gender group (p-value ns)] Girls-only: $\beta = .01$, Boys-only: $\beta = .03$, [Type of institution (p-value ns)]: Secure: $\beta = -.03$, Semi-secure: $\beta = -.09$, [Regression at time 1 ($p<.10$)],

						[Repression x Gender group (p-value ns)]: Boys x Repression: $\beta = -.02$, Girls x Repression: $\beta = -.06$, [Repression x Type of institution (p-value ns)]: Secure x Repression: $\beta = .03$, Semi-secure x Repression: $\beta = .04$
Farmer et al. (2003). USA	Treatment Foster Care in a System of Care: Sequences and Correlates of residential placements	The sample includes youth (n=184, ages 3-17) with both psychiatric disorders and aggressive behavior who resided in TFC during a two-year period (June 1999-May 2001).	The sample represents youth who resided in a treatment foster care facility in North Carolina, USA.	Proportional Hazard Regression Model	age at placement entry, gender, race, DSS custody, prior group home, BERS total, CBCL total, CBCL internalizing, CBCL externalizing	<u>Outcome: Movement out of TFC: HR(95%CI):</u> Age at placement: 1.21(1.08, 1.35)*** Male: .83(.46, 1.50) White: .90(.54, 1.49) DSS custody: .77(.47, 1.27) Prior group home: 1.00(.97, 1.00) BERS total: .98(.97, .99)**
Fernandez (2008a). Australia	Unravelling emotional, behavioral and educational outcomes in a longitudinal study of children in foster-care	59 children (29 boys, 30 girls) from 4-15 years (m=8.8 years) placed in foster families	Sample is representative of children in Australian foster care	mixed methods, t-tests	Being in out-of-home care	<u>T-tests (T1 vs T2):</u> Internalizing: $t(50)=2.07^*$, Anxiety and depression subscale: $t(50)=2.01^*$ <u>T-tests (Children in care vs. Control group):</u> Aggressive behavior*: $p=.013$, Externalizing*: $p=.019$, 'Behaving appropriately': $p=.038$ <u>T-test (Girls vs Boys in care):</u> Attention problems*: $p=.037$
Fernandez (2008b). Australia	Psychosocial wellbeing of children in care: a longitudinal study of outcomes	59 children (29 boys, 30 girls) from 4-15 years placed in foster families	Sample is representative of children in Australian foster care	mixed methods, t-tests	age, sex, number of placements, time in care, age at separation	<u>Outcome: Psychosocial wellbeing:</u> Girls had more anxiety problems $t(22)=2.09^*$, $p=.049$, Younger children had more anxiety problems $t(22)=2.12^*$, $p=.046$, Children in care showed more aggressive behavior

						($p=.013$) and externalizing problems ($p=.019$), Children in care had lower ratings for 'behaving appropriately' ($p=.038$)
Garcia et al. (2015). USA	The influence of caregiver depression on children in non-relative foster care versus kinship care placements	199 children (3-8 years) in out-of-home care	Sample is representative of children in out-of-home care at a Mid-Atlantic city in the USA (specific city not specified).	Linear regression	placement type, caregiver depression	<u>Outcome: CBCL Total & Subscales: Within foster care (FC) vs. kinship care (KC):</u> [Caregiver never depressed]: CBCL internalizing*: FC: 4.03% change (SD:32.84), KC: -9.24% change (SD:29.40), $p=.038$, CBCL externalizing: FC: 4.95% change (SD:30.10), KC: -2.49% change (SD:31.31), $p=.243$, CBCL total: FC: 4.32% change (SD:30.36), KC: -5.13% change (SD:30.04%), $p=.131$ [Caregiver became depressed]: CBCL internalizing: FC: 24.25% change (SD: 22.68), KC: -0.81% change (SD:33.87), $p=.172$, CBCL externalizing: FC: 12.50% change (SD: 17.94), KC: 9.90% change (SD: 35.02), $p=.888$, CBCL total: FC: 24.50% change (SD:12.58), KC: 3.95% change (SD:30.73), $p=.207$ [Caregiver improved]: CBCL internalizing: FC: -4.25% change (SD: 25.41), KC: -15.47% change (SD: 41.19), $p=.488$, CBCL externalizing*: FC: 10.88% change (SD:19.42), KC: -14.65% change (SD: 24.12), $p=.016$, CBCL total: FC: 7% change (SD:28.75), KC: -20.76% change (SD:35.24), $p=.065$ [Caregiver remained depressed]: CBCL internalizing: FC: 6.20% change (SD:18.79), KC: -3.11% change (SD: 26.36), $p=.302$, CBCL externalizing: FC: 4.40% change (SD:29.30),

						KC: -1.05% change (SD: 22.10), $p=.520$), CBCL total: FC: -2.70% change (SD:25.88), KC: -4.34% change (SD: 22.05), $p=.841$
Garrido et al. (2011). USA	Psychosocial consequences of Intimate Partner Violence (IPV) exposure in maltreated adolescents: Assessing more than IPV occurrence	140 (12-15 year old) maltreated adolescents placed in foster care	This sample represents children in foster care who have been placed due to maltreatment.	Hierarchical multiple regression analyses	multidimensional IPV index (IPV frequency, IPV proximity, IPV severity), age, sex, community violence exposure, maltreatment severity, multidimensional IPV index x sex, multidimensional IPV index x age	Outcome: YSR Total Problems: Age ($t=.94$, $\beta=.10$, ns), Sex ($t=-.81$, $\beta=-.09$, ns), Community violence exposure ($t=3.50^{**}$, $\beta=.38$), Maltreatment severity ($t=1.60$, $\beta=.17$, ns), Multidimensional IPV index ($t=2.12^{*}$, $\beta=.23$) Outcome: CBCL Total Problems: Age ($t=-.95$, $\beta=-.13$, ns), Sex ($t=-.53$, $\beta=-.07$, ns), Community violence exposure ($t=2.41^{*}$, $\beta=.30$), Maltreatment severity ($t=-1.11$, $\beta=-.13$, ns), Multidimensional IPV index ($t=-1.14$, $\beta=-2.05$, ns), Multidimensional IPV index x Age ($t=1.02$, $\beta=1.83$), Multidimensional IPV index x Sex ($t=1.63$, $\beta=.24$, $p=.10$)
Goeman et al. (2018). The Netherlands	Foster children's behavioral development and foster parent stress	431 foster families in the Netherlands	Sample represents foster children in the Netherlands.	Structural equation modeling	Baseline internalizing and externalizing behavior problems, parental stress	Outcome: Externalizing behavior problems: [Model 1 (concurrent)]: Stability effects: T1 parental stress $\rightarrow$ T2 parental stress .77*, T2 parental stress $\rightarrow$ T3 parental stress .47*, T1 parental stress $\rightarrow$ T3 parental stress .40*, T1 int/ext $\rightarrow$ T2 int/ext .84*, T2 int/ext $\rightarrow$ T3 int/ext .63*, T1 int/ext $\rightarrow$ T3 int/ext .25*
Goodkind et al. (2013). USA	From child welfare to juvenile justice: Race, gender, and system experiences	Two sets of analyses are present. The first includes the full sample ($n=17,471$) of all child	The sample represents children who received in-home services from the child welfare system and/or	generalized estimating equations (GEE)	race, gender, case open after 13, out of home care experience, mental health services, substance abuse services, number of placements, years in placement, congregate care, runaway	Predictors of Juvenile Justice: Placement sample: OR(95%CI): Race: 2.38*** (1.43, 3.98), Gender: 3.89*** (2.39, 6.34), Case open after 13: 2.95*** (2.12, 4.10), Number of placement: 1.11*** (1.08, 1.14),

		welfare-involved youth. The second (n= 3,712) includes only those who have experienced out-of-home care in Allegheny County, Pennsylvania.	were placed in out-of-home care in Allegheny County, Pennsylvania.			Years in placement: .93***(.89, .96), Congregate care: 3.60*** (2.11, 6.14), Runaway: .72***(.56, .92), Mental health services: 1.47** (1.18, 1.84), Substance abuse services: .73** (.59, .90), Race x Gender: 1.64* (1.09, 2.46), Race x Congregate care: .48*** (.32, .73), Gender x Congregate care: .47** (.30, .76)
Grogan-Kaylor et al. (2008). USA	Behaviors of youth involved in the child welfare system	1180 youth ages birth to 14 who had contact with the child welfare system	Nationally representative for the full population of children and families entering the child welfare system (NSCAW Research Group, 2002).	Tobit specification for regression model	youth, family, community, and child welfare system risk/promotive factors	Outcome: Behavior: Youth age in years: $\beta=3.84(1.38)$, $t=2.79^{**}$, Youth gender: $\beta=-14.80(5.47)$, $t=-2.71^{**}$, Black/Non-Hispanic: $\beta=-9.33(5.70)$, $t=-1.64$, $p=.11$, Hispanic: $\beta=-2.27(6.83)$, $t=-.33$, $p=.74$, Other race: $\beta=-2.22(9.31)$, $t=-.24$, $p=.81$, In home services: $\beta=-1.33(5.73)$, $t=-.23$, $p=.82$, Out-of-home care: $\beta=-2.17(5.69)$, $t=-.38$, $p=.70$, Physical abuse: $\beta=14.55(7.10)$, $t=2.05^{*}$, $p=.04$, Sexual abuse: $\beta=9.15(6.13)$, $t=1.49$, $p=.14$, Other reason: $\beta=-.02(5.92)$, $t=.00$, $p=1.00$, Neighborhood quality: $\beta=-3.20(2.82)$, $t=1.13$, $p=.26$, Child welfare service use: $\beta=6.57(2.20)$, $t=2.98^{**}$, $p<.01$, Parental mental health: $\beta=-.12(.16)$, $t=-.75$, $p=.46$, Parental monitoring: $\beta=-16.66(5.78)$, $t=-2.88^{**}$, $p<.01$, Parental-youth relationship: $\beta=-10.29(3.90)$, $t=-2.64$, $p=.01$, Youth health: $\beta=-3.48(2.39)$, $t=-1.46$, $p=.15$, Youth psychopathology: $\beta=.56(.21)$, $t=2.62$, $p=.01$, Youth trauma: $\beta=.81(.29)$, $t=2.76^{**}$, $p<.01$,

						Peer relationships: $\beta = -.79(.39)$, $t = -2.04$, $p = .05$, Resiliency protective factors: $\beta = -1.39(1.99)$, $t = -70$, $p = .49$, School engagement: $\beta = -13.33(9.75)$, $t = -1.56$, $p = .18$
Habersaat et al. (2018). Switzerland and	Differences and similarities in predictors of externalizing behavior problems between boys and girls	118 girls and 240 boys from child welfare and juvenile justice institutions.	The sample represents adolescents and young adults institutionalized in Switzerland.	regression analyses	nonverbal reasoning, baseline externalizing behavior, anger-irritability, gender, callous-unemotional traits	<u>Regression analyses predicting externalizing behaviors at T2 β(SD), (95%CI), p-value:</u> Non Verbal reasoning: $-.10(.07)$, $(-.23, .03)$, $p = .130$, Baseline externalizing behavior: $.58(.07)$, $(.44, .72)$, $p < .001$, Age of onset: $-.31(.23)$, $(-.75, .17)$, $p = .184$, Anger-irritability: $.38(.17)$, $(.03, .71)$, $p = .036$, Gender: $.10(.09)$, $(-.08, .27)$, $p = .252$, Callous-unemotional traits: $-.36(.20)$, $(-.73, .03)$, $p = .072$, Gender x Age of onset: $.37(.23)$, $(-.07, .82)$, $p = .108$, Gender x Callous-unemotional traits: $.43(.18)$, $(.06, .77)$, $p = .022$, Gender x Anger-irritability: $-.34(.16)$, $(-.65, -.04)$, $p = .036$
Hansson et al. (2012). Sweden	Effects of multidimensional treatment foster care (MTFC): Results from a RCT study in Sweden	46 youths and their families (12-17 years) who met the diagnostic criteria for conduct disorder according to the DSM-IV-TR (American Psychiatric Association), and at risk for immediate out-of-home	The sample represents adolescents in Hassleholm, Sweden, who are at risk for immediate out-of-home placement due to conduct disorder	general linear model (GLM)	MTFC treatment vs group care	<u>Clinical change for YSR (youth self-report), CBCL-mothers, and SCL-90 (symptom checklist-90) mothers from baseline to end of treatment and baseline 24-month follow up, X^2 and sig.:</u> Change from baseline to end of treatment n(%): [CBCL ($X^2 = 3.90^*$)]: MTFC: reduction 10(67%), no reduction 5(33%) TAU: reduction 7(38%), no reduction 14(62%)

		placement . The 46 youths were randomly allocated to either MTFC (n= 19) or TAU (n=27).				
Harold et al. (2013). USA	Depressive symptom trajectories among girls in the juvenile justice system: 24 month outcomes of an RCT of multidimensional treatment foster care	166 girls (13-17 years at T1) with at least one criminal referral in the past 12 months and mandated to out-of-home care	The sample represents girls who have been mandated to community-based out-of-home care due to chronic delinquency in the Northwestern United States between 1997 and 2006.	hierarchical linear growth models	Intercept, baseline BSI (depressive symptoms), MTFC, Trial, MTFC x Trial, girl age, physical abuse history, sexual abuse history, minority status, prior criminal referrals, days in locked settings, days to treatment entry	<u>HLM prediction model of growth in depressive symptoms over two years (unstandardized)</u> <u>(Intercept, Slope, Quadratic Deceleration):</u> Intercept: 2.74*, -2.90, .53, Baseline BSI (Depressive symptoms): n/a, .73***, -.21***, MTFC: .15, -.34*, .09, Trial: .12, -.38*, .14*, MTFC x Trial: -.00, -.08, .02, Girl age: -.09, .09, -.01, Physical abuse history: .11, -.05, .01, Sexual abuse history: .16, -.36, .11*, Minority status: -.04, .01, .02, Prior criminal referrals: -.02, .05, -.01, Days in locked settings: .00, -.00, .00, Days to treatment entry: .00, -.00, .00
Havnen et al. (2014). Norway	Stability and change- a 7- to 8-year follow-up study of mental health problems in Norwegian children in long-term out-of-home care	70 Norwegian children (6-12 years) in long-term out-of-home care	The sample is a nationwide representative of children in Norwegian out-of-home care	t-test, regression analyses, mean score analyses, frequency analyses	Out-of-home care experience	<u>Outcome: Children's mental health problems: T-test (T1vsT4):</u> [Caregiver's reports]: Total difficulties: T1 m: 16.27(9.11), T4 m: 15.79(5.75) $t=4.13$, Emotional problems: T1 m: 4.05(2.00), T4 m: 3.59(1.32), $t=1.331$, Conduct problems: T1 m: 2.77(3.47), T4 m: 2.40(1.61), $t=1.094$, Hyperactivity: T1 m=2.80(2.00), T4 m=2.39(1.82), $t=1.316$ [Teacher's reports]: Total difficulties: T1 m= 17.88(8.56), T4 m: 10.15(7.98), $t=6.842***$, Emotional problems: T1 m: 3.32(2.39), T4 m:

						1.98(2.16), $t=4.429^{***}$, Conduct problems: T1 m: 4.39(2.51), T4 m: 1.46(2.07), $t=6.593^{***}$, Hyperactivity: T1 m: 3.39(1.95), T4 m: 2.17(1.79), $t=3.662^{***}$
Hebert et al. (2016). Canada	Association between unstable placement patterns and problem behaviors in adolescent girls	249 adolescent girls in residential care	The sample represents adolescent girls in residential centers in the Canadian province of Quebec.	Latent profile analysis (LPA), path analysis	placement patterns	Outcome: Delinquent behavior subscale by placement stability pattern: Aggression: 1. Stable pattern vs. relational instability pattern: $\chi^2=2.333$, 2. Stable pattern vs. physical instability pattern: $\chi^2=.279$, 3. Relational instability pattern vs. physical instability pattern: $\chi^2=1.406$
Hiller et al. (2018). UK	The emotional and behavioral symptom trajectories of children in long-term out-of-home care in an English local authority	207 young people (birth-14 years, $m=7.26$ years, $sd=3.23$) under the long-term care of a local authority in the South West of England	The sample is representative of young people in long-term care in the UK.	growth mixture modelling (GMM), trajectory modelling	time in care, sex of child, age of removal, markers of instability in care, predictors of trajectory membership	Outcome: Emotional problems: Class 1 borderline-normal trajectory (36.1%): slope: $-.47$, $SE=.19$, $p=.01$, Class 2 resilient trajectory (28.5%): slope: -1.82 , $SE=.40$, $p<.001$, Class 3 chronic symptom trajectory (19.7%): slope: $.13$, $SE=.14$, $p=.36$, Class 4 problems in the normal range in Y1-Y3 then significantly increased to the abnormal range (15.7%): slope: 1.72 , $SE=.32$, $p<.001$
Hindt et al. (2019). USA	Impact of emergency shelter utilization and kinship involvement on children's behavioral outcomes	282 youths (age: 9.90 years ($sd=2.37$)) entering the child welfare system	Sample represents children receiving child welfare services in Illinois, USA	multilevel modeling	emergency shelter utilization, kinship involvement	Outcome: Externalizing symptoms for youth without emergency shelter placements: Gender: $\beta=-.012(.023)$, $p=.587$, CANS Time 1 (ext/int): $\beta=-.030(.008)^{***}$, $p<.001$, Shelter: $\beta=-.020(.030)$, $p=.502$, Kinship involvement: $\beta=-.001(.014)$, $p=.959$, Age: $\beta=.004(.014)$, $p=.767$, Race/Ethnicity: $\beta=-.011(.024)$, $p=.653$,

						Community violence: $\beta=-.031(.013)^*, p=.016$, Maltreatment: $\beta=.007(.004), p=.076$, Shelter x kinship involvement: $\beta=-.038(.032), p=.229$ <u>Outcome: Internalizing symptoms for youth without emergency shelter placements:</u> Gender: $\beta=-.045(.029), p=.124$, CANS Time 1 (ext/int): $\beta=-.034(.007)^{***}, p<.001$, Shelter: $\beta=.045(.025), p=.077$, Kinship involvement: $\beta=-.001(.016), p=.976$, Age: $\beta=-.015(.010), p=.156$, Race/ethnicity: $\beta=-.008(.026), p=.740$, Community violence: $\beta=-.013(.017), p=.424$, Maltreatment: $\beta=.007(.005), p=.135$, Shelter x kinship involvement: $\beta=-.085(.025)^{***}, p=.001$ <u>Outcome: Internalizing symptoms for youth with emergency shelter placements:</u> Gender: $\beta=-.022(.027), p=.404$, CANS Time 1 internalizing symptoms: $\beta=-.035(.008)^{***}, p<.001$, Kinship involvement: $\beta=-.073(.023)^{**}, p=.003$, Age: $\beta=.004(.015), p=.799$, Shelter days: $\beta=.007(.016), p=.642$, Race/ethnicity (African American): $\beta=-.107(.037)^{**}, p=.005$, Community violence: $\beta=.006(.022), p=.774$, Maltreatment: $\beta=.017(.007)^*, p=.015$, Shelter x kinship involvement: $\beta=-.023(.025), p=.366$
Holstead et al. (2010). USA	Modernizing residential treatment centers for children and	The sample consists of 56 youth ranging	The sample represents youth in residential treatment	Simple number comparisons	Residential treatment (Damar Pilot)	-No elopements, no self-injurious behaviors, no episodes of physical aggression, and only a single incident of property

	youth- an informed approach to improve long-term outcomes: The Damar Pilot	from 13 to 17 years old in residential treatment centers. All of the participants had severe behavioral and psychiatric difficulties.	facilities in Indianapolis, Indiana, USA.			destruction for participants in the treatment group. -Aggressive behaviors in the treatment group decreased by 73%. -Incidents of noncompliance in the treatment group also decreased by 65%. -The treatment groups' average length of stay in a residential care setting was reduced by 4.6 months.
Huang et al. (2016). USA	Foster care, geographic neighborhood change, and the risk of delinquency	145 foster youth from two birth cohorts, one born in 1983 and one in 1984, in Chicago, Illinois	The sample represents children in foster care in Chicago, Illinois. All children were associated with at least one substantiated allegation of maltreatment, and all stayed in at least one out-of-home placement for 30 days or longer.	cox regression model	age at initial placement, gender, race, neglect, physical, placement count, neighborhood difference factors (concentrated disadvantage, residential stability)	<u>Cox regression modeling time to juvenile arrest B(SE):</u> [Model 1]: Age at initial placement: -.15(.31), Male: 1.43*(.67), Hispanic: -.59(1.05), Caucasian: -13.12(667.37**), Neglect: 1.88(1.09), Physical abuse: -.10(.52), Placement count- two: -.18(.80), Placement count- three: .51(.62), Placement count- four or more: 1.29(.83)
Huefner et al. (2009). USA	Conduct disordered youth in group care: An examination of negative peer influence	712 youth (9-19 years, mean age 15 years) in a large residential treatment program	The sample represents youth in large residential centers in the Midwest, USA. The sample was limited to first-time admissions to the program only.	Hierarchical linear modeling	gender, early departure at residential treatment, race	<u>Predictors of intercept and slope of conduct disorders B(SE), t(df):</u> [Intercept]: CD status: .1581(.076), 2.09(707)***, Gender: -.0258(.067), -.384(707), Early departure: .5794(.100), 5.81(707)***, Race: -.1577(.055), -2.87(707)** [Slope]: CD status: -.0040(.002), -2.38(707)*, Gender: .0044(.002), 2.93(707)**

						Early departure: .0060(.004), 1.58(707), Race: .0070(.001), 2.22(707)*
Huefner et al. (2012). USA	Examination of negative peer contagion in a residential care setting	1,438 first-time admission to a large Midwestern out-of-home residential program for youth with emotional and behavioural problems.	The sample represents youth who experience first time admissions to a large out of home family style residential treatment facility for emotional and behavioural problems between 2001 and 2004 in Northwestern USA.	hierarchical linear modeling	average number of CD/ODD incidents in home, mean youth length of stay in home, family and teacher level of experience tenure, negative peer density	<u>Combined model for Daily Incident Report (DIR) B(SE), t(df)=p-value:</u> Average number of CD/ODD incidents in home (intercept): .649(.050), 12.82(126)=.000***, Mean youth length of stay in home: -.011(.004), -2.95(126)=.004**, Family and Teacher level of experience tenure: -.003(.001), -2.07(126)=.04*, Negative peer density (slope): -.002(.001), -1.58(126)=.09, Mean youth length of stay in home: .00021(.00012), 1.72(126)=.09, Family and Teacher level of experience tenure: -.000007(.00003), -2.24(126), p=.81
Humphreys et al. (2015). Romania	Effects of institutional rearing and foster care on psychopathology at age 12 years in Romania: follow-up of an open, randomized controlled trial	187 children being raised in institutions in Bucharest, Romania	Sample represents children in institutional care in Bucharest, Romania.	generalized linear models	ever placed in institution, never placed in institution, care as usual, foster care	<u>Outcome 1: Psychopathology for children ever placed in institution vs. never placed in institution:</u> Internalizing symptoms (p=.0127), Externalizing symptoms (p<.0001), ADHD (p<.0001) <u>Outcome 2: (Care as Usual vs. Foster care)</u> Internalizing symptoms (p=.5681), and Externalizing symptoms (p=.0255) higher for children in care as usual. ADHD (p=.5790) counts higher for children in foster care.
Hurlburt et al. (2010). USA	Advancing prediction of foster placement disruption using Brief Behavioral Screening	The sample consists of children aged 5-12 in foster and kinship care in the	The sample represents foster children in the San Diego county.	Hierarchical logistic regression, growth mixture models	Involvement in foster care	<u>PDR trajectory classes:</u> 1. Low PDR count trajectory (69.1%) 2. Consistently high PDR count trajectory (14.4%) 3. Increasing behavior count trajectory (4.7%) 4. Decreasing behavior count trajectory (11.8%)

		San Diego county DHHS child welfare system. The final RCT full sample comprised 700 foster child families (359 in intervention and 341 in control).				
Hussey et al. (2002). USA	Profile characteristics and behavioral change trajectories of young residential children	57 children in residential treatment	The sample represents children in the residential treatment program of a large, nonprofit, child mental health agency in Cleveland, Ohio.	hierarchical linear modeling	intercept, time, rater, gender, race, age at the first rating, IQ, total number of previous out-of-home placements, length-of-stay	<u>Predictors of total DSMD Score:</u> Intercept: 91.74**, Time (unit change of the score per day): -.001, Rater-teacher: -6.75**, Gender-male: -6.12**, Race-African American: -2.31, Age at the first rating: -1.13*, IQ: -.14**, Total number of previous out-of-home placements: .10, Length-of-stay long- 498 days or longer: 5.15*
Hussey et al. (2005). USA	Profile characteristics and behavioral change trajectories of young residential children	142 children (5-13 years, m=10, SD=1.83) in residential treatment	The sample represents preadolescent children receiving residential treatment programs in Cleveland, Ohio.	hierarchical linear modeling, cross-sectional analyses, growth curve analysis	time, rater, gender, race, age at first rating, IQ, total number of previous out-of-home placements, length-of-stay	<u>Outcome: Total DSMD Score (B):</u> Time (unit change of the score per day) (-.001), Rater-teacher (-6.75**), Gender-male (-6.12**), Race- African American (-2.31), Age at the first rating (-1.13*), I.Q. (-.14*), Total number of previous out-of-home placements (.10), Length-of-stay long-498 days or longer (5.15*)
Izzo et al. (2016). USA	Intervening at the setting level to prevent behavioral incidents in residential child care: Efficacy of the CARE program model	Children from 11 residential agencies.	The sample represents youth living in group care environments.	Interrupted time series analysis	CARE (Children and Residential Experiences) Intervention (setting level intervention), OSC (Organizational Social Context)	<u>Adjusted estimates for trends and program effect: B(95%CI):</u> [Baseline trend: Average monthly proportional change during the baseline period]: Aggression toward staff: 1.10**(1.03, 1.18) Property destruction: 1.11**(1.04, 1.19)

						Aggression toward peers: 1.09**(1.04, 1.05) Cohort 1: 1.18**(1.10, 1.27) Cohort 2: 1.01(.95, 1.08) Self-harm: 1.04(.98, 1.11) Cohort 1: 1.08(.99, 1.17) Cohort 2: 1.01(.93, 1.11) Runaway: 1.04(.99, 1.10) Negative OSC: 1.01(.91, 1.13) Average OSC: 1.03(.95, 1.12) Positive OSC: 1.05(.94, 1.18)
Jacobson et al. (2013). Norway	Cognitive development and social-emotional functioning in young foster children: A follow-up study from 2 to 3 years of age	60 foster children (22-25 months) (m=23.3, SD=.7) and 42 comparison children (22-24 months) (m= 23.2, SD=.5)	The sample represents foster children in Norway. The comparison children were primarily recruited through kindergarten and public health centers at the same sites as the study group. They represent Norwegian norms for measures employed in the present study.	Linear mixed effects (LME) models	foster care	<u>Outcome: ITSEA (Infant-Toddler Social and Emotional Assessment):</u> Externalizing symptoms: Group- Time 3 years vs. 2 years foster group: $\beta=4.4$(CI: -.7, 9.3), $p=.092$, Group- Time 3 years vs. 2 years comparison group: $\beta=6.7^*$(CI: 1.6, 11.8), $p=.011$, Foster vs. comparison group at 2 years: $\beta=1.8$(CI: -.6, 4.2), $p=.141$, Foster vs. comparison group at 3 years: $\beta=-.6$(CI: -3.4, 2.3), $p=.695$, Birth weight: $\beta=-.2$(CI: -.6, .2), $p=.281$, Gender: $\beta=3.8$(CI: -.1, 7.7), $p=.058$, Education low/high: $\beta=-2.7$(CI: -8.1, 2.6), $p=.310$, Education high/high: $\beta=-2.1$(CI: -7.4, 3.3), $p=.442$ Internalizing symptoms: Group- Time 3 years vs 2 years foster group: $\beta=4.0$(CI: -.4, 8.5), $p=.075$, Group- Time 3 years vs 2 years comparison group: $\beta=4.0$(CI: -.5, 8.5), $p=.080$, Foster vs comparison group at 2 years: $\beta=3.2^*$(CI: .9, 5.5), $p=.008$, Foster vs. comparison group at 3 years: $\beta=2.39$(CI: .5, 6.0), $p=.022^*$, Birth weight: $\beta=.0$(CI: -.3, .4), $p=.869$,

						Gender: $\beta=3.5$ (CI: -.1, 7.0), $p=.044$, Education low/high: $\beta=-3.6$ (CI: -8.2, 1.1), $p=.130$, Education high/high: $\beta=-2.5$ (CI: -7.2, 2.2), $p=.298$
Jacobson et al. (2018). Norway	Foster parents' emotional investment and their young foster children's socioemotional functioning	60 foster children (22-25 months (m=23.3, SD=.7)	The sample represents foster children in Norway.	Linear regression	foster caregiver's acceptance, commitment, and awareness of influence	<u>Outcome: Externalizing symptoms:</u> T1 caregiver acceptance: $\beta=5.18$(CI: -1.81, 12.17), $p=.143$, T1 Commitment: $\beta=-10.25$ (CI:-17.87, -2.64), $p=.009$, T1 Awareness of influence: $\beta=-3.96$(CI:-10.57,2.64), $p=.234$, T2 Acceptance: $\beta=-4.14$(CI:-12.22, 3.94), $p=.308$, T2 Commitment: $\beta=1.55$(CI:-7.05, 10.14), $p=.719$, T2 Awareness of influence: $\beta=.89$ (CI: -7.19, 8.97), $p=.826$ <u>Outcome: Internalizing symptoms:</u> T1 caregiver acceptance: $\beta=.24$(CI: -6.37, 6.85), $p=.942$, T1 Commitment: $\beta=-4.06$ (CI:-11.26, 3.14), $p=.263$, T1 Awareness of influence: $\beta=.13$(CI:-6.12, 6.37), $p=.968$, T2 Acceptance: $\beta=-5.10$(CI:-11.36, 1.15), $p=.107$, T2 Commitment: $\beta=.99$(CI:-5.66, 7.64), $p=.767$, T2 Awareness of influence: $\beta=1.27$ (CI: -4.98, 7.52), $p=.685$
James (2004). USA	Why do foster care placements disrupt? An investigation of reasons for placement change in foster care	The sample consists of 580 children between the ages of 2 and 16 in the foster care system in San Diego County.	The sample represents children in San Diego foster care	cox regression	gender, age at entry, race or ethnicity, maltreatment type, baseline behavior problems, prior out-of-home care episodes, days in kinship care, number of routine placement moves, number of planned placement moves to kin or siblings, number of other disruptive moves	<u>Number of placement changes due to behavior N(%):</u> 1 Change: 12(2.2%) – This means that of all the children who experienced 1 placement change, 2.2% of them occurred because of children's behavior. 2 Changes: 64(14.3%) 3 Changes: 65(27.4%) 4 Changes: 52(34.7%) 5 Changes: 32(32.0%) 6 Changes: 32(52.5%)

						<u>Outcome: Relative risk of first behavior related placement change β(SE), p-value:</u> Gender: .30(.20), $p=.12$, Age at entry: .12(.02), $p=.000$, Race or ethnicity: $p=.13$ Hispanic: -.14(.20), African American: .11(.20), Other: -.79(.39), Sexual abuse: -.20(.27), $p=.45$, Physical abuse: .15(.20), $p=.45$, Neglect or caretaker absence: .11(.22), $p=.61$, Emotional abuse: .39(.19), $p=.04$, Baseline internalizing: .12(.23), $p=.61$, Baseline externalizing: .89(.23), $p=.000$, Prior out-of-home care episodes: -.11(.18), $p=.54$, Days in kinship care: -.01(.00), $p=.000$, Number of routine placement moves: -.61(.11), $p=.000$, Number of planned placement moves to kin or siblings: .19(.22), $p=.39$, Number of other disruptive moves: -.26(.15), $p=.08$
James et al. (2012). USA	Characteristics and behavioral outcomes for youth in group care and family-based care: a propensity score matching approach using national data	1,191 children (254 in group homes and/or residential treatment, 937 in family-based settings of care and had not experienced any stays in group care or other restrictive settings, such as inpatient	Nationally representative for the full population of children and families entering the child welfare system (NSCAW Research Group, 2002).	propensity score matching (PSM), logistic regression	age, gender, race, family risk score, primary maltreatment type (sexual abuse, physical neglect, emotional neglect, other), total behavior problems, ext. problems, int. problems, developmental problems, chronic health status, number of placements, insurance type (medicaid, private), urbanicity	<u>Model 1: Outcome: Total Behavior problems OR(95%CI):</u> Age: 1.20(1.02,1.40), $t=2.27^*$, Gender: 2.84(1.17, 6.92), $t=2.33^*$, Race-black: 1.15(.49, 2.74), $t=.33$, Race-Hispanic: 1.05(.51,2.17), $t=.15$, Race-other: .56(.20, 1.54), $t=-1.14$, Family risk score: 2.96(.45,19.54), $t=1.14$, Sexual abuse: .45(.18,1.09), $t=-1.79$, Physical neglect: .25(.09, .73), $t=-2.57^*$, Emotional neglect: .55(.27, 1.12), $t=-1.68$,

		psychiatric care).				Other type of primary maltreatment: .07(.02, .28, $t=-3.76$, Total behavior problems: 2.21(.99, 4.92), $t=1.96^*$, Developmental problems: .69(.25, 1.90), $t=-.73$, Chronic health status: 2.39(.89, 6.45), $t=1.74$, Number of placements: 2.04(1.64, 2.54), $t=6.53$, Medicaid: 2.39(.82, 6.98), $t=1.62$, Private insurance: 5.84(1.25, 27.28), $t=2.28^*$, Urbanity (ref:rural): 1.26(.51,3.11), $t=.50$
Jonson-Reid et al. (2000). USA	From maltreatment report to juvenile incarceration: the role of child welfare services	149,549 school-age children in 10 California counties from the time of a first investigated report of abuse or neglect to potential incarceration as an adolescent	The sample represents children who received child welfare services in 10 California counties. The 10 study counties include urban, suburban/urban, and rural areas.	Cox proportional hazards models	age at 1st report, race, gender, Neglect, change in report type, 3+ reports, foster/other child welfare services	<u>Proportional Hazards Model: Risk of Incarceration β(SE), Wald χ^2, p-value, Risk ratio:</u> Age at 1st report-14 or older: .85(.18), $\chi^2=21.66(p=.0001)$, RR: 2.35, African American: .69(.43), $\chi^2=2.65(p=.10)$, RR: 2.00, Hispanic: .89(.37), $\chi^2=5.78(p=.02)$: RR: 2.45, Male: 2.20(.27), $\chi^2=67.40(.0001)$, RR: 9.07, Neglect: .26(.09), $\chi^2=8.95(p=.003)$, RR: 1.30, Change in report type: .33(.14), $\chi^2=5.64(p=.02)$, RR: 1.40, 3+ reports: -.10(.28), $\chi^2=.13(p=.72)$, RR: .91, Foster/other child welfare services: -.04(.33), $\chi^2=.02(p=.91)$, RR: .96, Male x AFAM: .62(.40), $\chi^2=2.39(p=.12)$, RR: 1.86, Male x HISP: .58(.36), $\chi^2=2.62(p=.11)$, RR: 1.78, Age x AFAM: .62(.24), $\chi^2=6.41(p=.01)$, RR: 1.85, Age x HISP: -.11(.22), $\chi^2=.24(p=.62)$, RR: .89, CWS x AFAM: -.65(.25), $\chi^2=6.67(p=.009)$, RR: .52, CWS x HISP: -.55(.25), $\chi^2=4.99(p=.03)$, RR: .58, Change in report type x Number of reports: -.20(.19), $\chi^2=1.11(p=.29)$, RR: .82,

						Time varying- Hispanic: .01(.01), $\chi^2=3.46(p=.06)$, RR:1.01, Time varying- Number of reports: .01(.01), $\chi^2=2.51(p=.11)$, RR: 1.01
Kang et al. (2017). Korea	Developmental outcomes among Korean adolescents in out-of-home care: a longitudinal study comparing kinship foster care and institutional care	244 adolescents (138 in kinship care and 106 in institutional care)	The sample is a national representation of children in foster and institutional care.	mixed design repeated measures ANOVA, ANCOVA	type of care (institution or kinship)	Outcome: Behavioral Outcomes [mean(SD), F value]: Self-esteem: Kinship=34.481(.321), Institution=35.560(.369), F=4.258*, Depression/anxiety: Kinship= 17.468(.292), Institution=16.700(.356), F=2.458, Delinquency: Kinship=13.197(.118), Institution=13.043(.137), F=.636, Aggression: Kinship= 23.293(.315), Institution= 23.485(.391), F=.131
Kerr et al. (2014). USA	Juvenile justice girls' depressive symptoms and suicidal ideation nine years after multidimensional treatment foster care	166 girls (m= 15.3, SD= 1.2) with a recent criminal referral who were mandated to out-of-home care. Girls were randomized to receive MTFC (n=81) or group care (GC) treatment as usual (TAU; n=85)	The sample represents girls with a recent criminal referral who were mandated to out-of-home care in Northwestern United States.	hierarchical linear growth models	MTFC (multidimensional treatment foster care)	Outcome: Suicidal ideation (Unstandardized coefficients(SE), Odds ratio(95%CI)): Intercept: Intercept: 2.432(1.703), 11.388(.394, 329.624), Baseline age: -.270*(.112), 2.14(.612, .952) Time slope: Intercept: -1.726**(.507), .177(.064, .493), Baseline CESD: .004*(.002), 1.004(1.000, 1.012), Baseline age: .080**(.031), 1.084(1.021, 1.152), MTFC: -.079(.047), .923(.843, 1.012), Cohort: -.161**(.049), .850(.774, .934), MTFC x Cohort: -.123**(.048), .882(.804, .972)
Kisiel et al.	Understanding strengths in relation to	The sample consists of	The sample represents all children	Path analysis	child strengths, traumatic stress symptoms	Path modeling of strengths, traumatic stress symptoms, risk

(2017). USA	complex trauma and mental health symptoms within child welfare	7,483 children and adolescents entering an intensive stabilization program through the Illinois child welfare system.	and adolescents entering into an intensive stabilization program (involves intensive therapeutic services for high-risk youth in foster care) for youth and foster care.			<u>behaviors, behavioral/emotional needs, and life domain functioning:</u> Strengths at Time 1 -> Strengths at Time 2 (.65*), Strengths at Time 1 -> Traumatic stress symptoms at Time 2 (.20*), Traumatic stress symptoms at Time 1 -> Strengths at Time 2 (.00), Traumatic stress symptoms at Time 1 -> Traumatic stress symptoms at Time 2 (.58*), Strengths at Time 2 -> Traumatic stress symptoms at Time 2 (-.43), Strengths at Time 2 -> Risk Behaviors at Time 2 (-.32*), Strengths at Time 2 -> Emotional/Behavioral at Time 2 (-.33*), Strengths at Time 2 -> Life domain functioning at Time 2 (-.47*), Traumatic stress symptoms at Time 2 -> Risk behaviors at Time 2 (.29*), Traumatic stress symptoms at Time 2 -> Emotional/Behavioral at Time 2 (.41*), Traumatic stress symptoms at Time 2 -> Life domain functioning at Time 2 (.25*)
Lanier et al. (2017). USA	Admission to psychiatric residential treatment facilities among youth from families investigated for maltreatment	Children 5-17 years, whose families were investigated for maltreatment between 2003 and 2012 (n=182,676).	The sample represents children who have been investigated for maltreatment in a Southeastern state in the US.	Cox regression analyses	age, gender, race, year of first investigation, first investigation substantiated, youth admitted to foster care, youth in family receiving TANF, system contact index (range 0-4), first investigation substantiated by foster care, first investigation substantiated by TANF, foster care by TANF	<u>Outcome: Later PRTF (Psychiatric Residential Treatment Facilities) entry Est.(SE), Hazard Ratio(HR), p-value:</u> [Model 1]: Age: .08(.01), 1.08, $p < .001$, Female: .42(.06), 1.52, $p < .001$, Non-White: .39(.06), 1.47, $p < .001$, Year of first investigation: .29(.02), 1.34, $p < .001$, First investigation substantiated: .34(.07), 1.41, $p < .001$, Youth admitted to foster care: 2.17(.08), 8.79, $p < .001$, Youth in family receiving TANF: -.28(.10), .76, $p < .001$

Lau et al. (2003). USA	Going home: The complex effects of reunification on internalizing problems among children in foster care	218 children (aged 4-6 yrs) in foster care	The sample represents children in foster care in San Diego County, California, USA.	structural equation modeling	reunification	Outcome: Internalizing symptoms: (There was no direct effect of reunification on later child internalizing problems, however, reunification was related to increased adverse life events that, in turn, were related to elevated levels of internalizing symptoms.) Internalizing baseline -> Internalizing follow up (B=.56*), Internalizing baseline -> Social isolation (B=.30*), Internalizing baseline -> Stressful life events (B=.26*), Internalizing baseline -> mental health provider contact (B=.27*), Reunification -> Mental health provider contacts (B=-.17*), Reunification -> Social isolation (B=-.21*), Reunification -> Stressful life events (B=.30*), Reunification -> Family dysfunction (B=.18*), Stressful life events -> Internalizing follow up (B=.14*), Stressful life events -> Social isolation (B=.15), Stressful life events -> Instability (B=.59), Stressful life events -> harm (B=.65), Stressful life events -> Family dysfunction (B=.60), Instability -> Social isolation (B=.27*), Social isolation -> Low support (B=.72), Social isolation -> Loneliness (B=.45)
Leathers (2006). USA	Placement disruption and negative placement outcomes among adolescents in long-term foster care: The role of	179 randomly selected 12-13 year old adolescents placed in foster care	The sample represents adolescents placed in family foster care for a year or longer in Cook County, Illinois.	Logistic regression analyses	gender, race, baseline behavior problems	Outcome: Negative placement outcome (residential treatment/incarceration) Odds Ratio: [Foster parent's report of behavior problems]: Gender: 4.52** African American race: 2.68

	behavior problems					Baseline behavior problems: 2.02** [Caseworker's report of behavior problems]: Gender: 4.76** African American race: 1.93 Baseline behavior problems: 1.41
Leathers et al. (2011). USA	Use of parent management training intervention with urban foster parents: a pilot study	31 children (age 4-12) in specialized foster care assigned to either an intervention or treatment as usual control group	The sample represents foster children in the Chicago metropolitan area. The project's budget did not allow for inclusion of more than one agency, thereby limiting representativeness.	random effect regression models	PMT (parent management training)	<u>Outcome: Externalizing behavior problems:</u> Without mediator [B(SE)]: Intercept: 65.96**(2.66), Intervention group: 1.90(3.44), Time trend: 1.83(1.70), Intervention time trend: -4.77*(2.19), With mediator [B(SE)]: Intercept: 65.96**(2.66), Intervention group: 7.96(4.29), Time trend: 1.81(1.69), Intervention time trend: -4.36(2.19), Understanding of intervention: -4.84*(2.24) <u>Outcome: Internalizing behavior problems:</u> Without mediator [B(SE)]: Intercept: 60.36**(3.18), Intervention group: 3.12(4.12), Time trend: 1.07(1.80), Intervention time trend: -5.95*(2.31), With mediator [B(SE)]: Intercept: 60.36**(3.14), Intervention group: 6.55(5.44), Time trend: 1.07(1.80), Intervention time trend: -5.96*(2.32), Understanding of intervention: -2.76(2.91)
Lee et al. (2009). USA	Examining externalizing behavior trajectories of youth in group homes: Is there evidence for peer contagion?	744 youth who were in placement at least 90 days and exited from residential care at Boys Town's	The sample represents youth from Boys Town's main campus near Omaha, Nebraska.	latent growth class model, multinomial logistic regression	Age, gender, race, number of prior placements, deviant peer density	<u>Latent Growth Classes of externalizing trajectories:</u> 1. Gradual increasers (9%), 2. High flyers (4%), 3. Gradual decrease (12%), 4. Low-level problem (35%), 5. No problem (39%)

		Home campus.				
Leloux-Opmeer et al. (2018). The Netherlands	Similarities and differences in the psychosocial development of children placed in different 24-h settings	121 Dutch children (mean age=8.78 years, SD=2.34 years) in foster care, family-style group care, and residential care	The sample represents Dutch out-of-home placed primary school children (aged 4-12) in foster care (kinship or non-kinship), family-style group care and open residential care.	repeated measures ANOVA	placement type (Foster care, family-style group care, residential care), pretest score (clinical/non-clinical)	Outcome: CBCL Subscales: [Repeated measures ANOVA]: Total score CBCL: Effects of setting: $F=1.55$, Effect of time: $F<1$, Effect of setting x time: $F=2.87$, Internalizing CBCL: Effects of setting: $F<1$, Effects of time: $F<1$, Effect of setting x time: $F=3.19^*$, Externalizing CBCL: Effects of setting: $F<1$, Effects of time: $F<1$, Effect of setting x time: $F=1.5$ [Factorial ANOVA]: Total score CBCL: Setting = $2.15(p=.12)$, Pretest score = $5.04(p=.03)$, Setting x pretest score = $.96(p=.39)$, Internalizing CBCL: Setting = $3.48(p=.03)$, Pretest score = $2.04(p=.16)$, Setting x pretest score = $2.58(p=.08)$, Externalizing CBCL: Setting = $.41(p=.66)$, Pretest score = $3.86(p=.05)$, Setting x pretest score = $.38(p=.69)$
Leon et al. (2016). USA	Father involvement in child welfare: Associations with changes in externalizing behavior	333 children in state custody in Illinois (6-13 years)	The sample represents children and adolescents in care in Cook and Will counties, Illinois.	hierarchical linear modeling	externalizing Time 1, age, gender, ethnicity, non-father kinship involvement	Outcome: Externalizing behavior Intercept β(SE), p, 95%CI: Externalizing Time 1: $\beta=.673(.044)$, $p<.001$, CI: [1.798, 2.137], Age: $\beta=.025(.034)$, $p=.463$, CI: [.959, 1.096], Gender: $\beta=-.275(.139)$, $p=.048$, CI: [.578, .998], Race/Ethnicity: $\beta=.348(.151)$, $p=.022$, CI: [1.053, 1.904], Non-father kinship involvement: $\beta=-.024(.012)$, $p=.041$, CI: [.953, .999], Father involvement: $\beta=-.326(.155)$, $p=.155$, CI: [.532, .980], Father x Gender: $\beta=.056(.126)$, $p=.655$, CI: [.826, 1.355], Race/Ethnicity x Father involvement: $\beta=.318(.171)$, $p=.064$, CI: [.982, 1.924]

						Predictors of Externalizing behavior Slope β(SE), p, 95%CI:: Externalizing Time 1: $\beta = -.027(.006)$, $p < .001$, CI: [.962, .984], Age: $\beta = .006(.005)$, $p = .194$, CI: [.997, 1.016], Gender: $\beta = -.027(.019)$, $p = .159$, CI: [.937, 1.011], Race/Ethnicity: $\beta = .011(.023)$, $p = .641$, CI: [.966, 1.058], Non-father kinship involvement: $\beta = .001(.002)$, $p = .954$, CI: [.997, 1.003], Father involvement: $\beta = -.075(.032)$, $p = .023$, CI: [.870, .990], Father x Gender: $\beta = .029(.020)$, $p = .153$, CI: [.989, 1.072], Race/Ethnicity x Father involvement: $\beta = .058(.034)$, $p = .093$, CI: [.990, 1.134]
Liddle et al. (2018). USA	Multidimensional Family Therapy as a community-based alternative to residential treatment for adolescents with substance use and co-occurring mental health disorders	113 adolescents (mean age = 15.4) who had been referred for residential treatment. Youth were randomly assigned to Multidimensional Family Treatment (n=57) or Residential Treatment (n=56).c	The sample represents adolescents who have been referred and approved for state-subsidized residential, dual diagnosis substance use treatment	latent growth curve modeling, latent class pattern mixture model analysis	Residential substance use treatment or Multidimensional Family therapy	Growth factors and treatment effects for outcome measures Estimate(SE): [Growth factor mean]: Intercept: Drug use problem severity: $63.00^{***}(2.13)$, Externalizing symptoms: $66.36^{***}(5.28)$, Internalizing symptoms: $61.27^{***}(5.33)$, Substance use frequency: $30.51^{***}(1.75)$, Delinquent behaviors: $1.21^{***}(.14)$, In-treatment slope: Drug use problem severity: $-12.39^{***}(1.13)$, Externalizing symptoms: - $5.41^{*}(2.15)$, Internalizing symptoms: - $6.87^{**}(1.87)$, Substance use frequency: - $12.78^{***}(.94)$, Delinquent behaviors: $-.14^{*}(.07)$ Slope post-baseline: Drug use problem severity: $.12(.11)$, Externalizing symptoms: $-.40(.26)$, Internalizing symptoms: $1.87(.27)$,

						Substance use frequency: .28**(.09), Delinquent behaviors: -.02*(.01) [Treatment differences]: Intercept: Drug use problem severity: -.75(4.80), Externalizing symptoms: -2.49(2.78), Internalizing symptoms: -3.37(2.46), Substance use frequency-early placement class: -2.20(4.90), Substance use frequency-late placement class: -6.84(5.69), Substance use frequency-minimal placement class: -6.54(4.50), Delinquent behaviors- early placement class: .06(.42), Delinquency behaviors-late placement class: <.01(.31), Delinquency behaviors-minimal placement class: .17(.30), In-treatment slope: Drug use problem severity: -3.88(2.56), Externalizing symptoms: .93(1.11), Internalizing symptoms: 2.60**(.92), Substance use frequency-early placement class: 2.77(3.31), Substance use frequency-late placement class: 4.43(3.41), Substance use frequency-minimal placement class: 1.01(2.34), Delinquent behaviors- early placement class: -.08(.24), Delinquency behaviors-late placement class: -.03(.16), Delinquency behaviors-minimal placement class: -.24(.14), Slope post-baseline: Drug use problem severity: .72**(.22), Externalizing symptoms: .10(.13),

						Internalizing symptoms: $<.01(<.01)$, Substance use frequency-early placement class: $-.27(.23)$, Substance use frequency-late placement class: $-.19(.44)$, Substance use frequency-minimal placement class: $.41*(.21)$, Delinquent behaviors- early placement class: $<.01(.02)$, Delinquency behaviors-late placement class: $<.01(.02)$, Delinquency behaviors-minimal placement class: $.04*(.02)$
Linacres et al. (2010). USA	The course of inattention and hyperactivity/impulsivity symptoms after foster placement	252 maltreated children (m=7.8 years, 3-14 yrs)	The sample represents children in New York foster care agencies	hierarchical linear modeling	quality and stability of foster placement	Outcome: Growth trajectories of symptoms over time: [Foster parent report]: Inattention symptoms: Symptoms decreased more for children whose foster parents reported low (<1 SD) compared with average (mean: $.12$) or high (>1 SD) parental warmth (coefficient: $.74(SE:.29)$, $p<.01$), suggesting a diminished positive impact over time of parental warmth on reducing inattention. Symptoms decreased more for children with a high (>1 SD) compared with those with an average (mean: $.29$) or low (<1 SD) number of home moves (coefficient: $-.23(SE:.11)$, $p<.05$). Hyperactivity symptoms: Hyperactivity decreased more for children whose parents reported low (<1 SD) compared with average (m=.12) or high (m: $>1SD$) parental warmth (coefficient: $.56(SE: .27)$, $p<.05$). Hyperactivity decreased more for children who experienced high (m=.41) compared with an average (m: 0) or low (m: $-.29$) number of home moves (coefficient: $-.24(SE:.11)$, $p<.05$).

Lohaus et al. (2018). Germany	Longitudinal relationships between foster children's mental health problems and parental stress in foster mothers and fathers	The sample consists of 94 foster children and a comparison group of 157 children and their biological families. (age range: 2-7 years).	linear regression analyses, Cross-lagged panel analyses	Maternal and paternal stress		<u>Cross-lagged paths:</u> <u>Externalizing symptoms and Paternal stress (β):</u> Ext. T1 $\rightarrow$ Ext. T2 (.805***) Ext. T2 $\rightarrow$ Ext. T3 (.828***) Paternal stress T1 $\rightarrow$ Paternal stress T2 (.591***) Paternal stress T2 $\rightarrow$ Paternal stress T3 (.582***) Externalizing symptoms T1 $\rightarrow$ Paternal stress T2 (.130) Paternal stress T1 $\rightarrow$ Externalizing symptoms T2 (.056) Externalizing symptoms T2 $\rightarrow$ Paternal stress T3 (.207*)
Lyons et al. (2001). USA	Outcome trajectories for adolescents in residential treatment: a statewide evaluation	285 adolescents who have been placed in a residential treatment by the Department of Mental Health in a western state	The sample represents adolescents who have been placed in a residential treatment by the Department of Mental Health in a western state.	growth curve model	Residential treatment	<u>Response models for CAPI items and scales (Intercept, Slope):</u> Overall scale (1.15, -.08, $p=.05$), Risk behaviors scale (.89, -.18, $p<.001$), Suicidal ideation/gesture: (.52, -.26, $p<.001$), Self-mutilation behavior: (.53, -.14, $p<.05$), Aggressive toward people: (1.77, -.19, $p<.05$), Aggressive toward objects (.70, .01, ns), Symptoms scale: (1.20, -.04, ns), Impulsivity: (1.68, .21, ns), Reality assessment (.89, -.33, $p<.001$), Disobedience (1.79, .10, ns), Depression (1.29, -.29, $p<.001$), Anxiety (1.31, .44, $p<.05$), Sleep disruption (.53, 2.18, $p<.01$), Activity level (.91, 2.87, $p<.01$), Sexualized behavior (.70, -.05, ns), Functioning scale (1.27, -.03, ns), Educational functioning (1.30, .13, ns), Family functioning (2.05, -.08, ns), Peer functioning: (2.07, -.07, ns), Self-care functioning (.56, .01, ns),

						Nutritional status (.37, -.12, $p<.05$)
Lyons et al. (2009). USA	An outcomes perspective of the role of residential treatment in the system of care	The analytic sample is based on assessments of 4,476 trajectories of CANS (Child and Adolescent needs and strengths) assessments for youth in residential treatment care	This information used in the present analyses was collected through the Contract Service Administrator for the New Jersey Department of Children and Families.	hinge trajectory analysis	residential treatment, discharge to a program that is one "step down " (i.e. rated as less service intensive) from residential care	<u>CANS overall (TOT) scale base model trajectory, higher order scale trajectories, and sub-scale trajectories:</u> [TOT(Overall CANS score)]: Intercept: 9.09, Step: -.07, $z=-2.79$, $p=.005$ [CBEN(Child Behavior/Emotional needs)]: Intercept: 11.17, Step: -.02, $z=-.42$, $p=.673$, [CRB(Child risk behaviors)]: Intercept: 6.03, Step: -.10, $z=-3.28$, $p=.001$
Maaskant et al. (2018). The Netherlands	Parent training in foster families with children with behavior problems: Follow-up results from a randomized controlled trial	88 foster children (aged 4-12) with severe externalizing behavior problems in long-term foster care arrangements	The sample represents foster children in Dutch foster institutions with severe externalizing behavior problems.	multilevel regression analysis	intervention RCT trial effects over time	<u>CBCL Total β(SE), p-value:</u> Intercept: $\beta=.35(.12)$, $p=.00$, Condition (Differences at baseline): $\beta=-.04(.16)$, $p=.79$, Time (Differences between posttest and baseline): $\beta=-.33(.10)$, $p=.00$, Time x Condition: $\beta=-.11(.15)$, $p=.44$, Time 2 (Differences between follow up and baseline): $\beta=-.52(.12)$, $p=.00$, Time x Condition: $\beta=.00(.18)$, $p=.98$
Maltby et al. (2018). USA	Infant temperament and behavioral problems: analysis of high-risk infants in child welfare	1084 infants 0-12 months old in the child welfare system investigated for suspected child abuse	Nationally representative for the full population of children and families entering the child welfare system (NSCAW Research Group, 2002).	multivariable logistic regression	difficult temperament, depressed caregiver, in-home placement, gender, race, infant development, poverty level, caregiver education, type of abuse	<u>Outcome: CBCL (Total sample) OR(95%CI):</u> Difficult temperament: 1.04 (.99, 1.09), Depressed caregiver: 2.32 (.91, 5.96), In-home placement: .69 (.22, 2.13), Female: .37 (.14, 1.02), Race-African American: .20 (.06, .69)*, Race-Hispanic: .14 (.05, .39)**, Race-other: .38 (.09, 1.58), Medium Infant development: .72 (.26, 1.97), High Infant development: .59 (.17, 2.00),

						100%-200% over poverty line: .29 (.03, 2.37), Over 200% above poverty line: .19 (.01, 2.88), Caregiver education- high school degree: .74 (.17, 3.21), Caregiver education greater than high school degree: 1.70 (.41, 7.11), Physical abuse: .81(.16, 3.98), Substance abuse: 3.44(1.24,9.56)*, Domestic violence: .70(.07, 6.54), Other type of abuse: 1.05(.25, 4.35)
McCrae et al. (2010). USA	Comparing three years of well-being outcomes for youth in group care and nonkinship foster care	Youth first placed in non-kinship foster care (N= 259) and youth first placed in group care (N= 89)	Nationally representative for the full population of children and families entering the child welfare system (NSCAW Research Group, 2002).	Hierarchical linear modeling	time in care (months), age at baseline, gender, race/ethnicity, first entry care type	<u>Outcome: CBCL Total z-Scores (negative values indicate poorer scores):</u> Intercept: -1.43***, Time(months): .01**, Age at baseline (11 and older): .10, Gender(male): -.27, Race/ethnicity(black): .12, First entry is group care: -.11
McGuire et al. (2018). USA	The relation between dimensions of maltreatment, placement instability, and mental health among youth in foster care	496 youth in foster care (mean age= 13.14)	Sample is representative of youth in foster care in the Midwest metropolitan area of the U.S.	Structural equation modeling	cumulative effect of maltreatment, dimensions of maltreatment (frequency and severity of physical abuse, sexual abuse, emotional abuse, neglect), placement changes, age	<u>Examining each dimension of child maltreatment separately (Direct effects, Indirect effects):</u> [Outcome: Externalizing symptoms]: Physical abuse severity ($\beta=.85$, $\beta=.19$), Sexual abuse severity ($\beta=-.61$, $\beta=.16$), Emotional abuse severity ($\beta=.4$, $\beta=.01$), Neglect severity ($\beta=1.06^{**}$, $\beta=-.47^{**}$), Placement changes ($\beta=.54^{**}$), Age ($\beta=-.03$) [Outcome: Internalizing symptoms]: Physical abuse severity ($\beta=.56$, $\beta=.08$), Sexual abuse severity ($\beta=.27$, $\beta=.07$),

						Emotional abuse severity ($\beta=.01$, $\beta=.01$), Neglect severity ($\beta=.1$, $\beta=-.2^*$), Placement changes ($\beta=.22^{**}$), Age ($\beta=.18$) [Outcomes: Externalizing symptoms]: Physical abuse frequency ($\beta=.58^{**}$, $\beta=-.001$), Sexual abuse frequency ($\beta=.19$, $\beta=.02$), Emotional abuse frequency: ($\beta=.33$, $\beta=.06$), Neglect frequency: ($\beta=-.22$, $\beta=-.07$), Placement changes ($\beta=.48^{**}$), Age ($\beta=-.12$) [Outcome: Internalizing symptoms]: Physical abuse frequency ($\beta=.11$, $\beta=0$), Sexual abuse frequency ($\beta=1.26^{**}$, $\beta=.01$), Emotional abuse frequency ($\beta=.94^{**}$, $\beta=.03$), Neglect frequency ($\beta=-.01$, $\beta=-.03$), Placement changes ($\beta=.22^{**}$), Age ($\beta=.13$)
McLaughlin et al. (2012). Romania	Attachment security as a mechanism linking foster care placement to improved mental health outcomes in previously institutionalized children	136 children (6-30 months) residing in institutions, randomized to foster care (n=68) or to care as usual (n=68)	Sample is representative of children in foster care in institutional settings in Bucharest, Romania.	ANOVA, linear regression, logistic regression	attachment intervention	Outcome: Total intervention effects: Total Internalizing symptoms: $\beta=-2.24(.75)$, $p=.004$ Anxiety symptoms: $\beta=-1.32(.49)$, $p=.009$, Depression symptoms: $\beta=-.92(.34)$ $p=.009$, Internalizing disorders: OR: .17, CI: [.04, .6], $p=.006$
McWey et al. (2010a). USA	The impact of continued contact with biological parents upon the mental health of children in foster care	362 children in foster care (ages 7-16)	Nationally representative for the full population of children and families entering the child welfare	multiple regression	gender, parental contact, exposure to violence	Outcome: Depression: Gender (female = 1): $B=3.24^*$, Some contact: $B=2.03(ns)$, Often contact: $B=-.91(ns)$, Exposure to violence (centered): $B=.66^{***}$, Intercept: $B=49.67^{***}$ Outcome: Externalizing behavior:

			system (NSCAW Research Group, 2002).			Gender (female=1): B=-1.19(ns), Some contact: B=-1.29(ns), Often contact: B=-3.62*, Exposure to violence (centered): B=.39**, Intercept: B=64.09***
McWey et al. (2010b). USA	Changes in externalizing and internalizing problems of adolescents in foster care	106 adolescents in foster care (aged 13-16)	Nationally representative for the full population of children and families entering the child welfare system (NSCAW Research Group, 2002).	growth curve analysis	time in care, neglect, sexual abuse, physical abuse, gender, age, length of time in care	<u>Outcome: Externalizing and Internalizing problems:</u> <u>(Intercept/Slope)</u> Externalizing problems: I: 61.74**/S: -1.39* Internalizing problems: I: 46.8**/S: -.60(ns) <u>Outcome: Externalizing and Internalizing problems: (With covariates and controls:)</u> [Externalizing problems]: Neglect: I: .32**/S: -.40**, Sexual abuse: I: .40**/ S: -.40**, Physical abuse: I: .13/S: -.23*, Gender: I: -.10/ S: .35**), Age: I: -.22**/ S: .20), Length of time in care: I: -.10/ S: -.03) [Internalizing problems]: Neglect: I: -.29**/ S: -.49, Sexual abuse: I: .29*/ S: -.43*, Physical abuse: I: -.06/ S: -.36*, Gender: I: -.18/ S: .21, Age: I: -.23*/ S: .15, Length of time in care: I: -.15/ S: -.11
Merritt et al. (2015). USA	Correlates of optimal behavior among child welfare-involved children: Perceived school peer connectedness, activity participation, social skills, and peer affiliation	1054 children (ages 11-17) referred to child welfare services in the U.S.	Nationally representative for the full population of children and families entering the child welfare system (NSCAW Research Group, 2002).	Generalized Ordered logistic regression analyses	school peer connectedness, social skills, nonviolent discipline score, deviant peer affiliation, gets along with teachers, has major special needs/behavior problems, hobbies, clubs, jobs, physical abuse, age, male, ethnicity	<u>Outcome: Non problematic behavior OR(95%CI):</u> Perceived school friend connectedness: 1.52**(1.10, 2.08), Social skills: 1.94*** (1.43, 2.64), Nonviolent discipline score: .98*** (.96, .99), Deviant peer affiliation: 2.07*** (1.42, 3.01), Gets along with teachers: .68(.34, 1.33), Has major special needs/behavior problems: .18*** (.10, .33), Hobbies: 1.07(.53, 2.16), Clubs: .71(.39, 1.28), Jobs: 1.78* (1.03, 3.07),

						Physical abuse: .47* (.22, .98), Physical abuse x school connectedness: .76 (.57, 1.02), Age: .93 (.80, 1.08), Male: .88 (.52, 1.51), Black: 1.04 (.52, 2.09), Hispanic: 1.16 (.49, 2.74)
Munson et al. (2009). USA	Natural mentoring and psychosocial outcomes among older youth transitioning from foster care	339 youth aging out of foster care	The sample represents older youth transitioning from the foster care system in Missouri.	regression	individual features of natural mentoring relationships	<u>Depression symptoms at 18.5 b(SE), t-value:</u> Of color: -.03(.03), $t=-.81$, Male: -.11(.03), $t=-3.39^{***}$, Mentoring duration: -.07(.03), $t=-2.08^*$, Mentoring contact: .00(00), $t=1.78$, Mentoring quality: .00(00), $t=-.10$
Munson et al. (2010). USA	Trajectories of depression symptoms among older youths exiting foster care	404 youths (17-19 years) from the foster care system in Missouri	The sample represents adolescents in foster care in the state of Missouri, USA.	variable-by-variable regression, latent growth mixture modeling	time in care, gender, ethnicity, physical abused, sexually abused, physically neglected, living situation at age 17, got drunk at age 17, marijuana use at 17, ever DBD (Disruptive behaviour disorder) at 17, family history of MHSU (mental health service use), family history of suicidal behaviour, left care, juvenile history at 17	<u>Outcome: Depression symptoms:</u> [3 classes]: 1. Never depressed class (78%, $n=317$), 2. Sharp decrease in depression over time (15%, $n=62$), 3. Modest increase in depression symptoms scores (6%, $n=25$) [Predictors]: Male gender***, Person of color**, Physically abused**, Sexually abused*, Physically neglected*, Living situation at age 17***, Got drunk at age 17***, Marijuana use at 17***, Ever DBD (Disruptive behaviour disorder) at 17***, Family history of MHSU (mental health service use)***, Family history of suicidal behaviour***, Left care*, Juvenile history at 17* [Predictors of membership in decreasing depression class OR(95%CI)]: Person of color: 1.98(.98, 4)*, Male: .09(.03, .24)****, Sexually abused: .88(.42, 1.83) ns,

						Physically abused: 1.46(.68, 3.12) ns, Neglected: 2.31(1.11, 4.84)*, Time in care: 1.04(.49, 2.19) ns, Drunk(past 6 months): 8.65(3.23, 23.13)***, Marijuana(past month): .53(.15, 1.93) ns, Juvenile detention: 1.89(.94, 3.79) ns, Living situation at 17: 1.46(.97, 2.18) ns, Disruptive behavioral disorder: 3.70(1.79, 7.66)***, Family history of psychiatric treatment: .45(.21, .90)*, Family history of suicide: 1.71(.78-3.75) ns
Narendorf et al. (2016). USA	Affect dysregulation in older foster youth	Study participants (n=325) were recruited from a sample of all youth in the custody of the foster care system in eight counties of Missouri who turned age 17 between 2001 and 2003.	The sample represents older youth in foster care in Missouri.	multivariable logistic regression models	Affect skills deficits subscale, affect instability subscale, ethnicity, gender, mental diagnosis in past year, left foster care, history of physical abuse, history of neglect, history of sexual abuse	<u>Affect Dysregulation predicting arrested outcomes at age 19 OR(CI):</u> Affect skills deficits subscale: 1.00(.91, 1.10), Affect instability subscale: .93(.86, 1.00), Youth of color: 1.32(.77, 2.26), Male: 4.32(2.47, 7.58)***, Mental Health diagnosis in past year: 1.37(.75, 2.50), Left foster care: 2.84(1.67, 4.85)***, History of physical abuse: .67(.38, 1.18), History of neglect: 1.31(.76, 2.23), History of sexual abuse: .88(.49, 1.55)
Newton et al. (2000). USA	Children and youth in foster care: Disentangling the relationship between problem behaviors and number of placements	415 youth in foster care in San Diego, California (0-17 years)	The sample represents children and youth in San Diego foster care.	Hierarchical regression modeling	placement change	<u>Effects of number of placement changes on behavior:</u> Total behavior problems: TBP time 1: $\beta=.502^{**}$, Number of placement changes: $\beta=.101^{**}$, Internalizing: Int time 1: $\beta=.411^{**}$, Number of placement changes: $\beta=.125^{**}$, Externalizing: Number of placement changes: $\beta=.122^{**}$

						<u>Effects of number of placement changes on behavior (youth with less than 5 placement changes):</u> Total Behavior problems: TBP time 1: $\beta=.526^{**}$, Number of placement changes: NS, Internalizing problems: TBP time 1: $\beta=.456^{**}$, Number of placement changes: NS, Externalizing problems: TBP time 1: $\beta=.457^{**}$, Number of placement changes: NS <u>Effects of number of placement changes on behavior (youth with 5 or more placement changes):</u> Total Behavior problems: TBP time 1: $\beta=.433^{**}$, Number of placement changes: $\beta=.270^{**}$, Internalizing problems: TBP time 1: $\beta=.282^{**}$, Number of placement changes: $\beta=.325^{**}$, Externalizing problems: TBP time 1: $\beta=.423^{**}$, Number of placement changes: $\beta=.273$
Nijhof et al. (2013). The Netherlands	Stability of post-treatment functioning after residential treatment: The perceptions of parents and adolescents	The sample consists of adolescents discharged from residential treatment facilities. 262 adolescents and 233 parents participated at T1, 205 adolescents and 187 parents participated at T2,	The sample represents adolescents who have been discharged from residential treatment care in the Netherlands.	Structural Equation Modeling, Cross-lagged analysis	Residential treatment, contact with family, wellbeing, social network, police contacts	<u>Adolescent report of sample that participated at all three time points (β):</u> [Police contacts]: Behavior problems T1->T2: $.60^{***}$ Behavior problems T2->T3: $.43^{***}$ Post-treatment indicator T1->T2: $.34^{**}$ Post-treatment indicator T2->T3: $.47^{***}$ Behavior problems T1->Post-treatment indicator T2: $-.12$ Behavior problems T2->Post-treatment indicator T3: $-.14$ Post-treatment indicator T1->Behavior problems T2: $-.01$

		and 108 adolescents and 124 parents participated at T3.				Post-treatment indicator T2->Behavior problems T3: .07 <u>Adolescent report of sample that participated in at least one-time point (B):</u> [Police contacts]: Behavior problems T1->T2: .65*** Behavior problems T2->T3: .59*** Post-treatment indicator T1->T2: .36*** Post-treatment indicator T2->T3: .42*** Behavior problems T1->Post-treatment indicator T2: -.12 Behavior problems T2->Post-treatment indicator T3: -.17 Post-treatment indicator T1->Behavior problems T2: -.12 Post-treatment indicator T2->Behavior problems T3: .11
Noftle et al. (2011). Canada	The trajectory of change for children and youth in residential treatment	225 children (6-17 years, $m=11.72$, $SD=2.55$) in residential treatment	The sample represents children and youth admitted voluntarily into residential treatment within a large mental health treatment center in Ontario, Canada.	curve-fitting analyses	residential treatment stay	<u>Potential reduction of symptoms during the child/youth's residential treatment stay:</u> Overall trend towards a decrease in symptoms across the trajectory, with scores generally moving from the clinical ($T>70$) to nonclinical range ($T=65$).
O'Brien et al. (2016). USA	Mental health and behavioral outcomes of sexual and nonsexual child maltreatment among child welfare-involved youth	380 children between the ages of 8 to 17.5 who were substantiated for maltreatment (sexual and nonsexual)	Nationally representative for the full population of children and families entering the child welfare system (NSCAW Research)	OLS (ordinary least square) regression models	entering CWS with substantiated sexual abuse vs exclusively nonsexual maltreatment, child age, child gender, child ethnicity, child in out-of-home placement (in-home), caregiver age, caregiver gender, caregiver race the same as child, caregiver has a kinship relationship to child, caregiver full-time employment, caregiver married, caregiver at or	<u>Outcome: CBCL Internalizing symptoms (SE):</u> Child sexual abuse: $\beta=-3.36(2.92)$, Child age in years: $\beta=.35(.36)$, Child male: $\beta=1.25(1.91)$, African-American: $\beta=-4.57*(1.91)$, Hispanic: $\beta=.17(1.93)$, Other race: $\beta=.25(3.07)$, Child in out-of-home placement (in-home): $\beta=-.88(2.65)$,

			Group, 2002).		below federal poverty level, caregiver education level	Caregiver age in years: $\beta = .14(.08)$, Caregiver male: $\beta = -6.22^{**}(1.93)$, Caregiver race the same as child: $\beta = -5.54^{**}(1.81)$, Caregiver has a kinship relationship to child: $\beta = -.64$ (2.66), Caregiver full-time employment: $\beta = -1.03$ (1.90), Caregiver married: $\beta = -.81$ (1.77), Caregiver at or below federal poverty level: $\beta = -2.90$ (2.02), Caregiver education level less than high school: $\beta = 3.31$ (1.97), Caregiver education level high school: $\beta = .92(1.71)$ Outcome: CBCL Externalizing symptoms <u>β(SE):</u> Child sexual abuse: $\beta = -2.16(3.85)$, Child age in years: $\beta = .45(.45)$, Child male: $\beta = 3.29$ (1.82), African-American: $\beta = -3.38$ (2.50), Hispanic: $\beta = -4.74(2.48)$, Other race: $\beta = -7.82^{**}(2.91)$, Child in out-of-home placement (in-home): $\beta = 1.13(3.05)$, Caregiver age in years: $\beta = -.01(.10)$, Caregiver male: $\beta = -3.03(2.17)$, Caregiver race the same as child: $\beta = -5.80$ (2.99), Caregiver has a kinship relationship to child: $\beta = 2.74$ (3.11), Caregiver full-time employment: $\beta = -1.75$ (2.12), Caregiver married: $\beta = .10$ (2.18), Caregiver at or below federal poverty level: $\beta = .41$ (2.18), caregiver education level less than high school: $\beta = -2.01$ (2.27), caregiver education level high school: $\beta = 1.13(1.90)$

						Outcome: PTSD symptoms β(SE): Child sexual abuse: $\beta=6.38^{**}$ (2.08), Child age in years: $\beta=-.36$(.31), Child male: $\beta=2.73$(1.61), African-American: $\beta=3.40$(1.76), Hispanic: $\beta=-1.00$(1.69), Other race: $\beta=-4.09^{*}$(1.99), Child in out-of-home placement (in-home): $\beta=-4.51^{*}$(1.72), Caregiver age in years: $\beta=.11$(.07), Caregiver male: $\beta=-2.44$(2.61), Caregiver race the same as child: $\beta=-3.54$(1.96), Caregiver has a kinship relationship to child: $\beta=-6.58$ (2.16), Caregiver full-time employment: $\beta=2.89^{*}$ (1.43), Caregiver married: $\beta=-2.05$ (1.30), Caregiver at or below federal poverty level: $\beta=-.43$ (1.29), Caregiver education level less than high school: $\beta=2.76$(2.11), Caregiver education level high school: $\beta=.34$(1.51)
Pears et al. (2012a). USA	Girls in foster care: Risk and promotive factors for school adjustment across the transition to middle school	75 girls in foster care	The sample represents adolescent girls in foster care.	Latent growth curve modeling	poor self-regulation, placement changes, caregiver support, self-competence	LGC Results: Aggression from peers: (I: 1.92***, S: -.26***), Aggression against peers: (I: 1.30***, S: .10*) Predictors of the growth curve β(SE), p-value: [Outcome: Aggression from peers] (effects on intercept): Poor self-regulation: $\beta=.03$(.08), $p=.72$, Placement changes: $\beta=.01$(.02), $p=.51$, Caregiver support: $\beta=-.11$(.12), $p=.36$, Self-competence: $\beta=.04$(.07), $p=.56$ [Aggression from peers]: (effects on slope): Poor self-regulation: $\beta=-.04$(.10), $p=.72$,

						Placement changes: $\beta=.03(.02)$, $p=.14$, Caregiver support: $\beta=-.15(.15)$, $p=.30$, Self-competence: $\beta=.22(.08)$, $p=.01$. [Aggression against peers] (effects on intercept): Poor self-regulation: $\beta=-.07(.04)$, $p=.08$, Placement changes: $\beta=.01(.01)$, $p=.10$, Caregiver support: $\beta=-.16(.06)$, $p=.01$, Self-competence: $\beta=-.04(.03)$, $p=.18$. [Aggression against peers] (effects on slope): Poor self-regulation: $\beta=.04(.06)$, $p=.48$, Placement changes: $\beta=.02(.01)$, $p=.05$, Caregiver support: $\beta=-.06(.09)$, $p=.46$, Self-competence: $\beta=.03(.04)$, $p=.47$.
Pears et al. (2012b). USA	Effects of a school readiness intervention for children in foster care on oppositional and aggressive behaviors in kindergarten	192 children in foster care (113 KITS intervention, 106 FCC treatment as usual)	The sample represents kindergarten age children in foster care.	Structural equation modeling	school readiness intervention (KITS)	Results of SEM: Intervention status -> T4 child oppositional and aggressive behaviors ($B=-.17^*$), T1 Child oppositional and aggressive behaviors -> T4 Child oppositional and aggressive behaviors ($B=.09$), Child gender -> T4 child oppositional and aggressive behaviors ($B=-.29^{**}$), T4 level of disruptiveness in the classroom -> T4 Child oppositional and aggressive behaviors ($B=.26^{**}$), T4 child oppositional and aggressive behaviors -> T4 TRF Aggressive behavior subscale ($B=.77^{**}$), T4 child oppositional and aggressive behaviors -> T4 TRF Delinquent behavior ($B=.88^{**}$), T4 Child oppositional and aggressive behaviors -> T4 CTRS Oppositional behavior subscale ($B=.67^{**}$)

Pears et al. (2013). USA	Early school engagement and late elementary outcomes for maltreated children in foster care	93 maltreated children in foster care (mean age 4.40 (sd= .83) and a community comparison group of 54 low SES, non maltreated children	The sample represents young, maltreated children in foster care.	Structural equation modeling	maltreatment and foster care, dimensions of school engagement (behavioral school engagement, affective school engagement, cognitive school engagement), gender, academic competence	<u>Early elementary school (grade k-1) predictors of late elementary school (grade 3-5) risk behaviors:</u> Maltreatment and foster care ($\beta=.23^*$), Behavioral school engagement ($\beta=-.01$), Affective school engagement ($\beta=-.06$), Cognitive school engagement ($\beta=-.50^{**}$) <u>Other interactions/associations:</u> Early maltreatment and foster care $\rightarrow$ later academic competence ($\beta=-.08$), Early behavioral school engagement $\rightarrow$ later academic competence ($\beta=-.08$), Early affective school engagement $\rightarrow$ later academic competence ($\beta=.23^{**}$), Early cognitive school engagement $\rightarrow$ later academic competence ($\beta=.35^{**}$), Gender (female) $\rightarrow$ cognitive school engagement ($\beta=.21^{**}$), Gender $\rightarrow$ academic competence ($\beta=.12$), Risk behaviors $\rightarrow$ endorsement of substance use ($\beta=.27^*$), Risk behaviors $\rightarrow$ externalizing behavior ($\beta=.85^{**}$), Risk behaviors $\rightarrow$ deviant peer association ($\beta=.64^{**}$)
Pears et al. (2016). USA	Decreasing risk factors for later alcohol use and antisocial behaviors in children in foster care by increasing early promotive factors	192 children in foster care (113 KITS intervention, 106 FCC treatment as usual)	The sample represents kindergarten age children in foster care.	path analyses	Intervention status, gender, general cognitive ability, kinship foster care, child oppositional & aggressive behavior, self-competence, positive attitudes towards alcohol, positive attitudes towards antisocial behavior, involvement with deviant peers	<u>Results of path analysis:</u> Intervention status (pre-k) $\rightarrow$ Positive attitudes towards alcohol (3rd grade) ($\beta=-.34^*$), Intervention status (pre-k) $\rightarrow$ Positive attitudes towards antisocial behavior (3rd grade) ($\beta=-.11^*$), Intervention status (pre-k) $\rightarrow$ Self competence (3rd grade) ($\beta=1.95^*$), Gender $\rightarrow$ Positive attitudes towards antisocial behavior (3rd grade) ($\beta=-.12^*$),

						Gender -> Involvement with deviant peers (3rd grade) ($\beta=.22^{**}$), General cognitive ability (pre-k) -> Self-competence ($\beta=.14$), Kinship foster care -> Self competence ($\beta=1.51^{*}$), Gender -> Child oppositional & aggressive behavior ($\beta=-1.67^{*}$), Self-competence -> Involvement with deviant peers ($\beta=-.06^{**}$)
Perry et al. (2017). USA	The role of placement history and current family environment in children's aggression in foster care	160 maltreated children in foster care (mean age= 7.57, sd=2.39)	The sample represents young maltreated foster children in San Diego county, California.	hierarchical linear regressions	placement history (kinship status, group home placements), current family environment (spousal presence, sibling physical aggression, sibling relational aggression, sibling social skills, time in home, children in home, sibling status, gender constellation, birth order)	<u>Longitudinal predictors of Physical aggression B(SE):</u> Child physical aggression T1: .53 ^{**} (.07), Child relational aggression T1: 1.73 ^{**} (.55), Spousal presence: -.36(.40), Kinship status: -.07(.40), Group home placements: .62(.35), Sibling physical aggression: .08(.08), Sibling relational aggression: -1.56 [*] (.71), Sibling social skills: -.75(.70), Time in home: -.01(.02), Children in home: -.13(.28), Sibling status: .37(.97), Gender constellation: .28(.37), Birth order: -.13(.42), Sibling physical aggression x Sibling status: -.25 [*] (.12)
Poulton et al. (2014). USA	Effects of multidimensional treatment foster care on psychotic symptoms in girls	Girls (n=166) (ages 13-17, mean=15.30 years, sd=1.17) who had been court-mandated to community-based, out-of-home care due to chronic delinquency.	The sample represents adolescent girls in the Northwestern United States placed in court-mandated out-of-home care due to chronic delinquency.	Growth curve analysis	Multidimensional treatment foster care (MTFC)	<u>Outcome: Psychotic symptoms (Intercept, Slope):</u> I: 51.84 ^{***} , S: -3.46 ^{***} <u>Outcome: (DISC-Diagnostic interview schedule for children) B(SE):</u> MTFC=-.65 ^{**} (.22), Baseline marijuana use=-.42(.37), Baseline age=.14(.10), Ethnicity=.30(.23), Prior symptoms=.19 ^{***} (.03) <u>Outcome: BSI (Brief symptom inventory) slope B(SE):</u> MTFC: $\beta=-2.05(.93)$,

						Baseline marijuana use: $\beta = -.42(.37)$, Baseline age: $\beta = .19(.45)$, Ethnicity: $\beta = -1.95(1.08)$
Preyde et al. (2009). Canada	Outcomes of children participating in mental health residential and intensive family services: Preliminary findings	Five children's mental health agencies in south central Ontario, Canada, participated. Three agencies served children aged 5 to 12 years and their families at intake. The remaining two agencies served youth aged 12 to 16 years and their families at intake. A sample of 17 youth from residential and a sample of 18 youth from the home-based intervention aged 12 years and older were also interviewed.	The sample represents children (5-12 years) in mental health agencies in south central Ontario, Canada.	t-tests	residential mental health treatment or home-based alternative	<u>Outcome: CAFAS(Child and Adolescent Functional Assessment Scale- measures psychosocial functioning) at discharge and BCFPI (Brief Child and Family Phone Interview- measures symptom severity) at follow up m(SD):</u> [Residential care]: School/Work functioning: 14.06(10.4)***, Home functioning: 12.5(9.8)***, Community- reflects delinquent acts: 4.38(8.4)*, Behavior towards others: 12.81(9.9)***, Moods/emotions- primarily anxiety and depression: 12.81(9.6)***, Self harm: 4.38(9.1)*, Substance use: 4.38(8.4), Problems in thinking: 4.38(8.4), Total: 69.39(48.4)***, AIAP-regulation of attention, impulsivity, and activity: 66.50(11.1)***, COP-cooperation with others: 67.01(11.8)***, CDp- conduct: 74.10(27.8)***, SPp-separation from parents: 59.61(16.7), MAp- managing anxiety: 55.51(12.3), MMp- managing mood: 63.94(18.5)*, CHFp- child functioning: 73.71(14.8)*, GFSp- family functioning: 82.74(29.4)***
Preyde et al. (2011). USA	Long-term outcomes of children and youth accessing residential or intensive home-based treatment:	Children and youth accessing five residential treatment centers of the home-based alternative	The sample represents youth in residential treatment in Ontario, Canada	t-tests, ANOVA	residential treatment, home based treatment	<u>Psychosocial functional outcomes for residential treatment (CAFAS subscales) m(SD) at admission/discharge, t, p-value:</u> School/work functioning: 22.15(9.56)/14.43(10.30)** , $t = 5.494$, $p < .001$,

	Three year follow up	in southern Ontario, Canada. Two of these agencies served youth (approximately 12 to 18 years of age), and three served children (approximately six to 11 years). 210 caregivers consented to participate in this study (105 RT and 105 IHT).				Home: (25.44(8.29)/12.00(9.72)** , $t=10.023, p<.001$), Community: (11.27(11.59)/5.29(10.18)* , $t=3.377, p=.001$), Behavior to others: (21.39(6.93)/13.00(8.90)** , $t=7.436, p<.001$), Moods: (16.46(8.63)/12.71(9.31)** , $t=4.369, p<.001$), Self harm: (7.34(9.57)/3.29(8.93)** , $t=3.461, p=.001$), Substance use: (2.91(7.54)/2.00(6.28), $t=1.097, p=.277$), Thinking: (5.95(9.13)/3.71(7.26)* , $t=2.281, p=.026$), Total: (112.88(36.43)/67.88(43.7) **, $t=8.374, p<.001$) <u>Symptom severity outcomes (BCFPI- Brief Child and Family Phone Interview) Residential treatment m(SD) at admission/T3/T4, F-,p-value:</u> RAIA- Regulation of attention, impulsivity and activity: (74.27(7.91)/68.50(11.87)/ 69.46(11.72)** , $F=9.924, p=.003$), CO- Cooperation with others: (76.93(8.63)/68.94(10.82)/ 67.78(10.06)***, $F=30.503, p<.001$), CD- Conduct disorder: (91.58(25.15)/78.98(28.40)/ 72.60(34.36)***, $F=15.441, p<.001$), SP- Separation anxiety from parents: (59.19(14.17)/57.91(13.51)/ 57.15(12.03), $F=.841, p=.363$), MA- Managing anxiety: (57.84(14.99)/58.82(14.03)/ 59.23(12.97), $F=.281, p=.598$), MM- Managing mood: (74.28(20.55)/65.73(18.51)/ 60.62(15.84)***, $F=21.085, p<.001$),

						TMH- Total mental health score: (78.68(10.65)/70.78(12.05)/68.99(10.93)***, $F=30.50$, $p<.001$)
Preyde et al. (2012). Canada	Non-suicidal self-injury and suicidal behavior in children and adolescents accessing residential or intensive home-based mental health services	210 children and youth accessing residential and home-based treatment (mean age 11.57, $sd=2.75$)	The sample represents children from mental health agencies (5-12 years) in southwestern Ontario, Canada who have previously discharged from RT(residential treatment) or IHT(intensive home-based treatment) and either discharged or entering RT and IHT.	repeated measures ANOVA, t-test	Being in residential or home-based treatment, Self-harming behaviors at baseline	<u>BCFPI Subscales by self-harm group at intake and discharge:</u> [Intake]: Total Mental Health Score: No Self harm: $n=94$, $M=77.43(11.43)$, CI: (75.09, 79.77), Self-harm: $n=45$, $M=82.50(11.14)$, CI: (79.15, 85.85), $p=.015^*$ [Discharge]: Total mental health score: No Self harm: $n=47$, $M=67.02(11.91)$, CI: (63.52, 70.52), Self-harm: $n=22$, $M=73.35(8.76)$, CI: (69.46, 77.23), $p=.030$ [12-18 months post-discharge]: Total mental health score: No Self harm: $n=111$, $M=71.04(12.15)$, CI: (68.75, 73.32), Self-harm: $n=57$, $M=73.64(13.61)$, CI: (70.03, 77.25), $p=.209$ [36-40 months post-discharge]: Total mental health score: No Self harm: $n=75$, $M=68.91(12.01)$, CI: (66.15, 71.67), Self-harm: $n=49$, $M=71.53(12.17)$, CI: (68.04, 75.03), $p=.239$
Proctor et al. (2010). USA	Trajectories of behavioral adjustment following early placement in foster care: Predicting stability and change over eight years	279 youth from the Southwest site of the Consortium for Longitudinal Studies of Child Abuse and Neglect	The sample represents youth in the Southwesters suburban areas of the United States.	Growth mixture modeling	Early cognitive ability, early social competence, placement stability, frequency of early physical abuse, frequency of early sexual abuse, frequency of early neglect, frequency of late physical abuse, frequency of late sexual abuse, frequency of late neglect	<u>Growth curve classes:</u> Internalizing behavior: 1. Stable adjustment (66.7%) experienced consistently high levels of positive adjustment. 2. Mixed/decreasing adjustment (25.4%) alternated between positive adjustment and maladjustment, with decreasing levels of

		(LONGS CAN). All children at this site entered the child welfare system by the age of three and a half years as a result of a substantiated report of maltreatment.				positive adjustment over time. 3. Increasing adjustment (7.9%) experienced high levels of initial maladjustment with moderate increases in adjustment beginning at age 10.) Externalizing behavior: 1. Stable adjustment (46.6%), 2. Mixed adjustment (28.7%), 3. Increasing adjustment (8.2%), 4. Stable maladjustment (16.5%) <u>Outcome: Trajectory class OR(95%CI):</u> [Internalizing problems]: 1. Stable adjustment: a. Early cognitive ability: 1.11(.99-1.26), b. Early social competence: 1.01(.99-1.03), c. Placement stability: 1.44*(1.06-1.95), d. Frequency of early physical abuse: 1.37(.92-2.05), e. Frequency of early sexual abuse: .57(.30-1.07), f. Frequency of early neglect: 1.09(.89-1.31), g. Frequency of late physical abuse: .64*(.46-.90), h. Frequency of late sexual abuse: 1.36(.62-1.81), i. Frequency of late neglect: .95(.77-1.16) 2. Increasing adjustment: a. Early cognitive ability: 1.30***(1.07-1.59), b. Early social competence: .96*(.92-1.00), c. Placement stability: 1.57(.90-2.73),

						d. Frequency of early physical abuse: 1.18(.60-2.33), e. Frequency of early sexual abuse: .79(.27-2.28), f. Frequency of early neglect: .92(.65-1.32), g. Frequency of late physical abuse: .57(.27-1.20), h. Frequency of late sexual abuse: 1.66(.78-3.50), i. Frequency of late neglect: .93(.64-1.35), [Externalizing problems]: 1. Stable adjustment a. Early cognitive ability: 1.15*(1.02-1.30), b. Early social competence: 1.02(1.00-1.04), c. Placement stability: 1.47*(1.05-2.05), d. Frequency of early physical abuse: 1.04(.72-1.49), e. Frequency of early sexual abuse: .69(.35-1.34), f. Frequency of early neglect: .97(.81, 1.17), g. Frequency of late physical abuse: .79(.54-1.16), h. Frequency of late sexual abuse: .89(.50-1.59), i. Frequency of late neglect: .99(.76-1.28) 2. Increasing adjustment a. Early cognitive ability: 1.01(.84-1.22), b. Early social competence: .99(.96-1.03), c. Placement stability: 1.32(.75-2.34), d. Frequency of early physical abuse: .71(.33-1.54),

						e. Frequency of early sexual abuse: .23(.03, 1.99), f. Frequency of early neglect: 1.21(.91-1.61), g. Frequency of late physical abuse: 34(.11-1.02), h. Frequency of late sexual abuse: .62(.17-2.28), i. Frequency of late neglect: 1.22(.88-1.68) 3. Stable disorder a. Early cognitive ability: 1.03(.88-1.20), b. Early social competence: .97*(.94-1.00), c. Placement stability: 1.22(.82-1.72), d. Frequency of early physical abuse: .94(.56-1.43), e. Frequency of early sexual abuse: 1.26(.58-2.89), f. Frequency of early neglect: .86(.63-1.06), g. Frequency of late physical abuse: 1.45(.96-2.48), h. Frequency of late sexual abuse: .95(.55-1.89), i. Frequency of late neglect: 1.15(.48-1.50)
Pullman (2011). USA	Effects of out-of-home mental health treatment on probability of criminal charge during the transition to adulthood	143 youth who have been served in out-of-home mental health settings such as residential treatment and inpatient hospitalization.	The sample represents youth who received publicly-funded out-of-home mental health treatment services through the Massachusetts Department of Mental Health (DMH) and who	growth model, Hierarchical generalized linear model	number of charges by 16, substance use disorder, out-of-home treatment, start week (linearly increasing indicator of number of weeks since discharge from last out of home treatment, resets when new treatment begins), week (linear change trajectory), female in week, age19+, female in age19+, post 19 (linearly increasing indicator of number of weeks since turning 19), female in post19,	<u>Hierarchical generalized linear model predicting being charged with a crime β(SE), OR(95%CI):</u> Intercept: -4.6704*(.1040), .0093(.008, .012), Number of charges by 16: .0263*(.0105), 1.0267(1.006, 1.048), Substance use disorder: .4682*(.0914), 1.5971(1.333, 1.913), In out-of-home treatment: -.5687*(.1107), .5662(.456, .703), Start week: .9431*(.2709), 2.5679(1.510, 4.367),

			were charged with a crime at some point between 16 and 25 years old (n=143).			Week: .5963*(.1245), 1.8154(1.420, 2.321), Female in week: -.6560*(.1466), .5189(.389, .683), Age19+: -.7143*(.1448), .4894(.369, .650), Female in age19+: .9380*(.2549), 2.5550(1.550, 4.210), Post19: -.5003*(.1396), .6063(.461, .797), Female in post19: .5017*(.1752), 1.6515(1.172, 2.328)
Pullman et al. (2018). USA	Tracing the pathway from mental health screening to services for children and youth in foster care	8636 youth aged 3-17 in the Washington State's foster care system (m=8.45 years, sd=4.18)	The sample represents youth in the Washington state foster care system.	Multivariate logistic regression	age at time of removal, gender, race- Caucasian, race- African American, race-Hispanic, race-Asian/Pacific Islander, race-Native American, race-Multiracial, first ever placement, abuse or neglect, caregiver, behavioral health diagnosis prior to out of home care	<u>Indicators of continued aggression in behavioral health services among children and youth screening above criteria on the CHET:</u> <u>OR(95%CI):</u> Age at time of removal: .09(.96,1.01), Sex female- 1.22(1.00, 1.49), Race- Caucasian: .56*(.33, .96), Race-African-American: 2.01(.24, 16.7), Race-Hispanic: .94(.47, 1.88), Race-Native American: .39*(.16, .96), Multiracial: 1.06(.46, 2.42), First ever placement: .63*(.49, .82), Physical abuse: 1.42(1.09, 1.87), Sexual abuse: 1.52(.98, 2.34), Temporary physical custody: .83(.67, 1.02), Removal-voluntary: .41***(.28, .59), Removal-runaway: 1.00(.56, 1.76), Caregiver-relative: .68(.28, 1.61), Caregiver-non relative: .77(.31, 1.86), Psychosis prior to out of home care: .81(.41, 1.60), Bipolar symptoms prior to out of home care: 1.61(.99, 2.62), Depression prior to out of home care: .87(.62, 1.21),

						Anxiety prior to out of home care: 1.03(.79, 1.35), ADHD/conduct/impulsive symptoms prior to out of home care: 1.25(.93, 1.69)
Rayburn et al. (2016). USA	The interrelationships between trauma and internalizing symptom trajectories among adolescents in foster care	155 adolescents (11-15 years) in out-of home care	Nationally representative for the full population of children and families entering the child welfare system (NSCAW Research Group, 2002).	Growth-curve analyses	trauma exposure and internalizing symptoms	<u>Outcome: PTS symptoms:</u> I: 7.59**, S: -.68** <u>Outcome: Internalizing symptoms:</u> I:10.94**, S: -1.13** <u>Latent growth curve interrelationships between trauma and internalizing symptoms:</u> Trauma intercept -> Internalizing intercept ($\beta=.73^{***}$), Trauma intercept -> Internalizing slope ($\beta=.04$), Trauma slope -> Internalizing slope ($\beta=.71^{**}$)
Ringeisen et al. (2009). USA	Mental Health service use during the transition to adulthood for adolescents reported to the child welfare system	620 youth aged 12 to 15 at baseline receiving CPS-services (NSCAW). The subsample in this study focused on young adults aged 18 to 21 years at final follow up (12-15 at baseline).	The sample is nationally representative of children in the child welfare system for maltreatment allegations in the United States.	Logistic regression	Maltreatment, mental health problems at baseline, gender, age, race, insurance type	<u>Mental health problems and use of outpatient specialty mental health services at the five-to six-year follow-up among youths who were reported as victims of maltreatment at baseline:</u> <u>OR(95%CI), p-value:</u> Mental health problems: 4.7(1.6, 13.7), $p=.005$ Female: 1.9(.7, 5.2), $p=.209$ Age: 1.1(.6, 2.1), $p=.762$ Racial or ethnic minority group: .3(.1, -.8), $p=.012$ Insurance: Medicaid: 3.1(1.0, 9.4), $p=.048$ Insurance: Private or TRICARE: .8(.2, 4.0), $p=.754$
Robst et al. (2011). USA	Peer contagion among youth in Medicaid-funded residential mental health treatment programs	2163 children and adolescents who received out-of-home care in a residential setting (SIPP-Statewide inpatient psychiatric program	The sample represents children and adolescents who received out-of-home care in a residential setting.	generalized estimating equations (GEE)	two facility characteristics: peer delinquency and facility size, prior juvenile justice encounter, SIPP episode, no past OOH treatment, past SIPP treatment, past TFC treatment, involuntary examination, length of treatment, gender, ethnicity, age	<u>Outcome: Juvenile justice encounter during treatment (β(SE), p-value):</u> [Delinquency measured at start of OOH treatment]: Peer delinquency: .541(.450), $p=.229$, Facility size: .012(.007), $p=.088$, Prior juvenile justice encounter: 1.177(.130), $p<.001$, SIPP episode: -1.420(.207), $p<.001$,

		or TFC- Therapeut ic Foster Care).				No past OOH treatment: .095(.186), $p=.610$, Past SIPP treatment: .488(.184), $p=.008$, Past TFC treatment: .181(.216), $p=.403$, Involuntary examination: .470(.136), $p=.001$, Length of treatment: .003(.001), $p<.001$, Female: -.114(.125), $p=.362$, White: -.029(.140), $p=.836$, Black: .278(.151), $p=.065$, Age: .081(.041), $p=.046$, [Delinquency measured at end of OOH treatment]: Peer delinquency: .862(.433), $p=.046$, Facility size: .011(.007), $p=.087$, Prior juvenile justice encounter: 1.164(.131), $p<.001$, SIPP episode: -1.295(.195), $p<.001$, No past OOH treatment: .103(.185), $p=.578$, Past SIPP treatment: .496(.183), $p=.007$, Past TFC treatment: .210(.220), $p=.339$, Involuntary examination: .462(.132), $p=.001$, Length of treatment: .003(.001), $p<.001$, Female: -.117(.122), $p=.338$, White: -.029(.140), $p=.835$, Black: .287(.151), $p=.057$, Age: .079(.040), $p=.049$ <u>Outcome: Juvenile Justice encounter after treatment (β(SE), p-value):</u> [Delinquency measured at start at OOH treatment]:

					Peer delinquency: .680(.318), $p=.032$, Facility size: .007(.005), $p=.146$, Prior juvenile justice encounter: 1.404(.092), $p<.001$, SIPP episode: -.121(.199), $p=.543$, No past OOH treatment: .164(.132), $p=.214$, Past SIPP treatment: -.280(.129), $p=.030$, Past TFC treatment: .063(.149), $p=.673$, Involuntary examination: -.043(.208), $p=.837$, Length of treatment: -.001(.000), $p=.066$, Female: -.161(.078), $p=.040$, White: -.156(.143), $p=.275$, Black: .062(.132), $p=.636$, Age: .081(.026), $p=.002$ [Delinquency measured at end of OOH treatment]: Peer delinquency: .782(.268), $p=.004$, Facility size: .006(.005), $p=.205$, Prior juvenile justice encounter: 1.398(.092), $p<.001$, SIPP episode: .008(.199), $p=.967$, No past OOH treatment: .150(.133), $p=.257$, Past SIPP treatment: -.286(.132), $p=.030$, Past TFC treatment: .061(.149), $p=.682$, Involuntary examination: -.032(.207), $p=.878$, Length of treatment: -.001(.000), $p=.070$, Female: -.160(.077), $p=.038$, White: -.161(.144), $p=.264$, Black: .067(.134), $p=.616$, Age: .078(.025), $p=.002$
Rose et al. (2017). USA	A longitudinal study of child maltreatment and mental	105,982 children from administra	The sample represents children and	event history analysis (cox	Trauma-associated diagnosis, family/group/individual therapy, therapeutic <u>Youth characteristics predicting PRTE admission Est.(SE), HR, 95%CI, p-value:</u>

	health predictors of admission to psychiatric residential treatment facilities	tive data files tracking reports of child maltreatment, foster care placements, family or child-only participation in TANF, and Medicaid claims from the state of North Carolina between the ages of 5-17.	adolescents in North Carolina that experienced maltreatment foster care placements, family or child only participation in TANF, and Medicaid claims.	proportional hazards modeling)	family and group foster placement, residential treatment, secure residential treatment, drug/alcohol services, one or more types of psychotropic, substantiated abuse/neglect/dependency, services needed or recommended, first placement in foster care, exited from foster care, return to foster care after exit, first foster care spell includes group home, first foster care spell includes therapeutic home, first foster care spell includes treatment center, TANF, gender, age at first maltreatment report, ethnicity, year of first investigation	Trauma-associated diagnosis: 1.4(.2), 3.9(2.9, 5.3), $p<.001$, Family therapy: .0(.1), 1.0(.8, 1.1), $p=.502$, Group therapy: .0(.1), 1.0(.8, 1.2), $p=.825$, Individual therapy: .0(.1), 1.0(.9, 1.2), $p<.584$, Therapeutic family and group foster placement: 1.4(.1), 4.2(3.5, 4.9), $p<.001$, Residential treatment: .6(.1), 1.7(1.3, 2.3), $p<.001$, Secure residential treatment; .0(.1), 1.0(.8, 1.1), $p=.596$, Drug/alcohol services: 2.2(.1), 8.7(7, 10.7), $p<.001$, One or more types of psychotropic: .2(.1), 1.3(.9, 1.7), $p=.116$, Substantiated abuse/neglect/dependency: .0(.1), 1.0(.9, 1.2), $p=.634$, Services needed or recommended: .1(.1), 1.1(1, 1.3), $p=.114$, First placement in foster care: .7(.2), 1.9(1.2,3.1), $p=.007$, Exited from foster care PA: -2.4(.3), .1(.1, .2), $p<.001$, Return to foster care after exit: 1.4(.4), 4.1(1.9,.9), $p<.001$, First foster care spell includes group home: .1(.3), 1.2(.7, 2.1), $p=.617$, First foster care spell includes kinship care: -.1(.2), .9(.6, 1.4), $p=.704$, First foster care spell includes therapeutic home: -.5(.2), .6(.4, .9), $p=.005$, First foster care spell includes treatment center: 1.1(.2), 3.1(1.9, 5.1), $p<.001$, TANF: -.5(.1), .6(.5, .7), $p<.001$, Child is female: .0(.1), 1.0(.9, 1.2), $p=.493$, Age at first maltreatment report: .0(.0), 1.0(1,1), $p=.690$,

						Race-Black: -.2(.1), .8(.7, .9), $p=.010$, Race-American Indian/Alaskan native: -1.5(.6), .2(.1, .7), $p=.010$, Race-Asian: .1(.7), 1.2(.3, 4.6), $p=.841$, Race-Native Hawaiian/Pacific islander: .8(.4), 2.2(.9, 5.2), $p=.086$, Ethnicity- Hispanic: -.2(.1), .8(.6, 1.1), $p=.109$, Year of first investigation 2008: .3(.1), 1.3(1.1, 1.6), $p=.001$, Year of first investigation 2009: .6(.1), 1.8(1.5, 2.2), $p<.001$, Year of first investigation 2010: .8(.1), 2.3(1.9, 2.8), $p<.001$, Year of first investigation 2011: 1.1(.1), 3.1(2.4, 4), $p<.001$, Year of first investigation 2012: 1.1(.3), 3.1(1.8, 5.3), $p<.001$
Rosenthal et al. (2010).	Living situation and placement change and children's behavior	The sample consists of children (n=4080) who received CPS-funded services.	This sample is nationally representative of children who received child welfare services. (NSCAW)	Cross-lagged panel analysis, auto-effects paths analysis, logistic regression	Placement change, prior behavior problems	1. Change in prior living situation/placement demonstrated strong association with change in subsequent living situation/placement. 2. Prior behavior was a strong predictor of subsequent behavior. 3. Behavior problems demonstrated strong association with change in living situation and placement. 4. The results of living situation and placement change on behavior was different for internalizing and externalizing behavior. Placement change was not a significant predictor of externalizing behavior at any time point. On the other hand, placement change predicted internalizing behavior at waves 1, 3, and 4 (but not 5).
Rubin et al. (2007).	The impact of placement stability on behavioral well-being for	729 children in out-of-home care	Nationally representative for the full population of children	Logistic regression model	placement stability, age, gender, ethnicity, baseline behavior, child health, abuse/maltreatment history, birth parent mental health, birth parent	<u>Unadjusted association between child's baseline attributes and behavioral well-being outcomes at 18 months:</u>

	children in foster care		and families entering the child welfare system (NSCAW Research Group, 2002).		history of domestic violence or arrest, birth parent substance abuse problems	Child's age ($p=.03$), Gender of child ($p=.28$), Race and ethnicity of child ($p=.84$), Child's baseline behavior is normal ($p<.0001$), Child has health problems at baseline ($p=.07$), History of neglect or abandonment ($p=.99$), History of CPS involvement ($p=.04$), Birth parent has serious mental/behavioral problems ($p=.16$), Birth parent has history of domestic violence or arrests ($p=.74$), Birth parent has problems with drugs or alcohol ($p=.02$)
Rufa et al. (2016). USA	Kinship foster care among African American youth: Interaction effects at multiple contextual levels	225 African American youth placed into foster care	This sample is nationally representative for the full African American population of children and families entering the child welfare system (NSCAW Research Group, 2002).	Path analysis	placement type and baseline behavior problems, gender, age, maltreatment, placement change, caregiver age, caregiver physical health, neighborhood problems	<u>Unstandardized regression coefficients</u> <u>b(SE), p-value:</u> [Internalizing at 18 months]: Baseline internalizing: $b=.36(.10)$ $p=.001$, Baseline externalizing: $b=.15(.05)$ $p=.001$, Child gender: $b=.03(1.10)$ $p=.98$, Child age: $b=.15(.18)$ $p=.41$, Physical abuse: $b=-.81(1.79)$ $p=.65$, Sexual abuse: $b=1.40(2.21)$ $p=.53$, Neglect: $b=-.09(1.880)$ $p=.96$, Change in placement: $b=.60(1.41)$ $p=.67$, Placement type: $b=-1.98(1.28)$ $p=.12$, Caregiver age: $b=-.07(.06)$ $p=.20$, Caregiver physical health: $b=-.01(.08)$ $p=.86$, Neighborhood problems: $b=4.00(1.49)$ $p=.01$, Caregiver x placement type: $b=.10(.11)$ $p=.36$, Neighborhood problems x placement: $b=-3.38(2.49)$ $p=.17$, Caregiver physical health x placement: $b=-.14(.10)$ $p=.18$,

						Caregiver physical health x caregiver age: $b=.002(.01)$ $p=.80$, Caregiver physical health x caregiver age x placement: $b=-.01(.01)$ $p=.26$ [Externalizing at 18 months]: Baseline internalizing: $b=-.04(.13)$ $p=.74$, Baseline externalizing: $b=.58(.06)$ $p=.001$, Child gender: $b=-1.46(1.48)$ $p=.33$, Child age: $b=.05(.24)$ $p=.82$, Physical abuse: $b=-1.10(2.60)$ $p=.67$, Sexual abuse: $b=3.726(3.20)$ $p=.25$, Neglect: $b=1.93(2.82)$ $p=.50$, Change in placement: $b=4.42(1.70)$ $p=.001$, Placement type: $b=-1.16(1.73)$ $p=.50$, Caregiver age: $b=-.12(.09)$ $p=.16$, Caregiver physical health: $b=.21(.14)$ $p=.14$, Neighborhood problems: $b=9.61(4.14)$ $p=.02$, Caregiver x placement type: $b=.18(.15)$ $p=.24$, Neighborhood problems x placement: $b=-7.60(6.02)$ $p=.21$, Caregiver physical health x placement: $b=-.20(.18)$ $p=.28$, Caregiver physical health x caregiver age: $b=.02(.01)$ $p=.04$, Caregiver physical health x caregiver age x placement: $b=-.03(.02)$ $p=.03$
Ruff et al. (2016). USA	An exploratory study of mental health interventions with infants and young children in foster care	23 children (age 5 or younger, average age 4.54 years (range= 2.25-5.93) who started mental health treatment	This sample represents young, preschool-age children in U.S. foster care. However, the sample size is small to be considered	T-tests	relationship-based treatment to improve therapeutic alliance	<u>Effects of intervention on symptoms:</u> Anxiety ($p=.000$), School problems ($p=.001$), Conduct problems ($p=.003$), Dissociative symptoms ($p=.004$), Sleep problems ($p=.005^*$), Depression ($p=.010$), Enuresis ($p=.023$), Sexual behaviors ($p=.025$), Self-injurious behavior ($p=.031$),

		at or before the age of 5. All children were removed from home for reasons of suspected abuse and neglect and placed into foster care.	nationally representative and results should be generalised with caution.			Aggression/violence ($p=.047$), Peer relationship problems ($p=.086$), Legal problems ($p=.162$), Risk taking ($p=.167$), Suicidality ($p=.186$), Problems with current family ($p=.201$), Anger ($p=.225$), Learning problems ($p=.308$), Transiency ($p=.328$), Psychotic thoughts/behaviors ($p=.329$), Substance abuse ($p=.329$), Hoarding ($p=.347$), Problems with family of origin ($p=.568$), Eating problems ($p=1.00$), Encopresis (no change)
Rushton et al. (2003). UK	Parenting late-placed children: The development of new relationships and the challenge of behavioural problems	61 children (5-9 years) placed from care with the intention of permanence in new, adoptive/non-kinship foster families.	The sample represents children in England newly placed from care with adoptive or permanent foster families.	mixed methods : interviews & χ^2 tests	attachment to new family	Non-attached children pushed away parents when comfort was offered ($\chi^2=4.2$, $df=1$, $p<.05$), bottling up their feelings ($\chi^2=9$, $df=1$, $p<.05$), and showing a greater tendency to be superficial or lacking in 'genuineness' ($\chi^2=16.1$, $df=1$, $p<.001$) compared to the rest of the sample. Children with low behavior scores also had low EFQ (indicators of relationship difficulties) scores ($\chi^2=9.8$, $df=1$, $p<.002$). Satisfaction with the child is statistically associated with low behavior and relationship problems ($\chi^2=5.5$, $df=1$, $p<.01$).
Ryan et al. (2005). USA	Family contact and recidivism: a longitudinal study of adjudicated delinquents in residential care	90 adjudicated delinquents released from a long-term residential facility in Michigan, USA.	The sample represents adjudicated delinquents in Michigan, USA.	cox regression	age at termination, length of stay, African American, race(other), completed treatment, in-home counseling, family service worker-initiated home visit, family-initiated campus visit	<u>Predictors of Recidivism among Delinquent youths after residential care B(SE):</u> Age at termination: -.642**, Length of stay: .071, African American: .846*, Race(other): -.537, Completed treatment: .186, In-home counseling: -2.62*, Family service worker-initiated home visit: -.055*, Family-initiated campus visit: -.181*
Ryan et al.	Developmental trajectories of	294 male adolescent	The sample represents	multinomial	ethnicity, age of child, prior arrest before age 16,	<u>Predictors of Outcome: Nonoffenders vs. Desisters</u>

(2007). USA	offending for male adolescents leaving foster care	s (between ages 16 and 18) leaving a large Midwestern foster care agency: non offenders, early onset desisters, and chronic offenders.	male adolescents who leave a large Midwestern foster care agency in the United States.	logistic regression	substance abuse, placement at termination (independent living, unknown, friends, relative), length of stay, moved three or more time, not enrolled in school	<u>and Nonoffenders vs. Chronic offenders (β):</u> [Desisters]: African American: -.170, Hispanic: .124, Age of child: -.001, Prior arrest before age 16: 1.67**, Substance abuse: .658, Placement at termination-independent living: .149, Placement at termination-unknown: 1.032*, Placement at termination-friends: .792, Placement at termination-relative: 1.987**, Length of stay: -.068**, Moved three or more times: 2.871***, Not enrolled in school: 1.447** [Chronic offenders]: African American: .183, Hispanic: .382, Age of child: .361, Prior arrest before age 16: 1.725***, Substance abuse: .723, Placement at termination-independent living: -.036, Placement at termination-unknown: .762, Placement at termination-friends: .835, Placement at termination-relative: .997, Length of stay: -.076**, Moved three or more times: 1.688**, Not enrolled in school: 1.095**
Ryan et al. (2010). USA	Kinship foster care and the risk of juvenile delinquency	The sample was limited to youth who spent at least 80% of their time in either a kin or non kin foster family home (n=18,705).	The sample represents youth in kin or non kin foster family homes in Los Angeles, California.	survival analysis (Cox Regression)	race, sex, reason for placement, placement instability, reasons for placement change, placement types, age at first placement, length of stay in placement, total changes in placement	<u>Cox regression: delinquency for females B(SE):</u> Kin placement: .06(.08), Age 5-10 opening**: .80(.17), Age 11+ opening**: 1.60(.20), African American**: .50(.12), Hispanic: .08(.11), Asian: -.11(.29), Neglect**: -.26(.09), Physical abuse: -.05(.10), Sexual abuse**: -.51(.17), Two placements: -.01(.10), Three placements: .03(.12),

						Four+ placements*: .22(.12), Moved behavior**: .48(.15), Moved AWOL **: 1.32(.13), Length of stay **: .01(.01), Group home*: .58(.13) <u>Cox regression: delinquency for males B(SE):</u> kin placement: .16(.06), Age 5-10 opening **: 1.07(.11), Age 11+ opening **: 1.94(.14), African American **: .52(.10), Hispanic **: .29 (.09), Asian: .33(.19), Neglect: -.07 (.07), Physical abuse: -.03(.08), Sexual abuse: -.22(.17), Two placements: -.01(.07), Three placements*: -.21(.09), Four+ placements: .11(.08), Moved behavior: -.01 (.16), Moved AWOL **: .99 (.14), Length of stay **: .01(.01), Group home **: .37(.11)
Sakai et al. (2006). USA	Adolescent inhalant use among male patients in treatment for substance and behavior problems: Two-year outcome	80 male adolescents admitted to a residential treatment programs	The sample represents male adolescents in residential treatment centers in Colorado, USA.	Multiple regression	baseline inhalant use, age, time in controlled environment, baseline measured conduct disorder severity	<u>Regression for outcome: Past year Conduct Disorder symptoms B(SE):</u> Baseline inhalant use: .99(.45) $p=.03$, Age: -.18(.18) $p=.34$, Time in a controlled environment: .00(.00) $p=.49$, Baseline measured CD severity: .43(.11) $p<.01$
Salazar et al. (2011). USA	Understanding social support's role in the relationship between maltreatment and depression in Youth with foster care experience	513 youth exiting the child welfare system in three Midwestern states in the U.S.	The sample represents youth (17 years or older) aging out of foster care in three Midwestern states.	negative binomial regression	social support, maltreatment, ethnicity, gender	<u>Social support as a moderator between maltreatment and depressive symptomatology B(95%CI) p-value:</u> [Pre-Care maltreatment]: Other or mixed race: -.124(-.462,.214), $p=.472$, Caucasian: .123(-.104,.351), $p=.287$, African American (ref), Female: .572(.361, .783), $p=.000$, Male (ref),

						Number of types of maltreatment experienced: .217(.127-.307), $p=.000$, Social support: -.437(-.629, .244), $p=.000$, Social support x maltreatment: .119(.013, .225), $p=.027$ [During-care maltreatment]: Other or mixed race: -.093(-.431, .246), $p=.592$, Caucasian: .263(.036, .490), $p=.023$, African American: (ref), Female: .542(.331, .754)***, Male: (ref), Number of types of maltreatment experienced: .269(.173, .364), $p=.000$, Social support: -.389(-.540, .237), $p=.000$, Social support x maltreatment: .147(.041, .252), $p=.007$
Scholte et al. (2000). The Netherlands	Exploring factors governing successful residential treatment of youngsters with serious behavioral difficulties: Findings from a longitudinal study in Holland	A random sample of 200 juveniles (mean age 15.3, SD 1.7) with serious behavioral difficulties admitted for residential treatment	This sample represents adolescents admitted to institutions for residential treatment in the Netherlands.	χ^2 tests, t -tests	staying or prematurely dropping out of residential treatment	1. More dropouts were in residential care by a court order (33% dropouts vs 18% stayers, $\chi^2=3.91$, $df=1$, $p=.05$). 2. At admission, stayers were less likely to engage in truancy and had much better relationships with teachers than the dropouts, while the dropouts had better relationships with peers, although these peers expressed higher levels of antisocial behavior compared to the peers of the stayers (all p values $<.05$, t-tests). 3. In their first half year of the stay, stayers were more often treated individually and did get more freedom, while the dropouts were subjected to highly structured daily programs. They had to obey strict rules more often and were punished more harshly. Furthermore, the stayers were much more positive about the therapeutic climate in the residential

					institution than the dropouts. They also reported good relationships with their mentors more often (all p values $<.05$, t-tests). 4. The stayers reported fewer difficulties in their relationships with their parents than the dropouts (7% vs. 24%, $\chi^2=7.0$, $df=1$, $p=.01$). 5. About 60% of adolescents reported externalizing problem behavior at a clinical level on the CBCL on admission. During the first 6 months, in the residential institution this number dropped markedly to about 40%, and it remained constant for the following 1.5 years, establishing a significant positive behavioral development trend over time ($\chi^2=11.99$, $df=2$, $p<.01$). 6. At the first follow-up, 6 months after admission, the number of adolescents expressing externalizing behavioral problems had dropped markedly among the stayers. However, the number of adolescents expressing externalizing behavioral problems had remained constant among the dropouts, which established a significant difference in numbers of adolescents expressing behavioral problems at a clinical level between both groups ($\chi^2= 4.18$, $df=1$, $p<.05$). This difference persisted in a second follow-up, 2 years after admission ($\chi^2=6.34$, $df=1$, $p<.05$). 7. About 60% of adolescents reported internalizing or emotional problems at a clinical level on admission. During their first 6 months in the residential institution this number dropped slightly and kept on dropping for the next 1.5 years to 26%,

						establishing a significant positive emotional development trend over time ($\chi^2=24.55$, $df=2$, $p<.01$). 8. At the first follow-up, 6 months after admission, the number of adolescents expressing internalizing behavioral problems had dropped among the stayers, while it had risen among the dropouts, although these differences did not establish an effect ($\chi^2=.83$, $df=1$, $p=.36$). At the second follow-up, the number of youngsters expressing internalizing problems at a clinical level in both groups had dropped markedly, with no marked differences between the groups ($\chi^2=.01$, $df=1$, $p=.94$). 8. Behaviorally problematic adolescents improved when the parents were also involved in the treatment on a regular basis (visiting the institution once a week). Among the youngsters with parents that were not involved in the treatment, only 32% improved, which is a substantial and significantly lower number ($\chi^2=4.2$, $df=1$, $p<.05$).
Scholte et al. (2006). The Netherlands	Residential treatment of adolescents with severe behavioral problems	Adolescents (mean age 14.9(1.9)) with severe behavioral problems receiving residential treatment in the Netherlands. The development of the adolescents who remained in the programs (N=78) was compared	The sample represents adolescents admitted to four different residential programs for the treatment of youngsters with severe behavioral and emotional difficulties in the Netherlands.	regression analysis	residential treatment program	<u>Program effects after 1 year as percentage of clinical change:</u> [Early leavers (reference group)]: CBCL total problems: 6%/6%, $p<.05$, CBCL externalizing: 0%/6%, $p<.05$, CBCL internalizing: 11%/17%, ns [Behavior modification program]: CBCL total problems: 11%/17%, $p<.05$, CBCL externalizing: 6%/8%, $p<.05$, CBCL internalizing: 19%/15%, ns [Psychodynamical program]:

		with the development of the adolescents who prematurely dropped out (N=20).				CBCL total problems: 14%/0%, $p<.05$, CBCL externalizing: 14%/0%, $p<.05$, CBCL internalizing: 14%/14%, ns [Structured community living program]: CBCL total problems: 50%/0%, $p<.05$, CBCL externalizing: 25%/12%, $p<.05$, CBCL internalizing: 13%/0%, ns [Adventurous learning program]: CBCL total problems: 44%/11%, $p<.05$, CBCL externalizing: 56%/11%, $p<.05$, CBCL internalizing: 22%/11%, ns
Seay et al. (2015). USA	The comorbid and individual impacts of maternal depression and substance dependence on parenting and child behavior problems	The sample (n=2204) represents CPS-involved children who remained in the home at waves 1,3, and 4.	The sample represents children reported to CPS who remained in the home at all waves of the nationally representative sample of NSCAW.	repeated measures logistic regression with generalized estimating equations (GEE)	Maternal substance abuse, maternal depression, comorbidity, child age, child gender, mother age, mother race, mother education, family income, most serious maltreatment type, wave of measurement	<u>Child behavior problems on comorbidity (of maternal substance abuse and depression): $b(SE)$, Z, 95%CI:</u> [Total CBCL scale on comorbidity]: Substance dependence only: 1.68(.24), $Z=3.67^{**}$, (1.27, 2.22), Depression only: 1.47(.06), $Z=9.31^{***}$, (1.36, 1.60), Comorbidity: 1.36(.16), $Z=2.67^{**}$, (1.09, 1.70), Child age: 1.03(.01), $Z=4.69^{***}$, (1.02, 1.04), Child gender: .91(.03), $Z=-2.45^*$, (.85, .98), Mother age: 1.00(.00), $Z=-1.03$, (.99, 1.00), Mother race: .85(.03), $Z=-4.29^{**}$, (.79, .92), Mother education: .87(.04), $Z=-3.28^{**}$, (.81, .95), Family income: .92(.03), $Z=-2.16^*$, (.86, .99), Most serious maltreatment-Sexual abuse: .94(.05), $Z=-1.06$, (.85, 1.05), Most serious maltreatment-Failure to provide: .89(.05), $Z=-2.03^*$, (.80, .996), Most serious maltreatment-Failure to supervise: .85(.04), $Z=-3.37^{**}$, (.77, .93),

						Most serious maltreatment-Other maltreatment: .86(.06), $Z=-2.27^*$, (.76, .98), Wave 2: .93(.02), $Z=-3.17^{**}$, (.89, .97), Wave 3: .90(.02), $Z=-4.83^{***}$, (.86, .94)
Shabat et al. (2008). USA	Exploring the relationship between conduct disorder and residential treatment outcomes	The sample consists of children and adolescents (n=457, ages 6-20) in 50 residential treatment centers and group homes across the state of Illinois, USA.	The sample represents children and youth in residential treatment centers and group homes across the state of Illinois, USA.	MANCOVA, chi-square test, ANCOVA		<u>Adjusted Mean change in CFARS items:</u> [Non-Conduct disorder group: Pre Mean/Post Mean, t, p]: Depression: 4.46/4.25, $t=1.63$, $p=.104$, Traumatic stress: 3.64/3.82, $t=-1.41$, $p=.161$, Overall mental health: 3.34/3.38, $t=-.46$, $p=.644$, Anxiety: 3.13/3.34, $t=1.96$, $p=.052$, Behavior in home: 4.54/4.53, $t=.09$, $p=.931$, Danger to self: 2.77/2.71, $t=.41$, $p=.680$, Hyperactivity: 3.82/3.90, $t=-.65$, $p=.514$, Socio-legal: 3.51/3.55, $t=-.27$, $p=.791$, Substance use: 2.27/2.28, $t=-.04$, $p=.969$, Danger to others: 3.56/3.38, $t=1.12$, $p=.262$ [Conduct disorder group: Pre Mean/Post Mean, t, p]: Depression: 3.85/3.44, $t=2.19$, $p=.032^*$, Traumatic stress: 3.50/3.21, $t=1.25$, $p=.216$, Overall mental health: 3.51/3.19, $t=2.34$, $p=.021^*$, Anxiety: 2.84/2.93, $t=-.51$, $p=.611$, Behavior in home: 4.57/4.24, $t=1.31$, $p=.192$, Danger to self: 2.71/2.46, $t=1.17$, $p=.247$, Hyperactivity: 3.70/3.63, $t=.31$, $p=.757$, Socio-legal: 4.92/4.53, $t=1.52$, $p=.132$, Substance use: 2.92/2.53, $t=1.64$, $p=.106$, Danger to others: 4.30/3.79, $t=1.92$, $p=.059$
Shook et al. (2011). USA	Patterns of Mental Health, Substance abuse, and Justice System	The sample consists of all children	The sample represents children aging out of child	2-step cluster analysis, ANCOVA	number of placements, years in placement, time in foster care, time in congregate care, age at	<u>Involvement in the systems: Mental Health, Drug and Alcohol, Juvenile Justice, and Criminal Justice:</u>

	involvement among youth aging out of child welfare	born between 1985 and 1994 whose families received in-home services from the child welfare system or who were placed in out-of-home care for any length of time in Allegheny County, PA, or both. The overall birth cohort includes 42,735 children from 23,754 families. Of this group, 9703 children were in an out-of-home placement for some period of time.	welfare services in Allegheny County, Pennsylvania, U.S.		aging out, mental health services intensity	[5 clusters]: 1. Low involvement (16%; n=207) 2. Mental health only (31%; n=394) 3. Mental health and Drug and alcohol only (22%; n=279) 4. Mental health and Juvenile justice (14%; n=181) 5. Mental health and Criminal justice (17%; n=211) [Estimated Marginal Means for ANCOVA Cluster Group Comparisons]: Low involvement group: No. of placements***: 6.17_a Years in placement**: 4.42_a % Time in foster care***: 73_a % Time in congregate care***: 19_a Age at aging out***: 18.16_a Mental health only group: No. of placements***: 6.83_a Years in placement**: 5.10_b % Time in foster care***: 55_b % Time in congregate care***: 36_b Age at aging out***: 18.22_a MH services intensity factor***: 3.12_a Mental health and Drug and alcohol group: No. of placements***: 8.33_b Years in placement**: 4.36_a % Time in foster care***: 40_c % Time in congregate care***: 51_c Age at aging out***: 18.16_a MH services intensity factor***: 3.52_b Mental health and Juvenile justice group: No. of placements***: 10.11_c Years in placement**: 4.47_a % Time in foster care***: 42_c

						% Time in congregate care***: 44_d Age at aging out***: 18.00_b MH services intensity factor***: 3.59_b Mental health and Criminal justice group: No. of placements***: 8.44_b Years in placement***: 4.32_a % Time in foster care***: 42_c % Time in congregate care***: 47_{c,d} Age at aging out***: 18.01_b MH services intensity factor***: 3.24_{a,b} <i>Note:</i> Numbers with different subscripts are significantly different from each other based on pairwise comparisons using Bonferroni adjustment.
Sinclair et al. (2016). UK	Multidimensional treatment foster care in England: differential effects by level of initial antisocial behavior	Hard-to-manage young people (aged 10-16) in English foster or residential homes. 88 for MTFC and 83 for usual care	The sample represents "hard to manage" youth in English foster care.	bivariate comparisons, regression, propensity weighing, doubly robust estimation and mediation analysis	Multi-dimensional Treatment Foster Care (MTFC)	<u>Outcome: CGAS (change t2-t1):</u> Antisocial group: $t=9.36^{***}$, Less antisocial group: $t=-.81$, Total: $t=6.93^{***}$ <u>Outcome: CGAS predictors (β):</u> [High anti-social group]: Risk: $-.350^{**}$, Offending: $-.061$, Mental health problems: $-.443^{***}$, CGAS t1: $-.248^*$ [Low anti-social group]: Risk: $-.286$, Offending: $-.123$, Mental health problems: $-.316$, CGAS t1: $.159$ [Total]: Risk: $-.254^*$, Offending: $-.052$, Mental health problems: $-.337^{***}$, CGAS t1: $-.141$
Stiles et al. (2019). USA	Examining bidirectional associations between school engagement	2633 children in contact with the CWS	Nationally representative for the full population of children	Structural equation modeling, autoregr	school engagement, prior levels of problem behavior	<u>Internalizing symptoms and school engagement (β):</u> Int Baseline -> Int 18 mos. ($.59^{***}$),

	and mental health for youth in child welfare	(mean age 10.04)	and families entering the child welfare system (NSCAW Research Group, 2002).	essive cross-lagged model		Int 18 mos. -> Int. 36 mos. (.60***), Int Baseline -> SE 18 mos. (-.09*), Int. 18 mos. -> SE 36 mos. (-.08*), SE Baseline -> Int. 18 mos (-.05), SE 18 mos -> Int. 36 mos (-.07), SE Baseline -> SE 18 mos (.41***), SE 18 mos -> SE 36 mos (.45***) <u>Externalizing symptoms and school engagement (β):</u> Ext Baseline -> Ext 18 mos (.66***), Ext. 18 mos -> Ext. 36 mos. (.72***), Ext Baseline -> SE 18 mos (-.13***), Ext. 18 mos -> SE 36 mos (-.11***), SE Baseline -> Ext. 18 mos (-.06), SE Baseline -> SE 18 mos (-.39***), SE 18 mos -> SE 36 mos (.43***), SE 18 mos -> Ext 36 mos (-.05)
Stoner et al. (2015). USA	Predictors of reduction in symptoms of depression for children and adolescents in foster care	228 foster care youth (ages 4-20) (mean age=11.79 years, sd=3.99)	The sample represents children and adolescents who exhibit significant depressive symptoms in foster care served in community settings	Optimal Data analysis	Ecological systems variables (Psychosis, attention problems, depression, oppositional behavior, antisocial behavior, substance abuse, adjustment to trauma, attachment, situational consistency, temporal consistency, danger to self, danger to others, elopement, sexually abusive behavior, social behavior, crime/delinquency, intellectual functioning, physical functioning, family functioning, school functioning, sexual development, monitoring in care, treatment, transportation in care, service permanence, behavioral health of caregiver, supervision of caregiver, caregiver involvement with care,	<u>Outcome: Reduction of depression:</u> Psychosis (.933), Attention problems (<.001), Depression (<.001***), Oppositional behavior (<.001***), Antisocial behavior (.018*), Substance abuse (.026*), Adjustment to trauma (<.001***), Attachment (<.001**), Situational consistency (.009**), Temporal consistency (.013*), Danger to self (.001**), Elopement (<.001***), Sexually abusive behavior (.105), Social behavior (<.001***), Crime/delinquency (.035*), Intellectual functioning (.072), Physical functioning (.204),

					caregiver knowledge, caregiver organization, caregiver resources, caregiver residential stability, family strengths, interpersonal strengths, relationship permanence, educational strengths, vocational strengths, well-being, spiritual strengths, talents, inclusion)	Family functioning (<.001***), School functioning (<.001***), Sexual development (.056), Monitoring in care (<.001***), Treatment (<.001***), Transportation in care (.001**), Service permanence (.045*), Behavioral health of caregiver (.651), Supervision of caregiver (.001**), Caregiver involvement with care (.007**), Caregiver knowledge (.006**), Caregiver organization (.057), Caregiver resources (.182), Caregiver residential stability (.060), Caregiver safety (1.000), Family strengths (.001**), Interpersonal strengths (<.001***), Relationship permanence (.001**), Educational strengths (.001**), Vocational strengths (.146), Well-being (<.001***), Spiritual strengths (.925), Talents (.004**), Inclusion (<.001***)
Strickler et al. (2016). USA	Relationship between time in residential treatment and youth outcomes: Results from a cross-site 5-year analysis	716 youths discharged from Residential treatment centers.	The analyzed data is archived from four residential treatment centers located throughout the state of West Virginia.	segmented regression analyses	Child and Adolescent Functional Assessment scale score, school/work functioning, home, behavior towards others, moods/emotions, substance use, restrictiveness of living environment	<u>Predictors of time in treatment (B, t, p-value):</u> [Group 1: Shorter time in treatment: 30-183 days] CAFAS (Child and Adolescent Functional Assessment Scale) total: .21, 4.87, $p<.001$, School/work: .16, 3.79, $p<.001$, Home: .22, 5.04, $p<.001$, Behavior towards others: .15, 3.53, $p<.001$, Moods/emotions: .12, 2.95, $p=.003$, Substance use: .03, .75, $p=.46$, ROLES (Restrictiveness of Living Environment Scale) scores: .03, 8.75, $p<.001$ [Group 2: Middle time in treatment: 184-304 days]

						CAFAS total: -.02, -.39, $p=.70$, School/work: -.07, -1.48, $p=.14$, Home: -.01, -.15, $p=.88$, Behavior towards others: -.01, -.25, $p=.80$, Moods/emotions: -.02, -.37, $p=.71$, Substance use: -.04, -.85, $p=.40$, ROLES scores: -.03, -.60, $p=.55$) [Group 3: longer time in treatment: 305-537 days] CAFAS total: -.10, -2.23, $p=.03$, School/work: -.02, -.57, $p=.57$, Home: -.08, -1.92, $p=.06$, Behavior towards others: -.05, -1.21, $p=.23$, Moods/emotions: -.12, -2.78, $p=.006$, Substance use: -.10, -2.35, $p=.02$, ROLES scores: -.08, -2.03, $p=.04$
Sullivan et al. (2010). USA	School change, academic progress, and behavior problems in a sample of foster youth	159 youths in foster care (retrospective data) (mean age= 15.4, SD=1.3)	The sample represents youth who had been in foster care.	multivariate analysis using the Pearson Product-Moment correlation test	school change	<u>Associations between:</u> YSR(Externalizing) and ANSC (Average # of school changes per year): .213**, YSR(Externalizing) and ESC(Elementary school changes): .132, YSR(Externalizing) and HSC(High school changes): .218*, YSR(Externalizing) and TNSC(Total number of school changes): .229**, YSR(Externalizing) and AGA(Age/grade appropriateness): -.256**, YSR(Externalizing) and RG(Repeated a grade): .055, YSR-I(Internalizing) and ANSC: .113, YSR-I and ANSC: .113, YSR-I and ESC: .135, YSR-I and HSC: .183**, YSR-I and TNSC: .140***, YSR-I and AGA: -.247**, YSR-I and RG: .049, YSR-I and YSR-E: .388**, YSR Total Problems (YSR TP) and ANSC: .169*, YSR TP and ESC: .143***, YSR TP and HSC: .267**,

						YSR TP and TNSC: .128, YSR TP and AGA: -.256**, YSR TP and RG: .041, YSR TP and YSR-E: .649**, YSR TP and YSR-I: .651**, Ever been suspended (EBS) and ANSC: -.020, EBS and ESC: -.004, EBS and HSC: .050, EBS and TNSC: .004, EBS and AGA: .011, EBS and RG: -.048, EBS and RG: -.048, EBS and YSR-E: .170, EBS and YSR-I: .117, EBS and YSR-TP: .099
Symanzik et al. (2019). German y	Stability and change of attachment disorder symptoms and interpersonal problems in foster children	84 foster children (aged 2-7 years) and 146 biological children (comparison group)	The sample represents foster children in the region of Bielefeld, Aachen, and Braunschweig, Germany with a history of maltreatment and/or neglect between 2 and 7 years of age placed in foster care for a maximum of 24 months.	Pearson correlations, linear regression	type of care, time in care, age	<u>Correlations between RPQ (Relationship Problems Questionnaire) subscale to measure RAD and ACC subscale for foster children:</u> Disinhibited behavior (RPQ) and Inhibited behavior (RPQ): .40***, Disinhibited behavior (RPQ) and Total RPQ score: .88***, Disinhibited behavior (RPQ) and Pseudomature behavior (ACC): .38**, Disinhibited behavior (RPQ) and Indiscriminate behavior (ACC): .68***, Disinhibited behavior (RPQ) and Insecure behavior (ACC): .15, Disinhibited behavior (RPQ) and Total ACC score: .51***, Inhibited behavior (RPQ) and Total RPQ score: .78***, Inhibited behavior (RPQ) and Pseudomature behavior(ACC): .35*, Inhibited behavior (RPQ) and Indiscriminate behavior (ACC): .37***, Inhibited behavior (RPQ) and Insecure behavior (ACC): .41***, Inhibited behavior (RPQ) and ACC Total score: .47***, Total RPQ score and Pseudomature behavior (ACC): .44***,

						Total RPQ score and Indiscriminate behavior (ACC): .65***, RPQ score and Insecure behavior (ACC): .31, Total RPQ score and Total ACC score: .59***
Tarren-Sweeney et al. (2017). Australia	Rates of meaningful change in the mental health of children in long-term out-of-home care: a seven-to nine-year prospective study	85 children in long-term foster or kinship care	The sample represents children in long-term foster and kinship care, in New South Wales (NSW), Australia.	t-test	time in out-of-home care	<u>CBCL total problems T-score (7-year follow up group/9-year follow up group):</u> Baseline: 60.6(12.4)/57.9(12.7), p = .34, Follow-up: 56.8(13.0)/57.0(12.9), p = .95, Change: -3.8(12.0)/-1.0(16.0), p = .36
Taussig et al (2001). USA	Ethnic differences in risk behaviors and related psychosocial variables among a cohort of maltreated adolescents in foster care	149 participants in foster care in a Southern California county	The sample represents adolescents who have been in foster care in Southern California, USA.	ANCOVA, regression	self-esteem, involvement, parental trauma, symptomatology	<u>Risk Behavior slopes for different ethnicities (White/Hispanic/African American):</u> Self-esteem* -> Delinquency (-.28/-.44/-.08), Self-esteem* -> Sexual behaviors (-.50/-.14/.03), Self-esteem* -> Substance use (-.30/-.60/-.03), Self-esteem* -> Total risk behavior (-.70/-.85/-.08), Parental involvement* -> Delinquency (-.43/-.65/-.07), Parental involvement -> Sexual behaviors (-.72/-.62/-.17), Parental involvement -> Substance use (-.48/-.70/-.25), Parental involvement* -> Total risk behavior (-1.1/-1.3/-.33), Trauma symptomatology -> Delinquency (.57/.54/.36), Trauma symptomatology* -> Sexual behaviors (1.0/.25/-.02), Trauma symptomatology -> Substance use (.47/.80/.22), Trauma symptomatology -> Total risk behavior (1.3/1.1/.44)
Taussig (2002). USA	Risk behaviors in maltreated youth placed in foster care: a longitudinal	214 ethnically diverse youth in foster care	The sample represents adolescents who have been in	hierarchical regression analyses	age, gender, ethnicity, sexual abuse, physical abuse, neglect, total behavior problems, PPVT, Vineland, Parental	<u>Predictors of Time 2 total risk behavior (B):</u> Age: .18*, Gender: -.07,

	study of protective and vulnerability factors	in Southern California, USA.	foster care in Southern California, USA.		support, classmate support, teacher support, friend support, scholastic competence, social acceptance, athletic competence, appearance, behavioral conduct, global self-worth	Ethnic 1 (African American=0, Caucasians and Hispanics =1): .13, Ethnic 2 (Hispanics =0, Caucasians =1): -.12, Sexual abuse: -.07, Physical abuse: .08, Neglect: .15, Total behavior problems: .26*, PPVT: -.19, Vineland: .09, Parental support: -.04, Classmate support: -.34*, Teacher support: .03, Friend support: .03, Scholastic competence: .10, Social acceptance: .48*, Athletic competence: .00, Appearance: -.20, Behavioral conduct: -.36*, Global self-worth: .22
Uretsky et al. (2017). USA	Trajectory of externalizing child behaviors in a KEEP replication	65 foster and kinship parents providing care for children between the ages of 4 and 12	The sample represents children between the ages of 4 and 12 in foster care.	multilevel linear mixed modeling	KEEP intervention	<u>Mean slope for the model with time as the only predictor:</u> -.13(SE=.03) <u>Contributions of participant characteristics on the trajectory of Child behavior change for KEEP group participants β(SE):</u> Initial status: 15.77*** (3.64), Positive parenting ratio: -16.78** (5.01), Initial risk of disruption: -2.30** (.80), Intercept: -.78** (.25), Positive parenting ratio: .94* (.36), Within person: 10.56 (.59), In initial status: 5.94 (1.49), In rate of change: .02 (.01)
Van Alphen et al. (2017).	Predictors of rehospitalization for depressed adolescents admitted to acute psychiatric treatment	165 adolescents (112 females) aged 13-19 years (m=15.61, SD=1.48) admitted to an acute residential treatment program	The sample represents adolescents with emotional and behavioral difficulties in short term residential care	cox regression analyses	Age, gender, baseline and discharge depression/anhedonia/hopelessness/anxiety symptoms	<u>Results of cox regression survival analysis predicting time to rehospitalization from baseline psychiatric symptoms and change in symptoms during treatment β(SE), p-value, OR(95%CI):</u> Age: -.20 (.21), $p=.331$, .82 (.55, 1.23), Sex: .19 (.72), $p=.796$, 1.20 (.29, 4.95),

						Baseline depression symptoms: .01(.03), $p=.776$, 1.01(.95, 1.08), Baseline anhedonia symptoms: -.06(.07), $p=.365$, .94(.82, 1.08), Baseline hopelessness symptoms: .14(.08), $p=.062$, 1.15(.99, 1.34), Baseline anxiety symptoms: -.01(.03), $p=.651$, .99(.93, 1.05), Discharge depression symptoms: .02(.03), $p=.434$, 1.02(.97, 1.07), Discharge anhedonia symptoms: .08(.07), $p=.300$, 1.08(.94, 1.24), Discharge hopelessness symptoms: -.21(.08), $p=.010$, .81(.69, .95), Discharge anxiety symptoms: .03(.03), $p=.343$, 1.03(.97, 1.09)
Van Duin et al. (2017). The Netherlands	Child protection service interference in childhood and the relation with mental health problems and delinquency in young adulthood: a latent class analysis study	390 multi-problem young adult males aged 18-27 (mean age 21.7) who have been in Child Protection Services	The sample represents young multi-problem male adults in Rotterdam, Netherlands who have been involved with Child protective services in the past.	latent class analysis, one-way ANOVA, t-tests	CPS interference	<u>Latent class analysis:</u> 1. Late CPS/penal investigation group (44.9%): did not experience maltreatment or a family supervision order in childhood. They all committed at least one offence and their first offence was at age 13 or 14. Their first judicial CPS report was executed at age fifteen or older (late CPS interference) and they had a maximum of two, solely judicial, reports. 2. Early CPS/multiple investigation group (30.8%): experienced maltreatment in childhood which often resulted in at least one family supervision order pronounced by the court. They had their first report at a young age, below age 13 (early CPS interference) and had three or more CPS investigations, due to various causes, since they often committed their first offence below age thirteen. 3. Late CPS interference without investigation group (14.6%): did not experience

					any severe family problems such as maltreatment or family supervision orders. If they committed an offence, it was at age 15 or older (late CPS interference). CPS decided mostly not to investigate the child and they often did not have any reports in their record. 4. Early CPS/family investigation group (9.7%): had early CPS interference below age thirteen, due to severe family problems such as maltreatment which resulted mostly in at least one family supervision order. CPS decided to investigate their situations once or twice, which were specifically protection investigations. Participants in this group were not likely to commit any offence. <u>Comparisons between LCA class membership on current psychological functioning:</u> There was a significant difference among classes on anxious/depressive problems ($p=.035$), a borderline significant difference on intrusive problems ($p=.056$), and a significant difference on substance use ($p=.029$). The post hoc test showed that participants of the early CPS/family investigation group reported significantly more anxious/depressive problems than participants of the early CPS/multiple investigation group ($p=.022$). Moreover, the early CPS/family investigation group reported more substance abuse than the late CPS interference without investigation group ($p=.056$). No significant differences among LCA classes were found on self-reported current delinquent behavior.

Vanderfaeille et al. (2016). Belgium	Children placed in long-term family foster care: a longitudinal study into the development of problem behavior and associated factors	49 foster children (ages 6-12 years)	The sample represents all foster parents with a foster child (6-12 years) who had lived at least six months with the foster family of one foster care agency with throughout Flanders.	Reliable Change Index (RCI), Mann Whitney U tests	Global factors (e.g. socioeconomic situation), contextual factors (e.g. relationships with family members in the wider context), family factors and child factors	<u>Variables associated with increased problem behavior:</u> [Overall]: Positive parenting (U=180.50*, $p<.05$, $r=.29$) was negatively and the factors discipline (U=179.00, $p<.05$, $r=.30$), Harsh punishment (U=115.50, $p<.001$, $r=.64$) and negative control (U=133.00, $p<.01$, $r=.43$) were positively associated with a statistically significant increase in problem behavior. As distal family factor, parenting stress was positively related to the development of problem behavior (U=139.00, $p<.01$, $r=.42$). No child or contextual factor was associated with an increase in problem behavior. Nor, as a global factor, was the educational level of the foster mother associated with an increase of problem behavior. [Internalizing problem behavior]: Proximal family factors harsh punishment (U=82.50, $p<.01$, $r=.42$), inconsistent discipline (U=62.00, $p<.01$, $r=.40$) and negative control (U=74.00, $p<.05$, $r=.35$) were positively associated with an increase in internalizing problem behavior. Parenting stress was also positively associated with an increase in internalizing problem behavior (U=53.00, $p<.01$, $r=.43$). The other child, family, and contextual and global factors were not associated with an increase in internalizing problem behavior. <u>Variables associated with a decrease in problem behavior:</u> [Overall]:

					The proximal family factor, supportive parental behavior ($U=83.00$, $p<.05$, $r=.31$), and the distal family factor, parenting stress ($U=86.00$, $p<.05$, $r=.30$), were respectively positively and negatively associated with a decrease in problem behavior. No other child, family, contextual or global factor was associated with a decrease in problem behavior. [Internalizing]: The CBCL internalizing score on T1 ($U=19.50$, $p<.001$, $r=.43$) and the length of the placement ($U=49.00$, $p<.05$, $r=.29$) were associated with a statistically significant decrease in internalizing problem behavior. Foster children whose internalizing problem behavior decreased had a higher CBCL internalizing score on T1 and were placed in foster care for shorter lengths of time. No other child, family, contextual or global factor was associated with a decrease in internalizing problem behavior. [Externalizing]: The CBCL externalizing score on T1 ($U=29.50$, $p<.05$, $r=.32$) and the educational level of the foster mother ($U=24.00$, $p<.05$, $r=.36$) were associated with a significant decrease in externalizing problem behavior. Foster children whose externalizing problem behavior decreased, had a higher CBCL externalizing score on T1 and a foster mother with a lower educational level. No other child, family, contextual or global factor was associated with a decrease in externalized problem behavior.

Vidal et al. (2019). USA	Placement and delinquency outcomes among system-involved youth referred to multisystemic therapy: a propensity score matching analysis	Youth (n=740) involved in a statewide dissemination of MST (Multisystemic Therapy). Treatment n=577 and comparison n=163.	The sample represents youth who received MST treatment in Rhode Island.	cox regression model (survival analysis)	MST treatment condition, age, gender, race, probation status, out of home placement episodes count, out of home placement settings count, substantiated maltreatment history, adjudication history, juvenile placement history	<u>Model 1: (Model fit: $\chi^2=50.2(10)$, $p<.001$)</u> <u>Treatment effects on out-of-home placement HR(95%CI):</u> MST treatment condition: .61***(.45,.81), Age: .92(.82, 1.02), Female: .95(.69, 1.31), Race-Non minority: 1.14(.82, 1.57), Probation status-no: .95(.52, 1.72), Out of home placement episodes count: 1.32***(1.14, 1.53), Out of home placement settings count: 1.08***(1.03, 1.13), Substantiated maltreatment history (no): .78(.55, 1.11), Adjudication history (no): .81(.45, 1.49), Juvenile placement history (no): 1.06(.62, 1.82)
Villodas et al. (2015). USA	Long-term placement trajectories of children who were maltreated and entered the child welfare system at an early age: Consequences for physical and behavioral well-being	330 children who entered out-of-home care following a substantiated report of child abuse or neglect during infancy/early childhood	The sample represents children from the southwestern site of the Longitudinal Studies of Child Abuse and Neglect (LONGSCAN). At this site, a sample of children and caregivers was recruited from the population of children in San Diego County who had a substantiated report of abuse or neglect during an 18-month enrollment period,	latent class analysis	caregiver stability	<u>Six Latent Classes for placement types and stability:</u> 1. Adopted (32%), 2. Kinship care (15%), 3. Stable foster care (9%), 4. Stable reunified (27%), 5. Disrupted reunified (12%), 6. Unstable foster care (5%) <u>Behavioral wellbeing and placement stability:</u> After controlling for baseline externalizing problems, the odds that caregivers reported clinically elevated externalizing problems at age 12 years were approximately three to five times greater in the adopted (OR=3.67, $p=.01$, 95%CI(1.42, 9.44)), stable reunified (OR=3.18, $p=.02$, 95%CI(1.18, 8.57)), and unstable (OR=4.71, $p=.004$, 95%CI(1.63, 13.64)), trajectories relative to the stable out-of-home trajectories.

			entered the child welfare system before the age of 3.5 years, and remained in out-of-home care for at least 5 months.			After controlling for baseline internalizing problems, there were no significant differences in internalizing problems at age 12 years between children in different placement trajectories. After controlling for baseline externalizing problems, the odds of having clinically elevated externalizing problems, the odds of having clinically elevated externalizing problems at age 12 years were 5.5 and 6 times greater for children in the Unstable trajectories relative to the stable out-of-home (OR=5.51, $p=.04$, 95%CI(1.06,28.51), and stable reunified (OR:6.28*, $p=.03$, 95%CI:(1.21,32.58), trajectories, respectively. After controlling for baseline Internalizing problems, the odds of having clinically elevated Internalizing problems at age 12 years were approximately 6.5 and 7.5 times greater among children in the Unstable trajectories relative to the stable out-of-home (OR= 6.73, $p=.02$, 95%CI(1.33,33.98)), and stable reunified (OR=7.47, $p=.02$, CI:(1.48, 37.79), trajectories, respectively.
Vis et al. (2016). Norway	Social functioning and mental health among children who have been living in kinship and non-kinship foster care: Results from an 8-year follow-up with a Norwegian sample	233 children who had been living in foster care (mean age= 17.4, SD= 2.9)	The sample represents children who have been living for more than 12 months in foster care by recruitment in Norway.	linear mixed model analysis	age, gender, foster care characteristics (kinship care, foster parents' education, foster care away from local community)	<u>Predictors of prevalence (t):</u> [Total problems T2]: Age: -.5, Gender: 5.1, Kinship care: 1.9, Foster parents' education: 6.1, Foster care away from local community: -11.5* <u>Predictors of change in symptomatology from T1 to T2:</u> [Total problems T2-T1]: Age: .9, Gender: 10.2*, Kinship care: -5.0, Foster parents' education: 8.7*,

						Foster care away from local community: -7.5
Wade et al. (2018). Romania	Effect of foster care intervention on trajectories of general and specific psychopathology among children with history of institutional rearing: a Randomized Clinical trial	220 children in institutional care in Bucharest, Romania randomized to a care as usual group (CAUG) or a foster care group (FCG). A matched sample of a never-institutionalized group (NIG) was recruited to serve as a comparison group as well.	The sample represents children in 6 institutions in Bucharest, Romania.	latent bifactor model	Intervention: institutionally reared children randomized to high-quality foster homes	<u>Latent growth model of overall behavioral problems (foster care group):</u> <u>Intercept(95%CI):</u> 8 years: .30(.04,.53)***, 12 years: .18(-.01, .37)***, 16 years: .07(-.18, .29)***, Slopes ages 8-16: -.12(-.26, .04) <u>Latent growth model of internalizing problems (foster care group):</u> <u>Intercept(95%CI):</u> 8 years: -.11(-.36, .11), 12 years: -.05(-.21, .11), 16 years: .03(-.21, .25), Slopes ages 8-16: .06(-.11, .24) <u>Latent growth model of externalizing problems (foster care group):</u> <u>Intercept(95%CI):</u> 8 years: -.17(-.36 to .07), 12 years: -.25(-.42, -.06)**, 16 years: -.08(-.26, .08)
Williams-Butler (2018). USA	Reducing delinquency among African American youth in foster care: Does gender make a difference in crossover prevention?	534 African American adolescents in foster care between the ages of 13 and 18 at baseline.	The sample represents African American adolescents in foster care.	ordinal regression	age, gender, neglect & any form of abuse combined, no stable relationships, at least one stable relationships, stable relationships, positive change in relational permanence over time, severe problems/more than a year behind, failing some subjects in school, doing moderately well in school, severely limited caregiver resources, limited caregiver resources, necessary caregiver resources, low number (<9) of placement changes (time 1), less time (<7 years) in care (time 1), time between assessment in months	<u>Ordinal regression predicting the reduced risk of delinquency:</u> <u>B(SE):</u> Age: -.73**(14), Gender: -6.12(4.03), Neglect & any form of abuse combined: -.18(.39), No stable relationships: -1.98(1.35), At least one stable relationship: -1.66(1.17), Stable relationships: -2.51*(1.18), Positive change in relational permanence over time: -.18(.39), Severe problems/more than a year behind: -.23(.56), Failing some subjects in school: .34(.46), Doing moderately well in school: .45(.44), Severely limited caregiver resources: -.42(.70), Limited caregiver resources: -.68(.48), Necessary caregiver resources: .03(.42),

						Low number (<9) of placement changes (time 1): -.32(.37), Less time (<7 years) in care (time 1): 1.44**(.37), Time between assessments in months: .06(.03), Gender x age: .50*(.21), Gender x neglect & any form of abuse combined: -.54(.92), Gender x no stable relationships: 2.16(1.88), Gender x at least one stable relationship: 1.42(1.65), Gender x stable relationships: 2.07(1.68), Gender x maintained relational permanence over time: -.75(.61), Gender x severe problems/more than a year behind: -2.16*(.92), Gender x failing some subjects in school: -1.34(.79), Gender x doing moderately well in school: -1.27(.75), Gender x severely limited caregiver resources: -.09(1.03), Gender x limited caregiver resources: -1.01(.80), Gender x necessary caregiver resources: -1.29*(.65), Gender x high number (>9) of placement changes (time 1): -.14(.58), Gender x longer time > 7 years in care (time 1): -1.54(.58), Gender x time between assessments in months: -.04(.04)
Williams-Butler et al. (2018). USA	Relational permanence and psychological well-being among African American Adolescents in Foster Care	534 African American adolescents (13-18 years) (m= 16 years)	The sample represents African American adolescents in foster care in Cook County, Illinois, USA.	Ordinal regression	age, gender, neglect & any form of abuse combined, relational permanence, positive change in relational permanence over time, school achievement, caregiver resources, low number (<9) of placement changes, less time (<7 years in care), time between assessments in months, interactions with gender and age/neglect&any form of abuse combined/relational	<u>Predictors of reduced risk of delinquency B(SE):</u> Age: -.73**(.14), Gender: -6.12(4.03), Neglect & any form of abuse combined: -.18(.39), No stable relationships at time 1: -1.98(1.35), At least one stable relationship at time 1: -1.66(1.17), Stable relationships at time 1: -2.51*(1.18), Positive change in relational permanence over time: -.18(.39),

					permanence/academic achievement/caregiver resources Severe problems/more than a year behind in school: -.23(.56), Failing some subjects in school: .34(.46), Doing moderately well in school: .45(.44), Severely limited caregiver resources at time 1: -.42(.70), Limited caregiver resources at time 1: .68(.48), Necessary caregiver resources at time 1: .03(.42), Low number (<9) of placement changes at time 1: -.32(.37), Less time (<7 years) in care at time 1: 1.44**(.37), Time between assessments in months: .06(.03), Gender x age: .50*(.21), Gender x neglect & any form of abuse combined: -.54(.92), Gender x no stable relationships: 2.16(1.88), Gender x at least one stable relationship: 1.42(1.65), Gender x stable relationships: 2.07(1.68), Gender x maintained relational permanence over time: -.75(.61), Gender x severe problems/more than a year behind: -2.16*(.92), Gender x failing some subjects in school: -1.34(.79), Gender x doing moderately well in school: -1.27(.75), Gender x severely limited caregiver resources: -.09(1.03), Gender x limited caregiver resources: -1.01(.80), Gender x necessary caregiver resources: -1.29(.65), Gender x high number (>9) of placement changes (time 1): -.14(.58), Gender x longer time >7 years in care at time 1: -1.54**(.58), Gender x time between assessments in months: -.04(.04)

Wu et al. (2015). USA	Effects of kinship care on behavioral problems by child age: a propensity score analysis	584 children in kinship care with those of 470 children in non-kinship care	Nationally representative for the full population of children and families entering the child welfare system (NSCAW Research Group, 2002).	logistic regression	kinship care	<u>Average treatment effect of kinship care on child behavior problems (all ages):</u> [Total]: Kinship care: -5.1*, Wave 1 outcome: .73***, Intercept: 18.52***
Wu (2017). USA	The relationship between kinship diversion and child behavior problems	The analytic sample involved children in child welfare services investigation who were removed from the home and placed in public (paid) kinship care, voluntary care, or private kinship care. The final sample included 654 children who were living in kinship arrangements following a substantiated maltreatment report at Wave 1.	Nationally representative for the full population of children and families entering the child welfare system (NSCAW Research Group, 2002).	ordinary least square (OLS) regression analysis	private kinship care, voluntary kinship care, baseline internalizing score, female, child age, race, child disability, neglect-failure to provide, neglect-lack of supervision, sexual abuse, domestic violence, exposed infant, parent substance abuse, other abuse types, caregiver race, caregiver married, caregiver employment, caregiver <=100% poverty line, number of children in household, caseworker younger than 35 years, caseworker gender, caseworker race, caseworker master's degree or higher education, caseworker years of child welfare work, numbers of contacts with supervisor per month, assessment: moderate or severe level of harm to child, assessment: moderate or severe level of risk	<u>Predictors of total child behavior problems β(SE):</u> Private kinship care: -5.72(1.91)**, Voluntary kinship care: -1.35(1.53), Baseline total score: .41(.08)***, Female: -1.43(1.54), Child age: -.06(.235), Race-white: .70(2.92), Race-Hispanic: -.39(2.81), Race-others: 3.00(4.39), Child disability: 1.78(2.53), Neglect-failure to provide: 1.97(3.87), Neglect-lack of supervision: 4.06(3.24), Sexual abuse: 1.54(3.94), Domestic violence: -5.36(3.28), Exposed infant: 2.46(3.3), Parent substance abuse: -2.13(3.48), Other abuse types: .66(4.27), Caregiver race-White: -.13(3.00), Caregiver race-Hispanic: -3.23(3.11), Caregiver race- Others: -2.31(4.08), Caregiver married: -2.16(2.07), Caregiver employment: .26(1.82), Caregiver <=100% poverty line: .40(2.05), Number of children in household: -.41(.6), Caseworker younger than 35 years: 1.49(1.93), Caseworker female caseworker: 1.03(2.03),

						Caseworker white: - 3.42(2.33), Caseworker Hispanic: -.52(2.31), Caseworker others: 8.33(4.49), Caseworker master's degree or higher education: -.85(1.72), Caseworker years of child welfare work: .03(.14), Numbers of contacts with supervisor per month: -.12(.08), Assessment: moderate or severe level of harm to child: -3.57(2.69), Assessment: moderate or severe level of risk: .88(4.12)
Yampolskaya et al. (2012). USA	Effects of mental health disorders on the risk of juvenile justice system involvement and recidivism among children placed in out-of-home care	All children in Florida aged 7-17 years who were investigated for maltreatment and subsequently placed in out-of-home care.	The sample represents maltreated children placed in out-of-home care in Florida.	cox regression (proportional hazards modeling), multivariate logistic regression analysis	mental health disorder (depression conduct disorder, attention-deficit disorder, bipolar disorder, substance abuse disorder, posttraumatic stress disorder, comorbidity (multiple disorders), male, age, African American, Hispanic, type of abuse (abuse, neglect), caregiver absence, number of out of home placements	<u>Factors associated with time to involvement with the juvenile justice system among children in out-of-home care: Multivariate model B, Wald χ^2, OR(95%CI):</u> Depression: B=.54, $\chi^2=5.03^*$, OR: 1.72(1.07, 2.76), Conduct disorder: B=1.62, $\chi^2=74.29^{**}$, OR: 5.07(3.51, 7.32), Attention-deficit disorder: B=.67, $\chi^2=8.98^{**}$, OR: 1.94(1.26, 3.00), Bipolar disorder: B=.62, $\chi^2=4.97^*$, OR: 1.86(1.08, 3.20), Substance abuse disorder: B=.62, $\chi^2=4.65^*$, OR: 1.85(1.06, 3.22), Posttraumatic stress disorder: B=-1.13, $\chi^2=8.25^{**}$, OR: .32(.15, .70), Comorbidity: B=-.45, $\chi^2=2.57$, OR: .64(.36, 1.11), Male: B= .56, $\chi^2=19.80^{**}$, OR: 1.76(1.37, 2.25), Age: B=.33, $\chi^2=160.56^{**}$, OR: 1.40(1.33, 1.47), African American: B=.31, $\chi^2= 6.16^*$, OR: 1.36(1.07, 1.74), Hispanic: B=.08, $\chi^2=.12$, OR: 1.08(.69, 1.72), Abuse: B=.02, $\chi^2= .02$, OR:1.02(.72, 1.47),

						Neglect: $B=.15$, $\chi^2=.71$, OR: 1.16(.82, 1.64), Caregiver absence: $B=.60$, $\chi^2=7.63^*$, OR: 1.81(1.19, 2.76), Number of out-of-home placements: $B=.12$, $\chi^2=456.19^{**}$, OR: 1.12(1.11, 1.13) <u>Predictors of recidivism among children involved with the juvenile justice system: Multivariate logistic regression model</u> <u>B, χ^2, OR(95%CI):</u> Presence of any mental health disorder: $B=.59$, $\chi^2=4.74^*$, OR: 1.81(1.05, 3.09), Male: $B=.10$, $\chi^2=.13$, OR: 1.10(.64, 1.89), Age: $-.05$, $\chi^2=.45$, OR: .95(.81, 1.11), African American: $B=-.01$, $\chi^2=2.57$, OR: .99(.58, 1.69), Hispanic: $B=-.86$, $\chi^2=2.57$, OR: .43(.15, 1.21), Abuse: $B=.02$, $\chi^2=.01$, OR: 1.02(.44, 2.33), Neglect: $B=.44$, $\chi^2=1.05$, OR: 1.55(.67, 3.58), Caregiver absence: $B=.06$, $\chi^2=.02$, OR: 1.07(.39, 2.91)
Yampolskaya et al. (2019). USA	Trajectories of substance use among child welfare-involved youth: Longitudinal associations with child maltreatment history and emotional/behavior problems	625 youth from ages 11-17 years (about 14 years, $m=14.32$, $SD=1.74$) investigated for maltreatment	Nationally representative for the full population of children and families entering the child welfare system (NSCAW Research Group, 2002).	MLGM (multilevel latent growth mixture modeling)	age, gender, race/ethnicity, type of maltreatment, abandonment, internalizing behaviors, externalizing behaviors, out-of-home placement	<u>Predictors for class 1(9%: Rapid progression use) Intercept/Slope β(SE):</u> Age: $.15(.88)/.18^*(.04)$, Gender: 18.09*(3.97)/-.75*(.18), Race- Black: - 20.11*(3.08)/.64*(.12), Race- White: - 15.34*(2.40)/.20(.15), Race- Hispanic: 5.33(7.78)/-.44(.28), Threatened harm: - 23.51*(3.93)/.97*(.27), Neglect: 10.20*(1.53)/-.72(.09), Physical abuse: - 4.92*(1.49)/-.31(.19), Abandonment: - 3.50*(10.06)/-.28(.31), Internalizing behaviors: -.11*(.26)/.07*(.01), Externalizing behaviors: 1.41*(.23)/-.05*(.01), Out-of-home placement: 18.48(2.91)*/- .70*(.08)

						<u>Predictors for class 2(91%: High stable substance use)</u> <u>Intercept/Slope β(SE):</u> Age: .19(.13)/-.01(.01), Gender: - 1.27*(.47)/.03(.06), Race- Black: -.56(.64)/.02(.05), Race- White: -.95(.49)/.02(.06), Race- Hispanic: 1.88*(.76)/-.03(.11), Threatened harm: - 2.31*(1.11)/.07(.05), Neglect: - 3.52*(.67)/.11*(.05), Physical abuse: - 1.84*(.82)/-.01(.05), Abandonment: - 7.43*(2.61)/.07(.10), Internalizing behaviors: -.09*(.02)/.01(.01), Externalizing behaviors: .12*(.02)/.01(.01), Out-of-home placement: -.62(.59)/.09(.05)
Yoon (2017). USA	Child maltreatment characteristics as predictors of heterogeneity in internalizing symptoms trajectories among children in the child welfare system	541 children who were involved with the child welfare system	Nationally representative for the full population of children and families entering the child welfare system (NSCAW Research Group, 2002).	Growth mixture modelling, latent growth curve analysis	Gender, race, poverty level, out-of-home placement, behavioral health services, maltreatment characteristics, type of maltreatment	<u>Internalizing trajectory groups:</u> 1. High-decreasing (9%) 2. Low-increasing (16%) 3. Low-stable (75%)
Yoon et al. (2017). USA	Co-development of internalizing and externalizing behavior problems during early childhood among child welfare-involved children	329 child welfare-involved children followed from age 2 years to 5 years	Nationally representative for the full population of children and families entering the child welfare system (NSCAW Research Group, 2002).	Parallel-process latent growth curve modelling	Type of maltreatment, intimate partner violence, caregiver characteristics (mental health, alcohol use, drug use, education), out-of-home placement, insecure attachment, gender, race,	<u>Predictors of internalizing symptoms (B, 95%CI):</u> <i>Intercept:</i> Physical abuse: .78(-2.11, 3.66) Emotional abuse: -.92(-5.24, 3.39) Neglect: 2.42*(.24, 4.59) Intimate partner violence: 4.63** (1.62, 7.64) Caregiver mental health: 3.56*(.67, 6.45) Caregiver alcohol use: -.75(-4.96, 3.47) Caregiver drug use: -2.61(-5.41, .18)

					Out-of-home placement: 4.17**(1.79, 6.56) Insecure attachment: .50***(.27, .72) Female: -1.59(-3.27, .54) Race Black: 3.37*(.78, 5.96) Race Hispanic: 1.83(-.79, 4.46) Other race: 5.58(.44, 10.73) Caregiver education less than high school: .59(-2.31, 3.49) Caregiver education high school: 1.21(-1.29, 3.70) <i>Slope:</i> Physical abuse: -.50(-1.93, .93) Emotional abuse: .43(-1.58, 2.45) Neglect: -.89(-1.96, .18) Intimate partner violence: -1.42(-2.95, .11) Caregiver mental health: -.12(-1.52, 1.28) Caregiver alcohol use: -1.44(-3.58, .70) Caregiver drug use: 2.07**(.72, 3.41) Out-of-home placement: -1.41*(-2.55, -.27) Insecure attachment: -.07(-.18, .05) Female: .19(-.84, 1.22) Race Black: -1.22(-2.54, .10) Race Hispanic: -.57(-1.84, .71) Other race: -2.83*(-5.15, -.52) Caregiver education less than high school: 1.47*(.03, 2.92) Caregiver education high school: .41(-.83, 1.64) <u>Predictors of externalizing symptoms (B, 95%CI):</u> <i>Intercept:</i> Physical abuse: 2.25(-.88, 5.38) Emotional abuse: -2.17(-6.87, 2.53) Neglect: 3.63**(1.27, 5.99) Intimate partner violence: 6.24*** (2.77, 9.71) Caregiver mental health: 3.80*(.68, 6.92)

						Caregiver alcohol use: -3.66(-8.38, 1.07) Caregiver drug use: -1.87(-4.97, 1.23) Out-of-home placement: 2.46(-.13, 5.05) Insecure attachment: .55***(.30, .80) Female: -2.79*(-5.10, -.49) Race Black: 3.09(.28, 5.90) Race Hispanic: 1.12(-1.74, 3.98) Other race: 5.64*(.03, 11.25) Caregiver education less than high school: 1.66(-1.48, 4.80) Caregiver education high school: 1.63(-1.07, 4.34) <i>Slope:</i> Physical abuse: .11(-1.32, 1.54) Emotional abuse: .61(-1.42, 2.63) Neglect: -.05(-1.12, 1.02) Intimate partner violence: -1.83*(-3.41, -.25) Caregiver mental health: -.37(-1.73, 1.00) Caregiver alcohol use: -.54(-2.64, 1.57) Caregiver drug use: 1.12(-.20, 2.44) Out-of-home placement: -.76(-1.89, .38) Insecure attachment: -.03(-.14, .08) Female: -.14(-1.17, .89) Race Black: -1.11(-2.42, .21) Race Hispanic: -.79(-2.06, .49) Other race: -4.23***(-6.58, -1.88) Caregiver education less than high school: -.59(-2.03, .85) Caregiver education high school: -.94(-2.18, .29)
Yoon (2018). USA	Fostering resilient development: Protective factors underlying externalizing trajectories of maltreated children	449 young maltreated children (aged 4-5)	Nationally representative for the full population of children and families entering the child	Latent class growth analysis	Maltreatment factors, protective factors (prosocial skills, caregiver well-being), gender, race, caregiver employed	<u>Externalizing trajectory groups:</u> 1. High-decreasing (10%) 2. Moderate-increasing (13%) 3 Low-stable (77%)

			welfare system (NSCAW Research Group, 2002).			
Zimmerman et al. (2000). USA	An evaluation of residential treatment for youth with mental health and delinquency-related problems	27 youth (11-15 years) with histories of behavioral and emotional disturbance.	The sample represents adolescents in residential treatment with histories of mental health and delinquency-related problems.	t-tests	Residential treatment	<u>T-tests for behavior problem scores over time:</u> [Total behavior problems]: Baseline to 3 mos: $t=1.72$, $p<.10$, Baseline to 7.5 mos: $t=.80$, $p=ns$, Baseline to 12 mos: $t=.18$, $p=ns$, Baseline to final measure: $t=.03$, $p=ns$, 3 mos to 7.5 mos: $t=.70$, $p=ns$, 7.5 mos to 12 mos: $t=.91$, $p=ns$

Appendix C. Details of other datasets considered

As a student researcher in the United Kingdom, I had initially hoped to carry out my analyses with a UK dataset and to influence and inform research and practice in the UK. However, a dataset that had a large enough sample size of children in out-of-home care that also included data on behavior problems could not be identified. After much investigation, I decided to apply for access into the US national dataset, National Survey of Child and Adolescent Well-Being (NSCAW). Below is a list of datasets that were identified and eliminated. The first four datasets described (#1-4) are from England.

Before settling on the NSCAW, many existing datasets including administrative data in the UK, Finland, Australia, and the US were explored. These datasets were concluded to be inadequate for the aims of this thesis, due to small sample size, lack of information on problem behavior variables, or reasons for care entry. Consultations with US colleagues (meeting with Dr. Fred Wulczyn at Chapin Hall, University of Chicago and email correspondences with Professor Joe Ryan at the University of Michigan, Professor Bethany Lee at University of Maryland, and Jennifer Rolls-Reutz at California Evidence-Based Clearinghouse (CEBC)) opened possibilities of the NSCAW dataset. NSCAW is a longitudinal dataset, which records information on a sample of randomly selected children and caregivers who have been the subject of a child protection investigation in the USA. A sample of these children are in out-of-home care. This dataset was particularly attractive for this study as it includes extensive information about children's mental health and well-being, including level of behavior problems, presence of post-traumatic stress symptoms, neighborhood characteristics, and daily adaptive functioning. Limitations of the dataset are outlined in the methodology chapter.

Databases that include children in out-of-home care:

1. Data from Children's Social Care (CSC) – Children Looked After (CLA)

Data from Children's Social Care holds information on Children-Look-After (CLA) in England. It was ruled out for the analyses of this thesis because it did not have information on socioemotional or problem behavior measures. The Children Looked After (CLA) data includes the Strengths and Difficulties Questionnaire (SDQ), but only for children who have been in out-of-home care for 12 months or more.

2. The British Cohort Study (BCS70)

The British Cohort Study (BCS70) began following children from when they were born in England in the 1970 and is still ongoing until this day. The sample includes approximately 430 adults (age 30) who have been in out-of-home care at some point in their lives. It was ruled out for this thesis because significant limitations have been identified by existing research studies that have already conducted research with this data (e.g., non-ignorable attrition) (Cheesbrough, 2001). Its historical characteristic may also limit the relevance of the analyses to present contexts (Dregan, Brown, & Armstrong, 2011).

3. Millennium Cohort Study (MCS)

The Millennium Cohort Study (MCS) follows children from when they were born in England in the year 2000 to the present. The sample includes approximately 40 children (age 17) who had been in out-of-home care at some point in their lives. The MCS was therefore ruled out for this thesis because this was not considered a large enough sample size to conduct any analyses.

4. Avon Longitudinal Study of Parents and Children (ALSPAC)

In the Avon Longitudinal Study of Parents and Children (ALSPAC; also known as Children of the 90s), children and their caregivers were followed from when they were born in England in the year 1991 to the present. For the ALSPAC, I explored whether I would be able to link the data to the CLA data (See #1 above) in order to achieve care-related data. Email exchanges with Dr. Alison Teyhan at the University of Bristol revealed that there were approximately 137 children who have had any experience in out-of-home care. This sample size was not considered sufficient to conduct the statistical analyses needed to answer the research questions for this thesis. Moreover, participants in out-of-home care during adolescence were able to be identified, but not earlier due to complexities in data linkages. Finally, it was unclear whether children who enter out-of-home care remain part of the study for follow-up data collections.

5. Finnish National Data

The Finnish National Data included all children born in Finland in 1987 and 1997 and their parents. This dataset included approximately 1900 children in out-of-home care, and was promising in that it included information on a range of factors, including: environmental information, developmental and psychiatric measures, and biological factors. However, the data did not include information about why the child was placed in out-of-home care. This dataset was therefore excluded for analysis since reasons for being placed in out-of-home care are known to be closely related to behavior development and may influence behavioral trajectories in ways that I would not be able to understand (McGrath-Lone, Dearden, Harron, Nasim, & Gilbert, 2017).

6. Pathways of Care Longitudinal Study (POCLS)

Pathways of Care Longitudinal Study (POCLS) is a large-scale longitudinal study of children aged 0-17 years in out-of-home care (OOHC) in New South Wales, Australia. Approximately 2,800 children are in the study sample, and includes information on safety, permanency, and wellbeing from various sources. It also contained information on child's physical health, socioemotional wellbeing, and cognitive ability. However, the dataset is only available to researchers who apply and pay for a secure computing workspace at the Sax Institute in Australia. The cost for this space was very expensive and difficult for a single research student to pay for.

7. Data from the University of Michigan: The Child and Adolescent Data Lab

The University of Michigan- Child and Adolescent Data lab in the USA collected data of children in out-of-home care to conduct a rigorous and comprehensive evaluation of performance-based child welfare services. The data was also rich in contextual information (e.g., school, community, local areas), and was promising in its capacity to isolate population and school effects. However, at the time that I was looking into this data, Michigan experienced changes in leadership within various agencies. Unfortunately, this meant that it was not possible to access the data at this point.

Appendix D. University of Oxford ethics application

The University of Oxford places a high value on the knowledge, expertise, and integrity of its members and their ability to conduct research to high standards of scholarship and ethics. The research ethics clearance procedures have been established to ensure that the University is meeting its obligations as a responsible institution.

They start from the presumption that all members of the University will take their responsibilities and obligations seriously and will ensure that their research involving human participants is conducted according to the established principles and good practice in their fields and in accordance, where appropriate, with legal requirements. Since the requirements of research ethics review will vary from field to field and from project to project, the University accepts that different guidelines and procedures will be appropriate.

- Please check ["Where and how to apply for ethical review"](#) and the [CUREC flowchart](#) first to see if you need ethics approval.
- Please complete this form using a word processor and email it, together with your [supporting documents](#), to your [Departmental Research Ethics Committee \(DREC\)](#) (if applicable). If you don't have a DREC please email this form to ethics@socsci.ox.ac.uk using your official **ox.ac.uk** email address. **Only emailed applications will be accepted.**

WHAT THIS CHECKLIST IS DESIGNED FOR

This **CUREC 1A checklist** is designed largely for research that falls within the Divisions of Social Sciences and Humanities where ethical issues are relatively few and straightforward. Interviews, field work and oral history are also included in the CUREC process.

The **full CUREC 2 application** is only required where certain project characteristics (e.g. type of participants, or procedures) result in a more complex set of ethical issues. It is expected that only in a limited number of cases will it be necessary for researchers to complete a CUREC 2 application. The checklist below will direct you to a CUREC 2 application if needed.

WHAT THIS CHECKLIST WILL NOT ASSESS

This checklist does not cover research governance, satisfactory methodology, or compliance with the requirements of publishers when administering their tests or questionnaires. As **principal researcher (i.e. principal investigator)**, it is your responsibility to ensure that requirements in these areas are met.

CUREC does not review studies classed as **audit** (see [Glossary](#) and [Decision Flowchart for CUREC](#) on our website).

If your study involves **NHS patients, NHS staff / data / facilities, or human tissue**, please check the [Decision Flowchart for NHS approval](#) and contact the [Clinical Trials and Research Governance \(CTRG\) team](#) in the first instance.

Further information on the University's research ethics procedures is available from the [CUREC website](#).

SECTION A: Filter for CUREC2 application

This section determines whether your study raises more complex issues which require the completion of a full application for ethical review, known as the CUREC 2 application.

(Please mark 'X' in the Yes/No column as appropriate to indicate your response.)

1. Are research participants classed as people whose ability to give free and informed consent is in question ? (This may include those under 18 (though see " competent youths "), prisoners, or adults "at risk".) Your attention is drawn to the University's Safeguarding Code of Practice and its implications for researchers involving children or adults at risk, including the need for the work to be risk assessed and for researchers to undertake related training. (Note: If any of your participants are aged 16 or under, please answer 'Yes' here and also answer question 5 below.)	Yes ☐	No X
2. By taking part in the research, will participants be at serious risk of criminal prosecution (e.g. by providing information on drug abuse or child abuse)?	Yes ☐	No X
3. Does the research involve the deception of participants?	Yes ☐	No X
4. Does your research raise issues relevant to the Counter-Terrorism and Security Act (the Prevent duty) , which seeks to prevent people from being drawn into terrorism? Please see advice on this on our Best Practice Guidance web page .	Yes ☐	No X
If you have answered 'No' to all of the questions above please go to Section B . If you have answered 'Yes' to any question above continue to question 5 below.		
5. Is your project covered by a CUREC approved procedure (formerly known as "CUREC Protocols")?	Yes ☐	No ☐
If yes, please give research procedure number(s):		
If you answered 'Yes' to ANY of questions 1-4, and answered 'No' to question 5, please stop completing this checklist and do not submit it for ethical review . Instead, please complete the CUREC 2 application form from the CUREC website. Then submit the CUREC 2 form for ethical review. If you answered 'Yes' to ANY of questions 1-3, and answered 'Yes' to question 5, please go on to Section B .		
SECTION B: Contact details and project description (NB: must be typed not handwritten)		
Contact details:		
1. Principal investigator / supervisor (if student research (title and full name):	Dr. Nikki Luke Dr. Lisa Holmes	
2. Name of student (if student research):	Jane Jiyoun Lee	
3. Degree programme, e.g. DPhil, BA, MPhil, BSc, MSc (if student research):	DPhil Education	
4. Department or Institute name:	Education Department, University of Oxford	
5. Address for correspondence (if different from above):		
6. University e-mail (not private email) and telephone:	jane.lee@education.ox.ac.uk	

	07833651919
7. Name and status of others taking part in the project, e.g. third year undergraduate; postdoctoral research assistant:	N/A

SECTION B continued	
Project description:	
8. Title of research project:	The effects of socioemotional skills on the longitudinal trajectories of problem behaviour among children in out-of-home care.
9. List of location(s) where project will be conducted:	Secondary data analysis – Office based only
10. If your research involves overseas fieldwork or travel and your department requires a travel risk assessment, will you have completed and returned a risk assessment form beforehand? (This has to be approved by your department before you travel. If you are travelling overseas, you are strongly advised to take out University travel insurance .) <i>Please also address any physical or psychological risks for Oxford researchers and local fieldworkers in section 15 below and discuss these with your safety officer.</i>	Yes ☐ No ☐ Not required in this instance X
11. Anticipated duration of overall research project:	months or 3 years (maximum 5)
12. Anticipated start and end dates of the part of the research project involving human participants and/or personal data:	From: (dd/mm/yyyy) - Not applicable To: (dd/mm/yyyy) - Not applicable Please note that you will need ethics approval before you start your research. CUREC 1As may take up to 30 days to process. Retrospective ethics approval cannot be granted.
13. External organisation funding the research (if applicable): N/A	
14. Title and very brief and simple lay description of research (about 150 words), plus description (about 200 words) of the nature of participants.	
a) Title, brief description of research (about 150 words) in lay language. When describing the research, please include your methodology, how you are applying professional guidelines, and the use to which results/data will be put. Please also declare any conflicts of interest here.	

Title:

The effects of socioemotional skills on the longitudinal trajectories of problem behaviour among children in out-of-home care.

Research Description:

This research project will conduct secondary data analysis using the data collected in the National Survey of Child and Adolescent Well-Being, I, II (NSCAW), a nationally representative study conducted in the United States. The aim is to examine the relationships between socioemotional skills and longitudinal trajectories of problem behaviour for children and adolescents receiving child welfare services. The analysis will ultimately investigate the promotion of positive developmental and social outcomes for children after they leave care. Problem behaviour is measured with the well-validated Child Behaviour Checklist (CBCL, Achenbach, 1991*), completed by Child/Caregiver/Caseworker/Teacher interviews). The NSCAW data enables the quantitative analysis of multilevel modelling of factors, latent growth curve modelling, and latent class analysis. The data and existing literature will be explored to determine the statistical methodology to best utilise the data.

The data collected in the NSCAW is anonymised and analysis will be in line with the original consent provided by the participants in the study.

* Achenbach, T.M. (1991). Manual for Child Behavior Checklist/4-18 and 1991 Profile. Burlington: University of Vermont Department of Psychiatry.

SECTION B continued

b) Description of participants and [obtaining informed consent](#) (about 200 words). When describing participants, please include

1. criteria for inclusion/exclusion
2. method of recruitment
3. processes for consent to participate

Please ensure you attach as separate documents (if applicable, in English translation):

- your [recruitment and advertisement material](#) e.g. a poster or brief invitation letter/ email
- information for participants to read (or hear) before they agree to take part e.g. [written information sheets](#) or (only if applicable) [oral information scripts](#).
- a document to record informed consent. Templates for [written consent forms](#) and/or [oral information scripts](#) (in case of an oral consent process) are available from the CUREC website
- a guide to interview questions (this may be a list of questions to be asked, or a preliminary scope of questions), or a sample of other instruments (such as a sample questionnaire)
- (if relevant) debriefing document after participants have taken part

As stated in Section B9, this research project will only conduct secondary analysis of existing data. The data for analysis come from the National Survey of Child and Adolescent Well-Being I, II (NSCAW), which includes a nationally representative sample of children and families that enter the child welfare system. For recruitment, children were selected from 92 Primary Sampling Units (PSUs) in 97 US counties. Infants, sexual abuse cases, and cases receiving ongoing services after investigation were oversampled. Contacting procedure involved field representatives mailing a personalized introductory letter and question and answer brochure to each caregiver. Approximately one week after mailing an introductory letter to the caregiver respondent, field representatives attempted telephone and in-person contact. Informed consent was acquired from the caregiver, former caregivers, and caseworkers. Children between ages 7 to 14 were asked for their assent after field representatives read the assent forms aloud and obtained signed permission to conduct the interview. For children below seven, the adult respondent was asked to consent for the child. In this process field representatives were trained to confirm that the adult respondent chosen had legal guardianship and the resulting legal right to consent to the child's participation. If the chosen adult respondent did not have legal guardianship, the field representative identified and contacted the person or agency who did have the authority to consent for the child. The Personal Responsibility and Work Opportunity Reconciliation Act of 1996 (PL 104-193) authorized the Department of Health and Human Services (DHHS) to conduct the NSCAW study.

15. What are the ethical issues connected with your research and what steps have you taken to address them?

Please do not answer 'none'. The committee needs to see evidence that you have identified potential ethical issues with respect to your research and have taken steps to address them. These issues could relate to:

- your own physical and psychological safety as a researcher (please see the [University's](#) and [Social Science Division's Safety in Fieldwork guidance](#))
- participant burdens and/or risks, and
- data protection/ confidentiality (please also see section 18).

For more guidance on ethical issues, please see

<http://researchsupport.admin.ox.ac.uk/governance/ethics/resources>

Secondary data analysis has two main ethical issues. First of all, the data must be stored securely and this will be met by storing the data in a physically secure office. The office where the device holding the data is located is a private, locked space that is only accessible by at most myself and my supervisors. Access to the building where the office is located is only accessible via authorized swipe card only and all external doors are monitored by security cameras. This door access system logs all access to the building and the security cameras record all activity. Device access is restricted through account name and password. Only one account will have access to the data and the password will be at least 9 characters long and will include upper case, lower case, numeric and special characters. The password will require changing every 3 months. The device will be set to automatically lock after 10 minutes of inactivity. Authentication will be required both at login and after inactivity. When the device is retired its hard drive will be wiped to DoD 5520.22-M standard. In the unlikely event that backup copies of the data need to be made they will be stored on an encrypted external hard drive.

The second ethical concern is that the data is being analysed in line with the original consent provided by the participants in this study. Ongoing conversations will take place as part of routine supervision to ensure that the original consent requirements are adhered to.

Finally, the approval process with Cornell University, who owns the NSCAW data, has been completed. All requirements have been met to ensure data security and protection.

Section B continued		
16. Will you obtain informed consent according to CUREC guidelines and good practice in your discipline before participation?	Yes X	No ☐
If you have marked 'No', please give a brief explanation and justification for this decision here:		
17. Will your research involve discussing sensitive issues? This could be information relating to race or ethnic origin, political opinions, religious beliefs, physical/mental health, trade union membership, sexual life or criminal activities.	Yes ☐	No X
If you have marked 'Yes', please make sure that you have included some supporting information (as directed in question 14 of this section) showing the range of questions covering these issues.		
18. Management and handling of personal and other research data Your management and handling of personal data and special category data of human participants, either directly or via a third party, will need to comply with the requirements of the General Data Protection Regulation (GDPR) and the new Data Protection Act, as set out in the University's Guidance on Data Protection and Research . In answering the questions below, please also consider the points raised in the Data Protection Checklist . For advice on research data management and security, please consult with the University's Research Data Team (researchdata@ox.ac.uk) and/or your local IT department and the University's web pages on research data management .		
a) Will your research involve the collection of records of consent (e.g. written forms, audio-recorded, or other recorded consent)? If 'Yes', these will be classed as fully identifiable personal data (directly linked to an individual).	Yes ☐	No X
b) Will your research involve the collection of other personal data ? If 'Yes', specify in what form(s) this will be stored:	Yes ☐	No X
Fully identifiable (directly linked to an individual)	Yes ☐	No ☐
Pseudonymised (potentially identifiable as data may be attributed to an individual if linkage information can be accessed elsewhere by researchers)	Yes ☐	No ☐
Fully anonymised (i.e. cannot be linked to an individual)	Yes ☐	No ☐
c) Will any of the personal data you collect classify as special category data? If 'Yes', in what form(s) will this be stored:	Yes ☐	No X

Fully identifiable (directly linked to an individual)	Yes ☐	No ☐
Pseudonymised (potentially identifiable as data may be attributed to an individual if linkage information can be accessed elsewhere by researchers)	Yes ☐	No ☐
Fully anonymised (i.e. cannot be linked to an individual)	Yes ☐	No ☐

d) How will any personally identifiable data be collected, [transferred and backed up](#)? Please describe the arrangements for any physical transfer of personal data (including paper records and data captured electronically via portable media) from where it is collected to local storage.

Personally identifiable data will not be collected.

e) Where, and for how long, will participants' personally identifiable data be stored during and after the study? (Please outline the procedures for ensuring confidentiality, eg security arrangements, anonymisation or pseudonymisation of such data. Please distinguish between records of consent and other forms of personally identifiable data stored)

Not applicable.

f) If storing pseudonymised data, please confirm that identifiers will be held separately from the research data and linked through a unique study number. Specify how and at what point the pseudonymisation will occur, how the linkage information will be stored and state whether or not (and when) the linkage will be destroyed.

Not applicable.

g) Who will have access to the personally identifiable data? If personally identifiable data is to be shared with another organisation, how will it be transferred/disclosed securely?

Not applicable.

h) When and how will personally identifiable data be destroyed? (NB. Personally identifiable data should be destroyed when no longer required.)

Not applicable.

i) How, where and for how long will other research data be stored after the study has finished? For more information about University and research funder retention policies, please see the University's web pages on [research data management](#).

The NSCAW data license terminates after 3 years. A replacement license needs to be obtained in order to achieve a valid license for another three years.

SECTION C: Methods and procedures to be used	
Method used: Please ensure you have addressed any potential ethical issues related to these methods in Section 14 and in your Participant Information Sheet	Please mark 'X'
1. Analysis of existing records	X
2. Snowball sampling (recruiting through contacts of existing participants)	☐
3. Use of casual or local workers e.g. interpreters	☐
4. Participant observation	☐
5. Covert observation	☐
6. Observation of specific organisational practices	☐
7. Participant completes questionnaire in hard copy	☐
8. Participant completes online questionnaire or other online task	☐
9. Using social media	☐
10. Participant performs paper and pencil task	☐
11. Participant performs verbal or aural task (e.g. for linguistic study)	☐
12. Focus group	☐
13. Interview	☐
14. Audio recording of participant (you will generally need specific consent from participants for this)	☐
15. Video recording of participant (you will generally need specific consent from participants for this)	☐
16. Photography of participant (you will generally need specific consent from participants for this)	☐
17. Others (please specify):	X
This is secondary data analysis of an existing dataset.	

SECTION D: Professional guidelines and training		
In this section, please mark 'X' against at least one of the following professional guidelines you aim to adhere to. You should use the principles listed in your chosen guideline(s) in conducting your own research. Note: this is not an exhaustive list.		Please mark 'X'
Research specialism/ methodology	Association and guidance document	
Anthropology	Association of Social Anthropologists of the UK and Commonwealth	☐
Criminology	http://www.britsoccrim.org/ethics/	☐
Education	British Educational Research Association Ethical Guidelines for Educational Research	X
Geography	Association of American Geographers Statement on Professional Ethics	☐
History	Oral History Society of the UK Ethical Guidelines	☐
Internet-based Research	British Psychological Society: Conducting Research on the Internet Association of Internet Researchers Ethics Guide Also see our Best Practice Guidance on internet-based research	☐
Law (Socio-Legal)	Socio-Legal Studies Association: Statement of Principles of Ethical Research	☐
Management	Academy of Management's Professional Code of Ethics	☐
Political Science	American Political Science Association (APSA) Guide to Professional Ethics in Political Science	☐
Politics	Political Studies Association. Guidelines for Good Professional Conduct	☐
Psychology	British Psychological Society Code of Ethics and Conduct	☐
Social Research	Social Research Association: Ethical Guidelines	☐
Sociology	The British Sociological Association: Statement of Ethical Practice	☐
Visual Research	ESRC National Centre for Research Methods Review Paper: Visual Ethics: Ethical Issues in Visual Research	☐
Other professional guidelines. Please specify the other guidelines used here:		☐
Please indicate what training in research ethics the researchers involved with this study have received, e.g. the title of the course and date completed (online training available at http://researchsupport.admin.ox.ac.uk/support/training/ethics). If no formal training has been undertaken, please indicate any discussions of research methodology between researchers and supervisors here. A training session on research ethics followed by a workshop as part of the Foundations in Education research module has been undertaken. Provided on 08/11/17.		

SECTION E: Signatures (The SSH IDREC Secretariat accepts either option below. If you have a [DREC](#), check which signature option it prefers.)

- **Option 1:** 'Electronic signatures', i.e. email confirmations from a University of Oxford email address, can be accepted. Separate emails should come from each of the relevant signatories as outlined below, indicating acceptance of the relevant responsibilities. **Pasted images of signatures cannot be accepted in the sections below.**
- **Option 2:** Handwritten (wet-ink) signatures. Please scan them and the rest of the checklist pages to create a single PDF document and email through.

Please ensure this checklist is signed by:

For staff research:

1. [Principal investigator](#)
2. **Head of Department (or nominee)**

For student research:

1. [Principal investigator](#) (project supervisor)
2. **Head of Department (or nominee)**
3. **Student researcher**

1. Principal investigator signature/supervisor signature (if student research)

I understand my responsibilities as [principal investigator](#) as outlined in the CUREC glossary and guidance on the CUREC website.

I declare that the answers above accurately describe the research as presently designed, and that a new checklist will be submitted should the research design change in a way which would alter any of the above responses so as to require completion of CUREC 2 (involving full scrutiny by an IDREC). I will inform the relevant IDREC if I cease to be the principal investigator on this project and supply the name and contact details of my successor if appropriate.



Signature (or email endorsement using the above declaration):

Print name (block capitals): Lisa Holmes.....

Date: 01-07-2019.....

2. Departmental endorsement signature

I have read the research project application named above. On the basis of the information available to me, I:

- consider the principal investigator to be aware of her/his ethical responsibilities in regard to this research;
- consider that any ethical issues raised have been satisfactorily resolved or are covered by relevant professional guidelines and/or CUREC approved procedures, and that it is appropriate for the research to proceed (noting the principal investigator's obligation to report should the design of the research change in a way which would alter any of the above responses so as to require completion of a CUREC 2 full application);
- am satisfied that: the proposed project design and scientific methodology is sound; the project has been/will be subject to appropriate [peer review](#); and is likely to contribute to existing knowledge and/or to the education and training of the researcher(s) and that it is in the [public interest](#).

Signed by Head of Department or nominee (example nominees for student research include the Director of Graduate Studies/ Director of Undergraduate Studies):

Signature (or email endorsement using the above declaration):

Print name (block capitals):

Date:

3. Student signature (if student research)

I understand the questions and answers that have been entered above describing the research, and I will ensure that my practice in this research complies with these answers, subject to any modifications made by the principal investigator properly authorised by the CUREC system.

Signature by student (or email endorsement using the above declaration): *Jane Jiyoun Lee*

Print name (block capitals): Jane Jiyoun Lee

Date:

SECTION F: SUBMITTING THE COMPLETED CHECKLIST	Please mark 'X'
1. Check you have completed all sections (A-E)	X
2. Ensure your application is signed (or endorsed by email) by you, your supervisor (if student) and your department/faculty	X
3. Please attach all supporting documents (see section B, question 14b for details). If the appropriate supporting documentation is not included with your application, you will then be asked to provide this separately. This may delay the ethical review process, and thus the start of your research.	X
4. Ensure you have declared conflicts of interest (if any) in Section B, question 14a.	X
5. If your department has a Departmental Research Ethics Committee (DREC) , submit this checklist and supporting information to the appropriate departmental officer.	X
6. If your department does not have a DREC, submit the checklist and supporting information to the SSH IDREC (email ethics@socsci.ox.ac.uk).	X
7. Applications must be sent by email from your official ox.ac.uk email account.	X

Appendix E. Sampling strategy and implications

Appendix E presents an in-depth description of the data collection strategy undertaken by the NSCAW staff. The NSCAW sampling design is a national survey with total population sampling, which is a non-random technique that involves surveying the total population that have distinct characteristics of interest (Etikan, Musa, & Alkassim, 2016). Of the types of total population sampling, the method used in the NSCAW sampling is homogenous sampling. Homogeneous sampling is concerned with surveying a population group that share the same specific characteristics or qualities of interest. The NSCAW sampling frame aimed to select and represent all children in the US who have been investigated by child protective services as a victim of child abuse or neglect. To survey the total population of children with this criterion of interest, the NSCAW sample or children were selected using a two-stage stratified complex sample design. At the first stage, the United States was divided into nine parts, referred to as sampling strata, comprised of the eight states with the largest child welfare caseloads, and the ninth stratum consisting of the remaining 38 states and the District of Columbia. Within each stratum, a sample of primary sampling units (PSUs) was randomly selected. The PSUs were generally defined as geographic areas that contain the population served by a single CPS agency. These areas generally corresponded to two or more neighboring counties. Of the original 100 sampled PSUs, six PSUs refused and were replaced with PSUs of approximately the same size. Eight PSUs were excluded because they were in states that required the CPS agency, rather than a NSCAW field worker, to make first contact with a caregiver. Accordingly, the sample consisted of 92 eligible PSUs in 97 counties located in 36 US states.

At the second stage of the sample design, children were stratified by mutually exclusive characteristics of interest for the study, which formed the within-PSU sampling strata and are referred to as sampling domains. These domains of interest were whether the child was receiving CPS services, whether the child was in out-of-home care, the child's age, and the main type of abuse experienced by the child. Disproportionately larger samples were selected of children with certain types of characteristics, to account for attrition and have sufficient cases to analyze. In addition, data collection procedures were altered in some PSUs to exclude unsubstantiated cases, because some sites did not allow the sampling of unsubstantiated cases by researchers due to restrictions in the state law. For the LTFC sample, only one child per household (where 'household' is the residence where the child lives) was included during sample selection in order to reduce the burden on caregivers. A frame non-coverage error occurs when groups in a target population are not included in the sampling frame and are therefore not selected. Three types of non-coverage error exist in the NSCAW sampling frame.

First, countries or child welfare agencies that had very low number of investigated children were intentionally removed from the frame in order to increase efficiency of interviewer efforts and data collection costs. The NSCAW PSU frame consisted of all countries in the US that were large enough to contain about 60-67 cases per year, the size of at least one interviewer's workload. Approximately 710 countries out of a total of 3,141 have been excluded, because they were smaller than this size. However, it was estimated by the NSCAW developers that less than 3% of the targeted population were in these counties. Thus, it was presumed that the exclusion of these countries will not have a significant impact on making statistical inferences.

Secondly, states that required prior consent by child welfare agencies before being contacted by NSCAW staff were removed from the frame as well. This decision was made because the response rates of these agency-first-contact states were so low that it was decided to remove these states from the defined target population. As such, the modified target population of the NSCAW sample is "all children in the US

who were subjects of child abuse or neglect investigations conducted by CPS and who live in states not requiring agency first contact” (Dowd et al., 2008, pg. 2-1). Since the actual target population is as stated, inferences made from the analyses of the NSCAW data should therefore not include child welfare populations of states that require agency first contact. However, many researchers who use the NSCAW data have and will make inferences in the context of the entire child welfare population in the United States. For such inferences, the removal of children in these agency-first-contact states is indeed a cause for non-coverage bias. Nonetheless, the child welfare population in these agency-first contact states is not greater than 5.2% and NSCAW developers expect that the bias resulting from this exclusion is disregardable, with analyses will likely to be unbiased to generalize to the entire US population. The findings have been interpreted in light of these limitations in the discussions chapter.

Lastly, child welfare agencies may have missed some children during the sampling period due to a variety of logistical reasons. For instance, records of children may not be up to date at the time of sampling because of lags in entering the appropriate information into their system. There were also county and state differences as to what was an ‘investigation’ and what was an open or closed case.

To assess the extent of the non-coverage bias that occurred due to the circumstances described above, the NSCAW researchers used data available on the 1999 National Child Abuse and Neglect Data System (NCANDS) Detailed Case Data Component (DCDC). Based on these assessments, it was concluded that the non-coverage error did not result in bias for the estimates of the analyses made. However, the NSCAW team nevertheless created complex sample weights for data analyzers to adjust for minor residual effects of under-coverage bias: a weight for analyses at the national level and a weight for analyses at the stratum level. As stated in the main text of the thesis, all analyses have been conducted with the appropriate sample weight.

Appendix F. Interview protocol

Appendix F presents the interview protocol on how and what types of assessments were administered to the NSCAW study sample. Assessments and questionnaires in the NSCAW were administered based on a developmental model that reflected age-sensitive risk and protective factors. As such, assessments and questionnaires were made selectively depending on the age of the child, so that appropriate age-related changes could be reflected. For each child, a maximum of 5 possible respondents were available: the child, (permanent/non-permanent) caregiver, caseworker, teacher, and former caregiver. Each respondent was interviewed different questionnaires, which depended on the out-of-home status and age of the child. Below, the interviews and questionnaires administered to each of these 5 respondents are presented.

D-1. Child Instrument

The Child Instrument was administered to all children at Waves 1,3, and 4 (which corresponds to Time point 1, 2, and 3 of the thesis data collection points of analysis), although children were given different assessments depending on their age. As shown below in Table 1, the Child Instrument includes measures that have been administered to children, or have been answered by the children directly.

Table 1. Overview of Child Instrument

Construct	Child age	Waves	Information gathered
Child characteristics	All	1,3,4	Demographic characteristics, height, weight, and head circumference for children young than 4 years old
Developmental/Cognitive status	≥ 4	1,3,4	- Vocabulary (expressive vocabulary and definitions) & Matrices (ability to perceive relationships and complete analogies). - Cognitive skills
Neurodevelopmental impairment	< 2	1,3	Basic brain function, ability to comprehend and express, and intellectual processes.
Communication	< 6	1,3,4	Expressive communication and auditory comprehension
Academic achievement	≥ 6	1,3,4	Reading (vocabulary, comprehension) and mathematics (calculation, reasoning, and concepts)
School engagement	≥ 6	1,3,4	School achievement; student's disposition toward learning and school
Peer relationships	5-7	1,3,4	Ability to make and keep friends
Protective factors	≥ 11	1,3,4	Resources that a child has that facilitate resiliency
Parent monitoring	≥ 10	1,3,4	Extent to which the caregiver monitors the child's activities
Independent living	≥ 14	4	Life skills
Questions for children in out-of-home care	≥ 6	1,3,4	Adjustment of children in out-of-home placement
Perceptions of	≥ 6	4	Adjustment of adopted and emancipated

permanency, disruptions, contact with family			youth
Satisfaction with caseworker services	≥ 11	1,3,4	Degree of satisfaction with caseworker services
Future expectations	≥ 10	1,3,4	Expectations related to children's life experiences
Social support	Emancipated youth	4	Perceived social support for emancipated youth
Physical health	Emancipated youth	4	Physical health status of emancipated youth
Depression	≥ 7	1,3,4	Depressive symptoms and aspects of well-being
Trauma	≥ 8	1,3,4	Indicators of PTS disorder
Youth activities	≥ 11	1,3,4	Involvement in activities
Youth behavior	≥ 11	1,3,4	Degree of aggressive behavior and impulse control
Relationship with caregiver	≥ 11	1,3,4	Degree of supportive relationship between child and adult
Exposure to violence	≥ 5	1,3,4	Violence observed and experienced at home
Services received	≥ 11	1,3,4	Factors that affect the service provision process
Substance abuse	≥ 11	1,3,4	Misuse of controlled substances
Sexual activity	≥ 11	1,3,4	Early sexual activity
Delinquency	≥ 11	1,3,4	Participation in delinquent or criminal activity
Injuries	≥ 11	1,3,4	Nature and extent of injuries in the past year
Victimization	Emancipated Youth	4	Emancipated youth's victimization
Child Maltreatment	≥ 11	1,3,4	Severity and specific type of abuse

D-2. Caregiver Instrument

The Caregiver Instrument was administered to both permanent and non-permanent caregivers, although the assessments were different depending on the permanent or non-permanent status of the caregiver. Non-permanent caregivers were interviewed on their experiences with foster caregiver services. The interview protocol also varied for each Wave. The measures administered to the caregiver are presented below in Table 2.

Table 2. Overview of Caregiver Instrument

Construct	Perm/Non-Perm	Waves	Information gathered
Household roster	P/NP	All	Family composition and demographic information
Child's living environment	P/NP	1,3,4	Variations/changes of mother father figures
Community environment	P/NP	1,3,4	Neighborhood community environment characteristics

Child health & services	P/NP	All	History of health, injury, and disability status of the child; services received by the child
Child's readiness to live on own	P/NP	4	Most recent caregiver's perception of emancipated youth's readiness to live independently
Adaptive behavior	P/NP	1,3,4	Regular behavior the child exhibits
Prosocial skills	P/NP	1,3,4	Social skills possessed by the child
Temperament (Child age 3)	P/NP	All	Ability to express emotions and cope with highly charged emotional situations
Behavior problem index	P/NP	2	Child well-being measure
Youth Behavior checklist	P/NP	1,3,4	Behavior problems
Income	P/NP	1,3,4	Financial resources available
Services received by caregivers	P	All	Frequency and duration that services were received
Social support	P	1,3,4	Perceived social support for child and family
Physical health	P/NP	1,3,4	Caregiver's physical health status
Services received by foster caregivers	NP	All	Frequency and duration that services were received
Adoption module for foster parents	NP	2,3	Adoption possibilities for child
Permanency planning	NP	4,5	Permanency planning options
Depression	P	1,3,4	Caregiver's depressive symptoms
Substance dependence	P	1,3,4	Caregiver's alcohol and drug dependence
Involvement with the Law	P	1,3,4	Caregiver's criminal history
Discipline & Child Maltreatment	P	1,3,4	Methods and frequency of discipline measures
Domestic violence	P	1,3,4	Type and frequency of violence occurring in the home and directed toward female caregiver
Satisfaction with caseworker	P	All	Satisfaction level with services received
Home environment (Child age <10)	P/NP	1,3,4	Child's home environment (both observed by field representative and caregiver interviews)

D-3. Caseworker Instrument

The Caseworker instruments were administered to both investigative and services caseworkers. Table 3 and 4 present an overview of the interviews of the investigative caseworker and services caseworker, respectively.

Table 3. Overview of Investigative Caseworker Instrument

Construct	Waves	Information Gathered
Background	1	Circumstances surrounding the investigative report; background of the caseworker
Alleged abuse	1	Details about the nature of the alleged abuse or neglect
Risk assessment	1	Factors determining case decisions
Services to parents	All	Service needs, regardless of availability
Services to child	All	Service the child may have received

Table 4. Overview of Services Caseworker Instrument

Construct	Waves	Information Gathered

History since case report	2,3,4	Child's history with the child welfare system since the case report that resulted in the child's selection for NSCAW.
Services to parents	All	Service needs, regardless of availability
Services to child	All	Services the child may have received
Independent living	4	Independent living skills the child may have developed and where each skill was learned
Adoption module	2,3	Adoption possibilities for children in out-of-home care
Permanency planning	4	Permanency planning possibilities for children in out-of-home care
History before case report	2	Child's history with the child welfare system before the case report that resulted in the child's selection for NSCAW
Court hearings	2,3,4	History of court hearings related to the case
Living environment	2,3,4	History of child's living situations since investigation
Caseworker involvement	2,3,4	Caseworker's individual involvement with case
Family compliance and progress	2,3,4	Family's progress with and adherence to case plan
Caseworker background	2,3,4	Demographic information about the caseworker

D-4. Teacher Instrument

The teacher instrument was administered to the teachers of the children who were in grades K-12. The measures administered to teachers are presented below in Table 5.

Table 5. Overview of teacher survey instrument

Construct	Waves	Information gathered
Teacher-child relationship	1,3,4	Subject area taught, average class size, knowledge of child
Peer relationships	1,3,4	Student's relationship with peers in class
Social Skills	1,3,4	Social skills possessed by child
Student behavior	1,3,4	Behavior of student now or in the past 2 months
Grade progression and academic performance	1,3,4	Grade progression, academic performance by subject, behavior/discipline problems, reading level

D-5. Former Caregiver Instrument

The Former Caregiver Instrument is administered to the caregiver that the child was removed from when placed in out-of-home care. These interviews were only administered partially at Wave 1, and should therefore not be used to make generalizations to any population. The measures administered to the former caregivers are presented below in Table 6.

Table 6. Overview of NSCAW former caregiver instrument

Construct	Child age	Information gathered
Family composition and demographics	All	Family composition and demographics
Child's living environment	All	Variations/changes of household composition or placement situation
Community environment	All	Behavior of individuals and families in terms of the environment of their community
Child's health and services	All	Health, injury, and disability status of child
Income	All	Financial resources available to the child's household
Services	All	Frequency and duration that services were received

Social support	All	Perceived social support for child and family
Physical health	All	Former caregiver's physical health status
Depression	All	Former caregiver experiences that indicate symptoms of depression
Substance dependence	All	Former caregiver experiences that indicate symptoms of alcohol and drug dependence
Involvement with the law	All	Former caregiver criminal history and involvement with the justice system
Discipline	All	Methods and frequency of discipline measures used
Domestic violence	All	Type and frequency of violence occurring in the home and directed toward female former caregiver
Satisfaction with caseworker	All	Satisfaction level with services received from caseworker

Appendix G. Raw and recoded data

Appendix G describes and reproduces the measures and any computations that were made for use in this thesis. Any reverse coding or alterations of the original data are also described here. When available, the items of each assessment are provided. This was not provided for some measures because of concerns related to copyright.

1. Child Behavior Checklist (CBCL)

The standardized Total Problems score of the *CBCL 2-3* and *CBCL 4-18* (Achenbach & Edelbrock, 1991) assessments were used for this thesis. The NSCAW research team administered this assessment to children ages 2 years old and older. Individual questionnaire items were not available for data users.

2. Social Skills Rating System (SSRS)

The subscales of the *SSRS* have been used to measure four domains of socioemotional skills: cooperation, assertion, self-control, and responsibility. The NSCAW provided 2 forms (parent and teacher). I utilized the parent report as it had the highest response rate. The NSCAW administered this measure to children with ages 3 years and older. For each question item, parents answer either (1=never, 2=sometimes, or 3=very often). A sum score for each subscale was used in the analysis of the thesis. This is in line with guidance from the *SSRS* developers (Gresham & Elliott, 1990).

2-1. Assessment questions for preschool scale (ages 3-5 years):

A. Self-Control sub-scale:

1. Follows instructions.
2. Responds appropriately when hit by other children.
3. Avoid trouble situations.
4. Controls temper in conflict with caregiver.
5. Controls temper when arguing with other children.
6. Follows rules when playing with others.
7. Listens/follows caregiver's instructions.
8. Waits turn in games.
9. Calmly end disagreements with caregiver.
10. Speak in appropriate tone of voice.

B. Cooperation sub-scale:

1. Helps you with household tasks without being asked.
2. Attempts household tasks before asking for your help.
3. Uses free time at home in an acceptable way.
4. Volunteers to help family members with tasks.
5. Keeps room clean and neat without being reminded.
6. Completes household tasks within a reasonable time.
7. Puts away toys or other household property.
8. Congratulates family members on accomplishments.
9. Follows household rules.
10. Communications problems to you.

C. Assertion sub-scale:

1. Participates in organized group activities.

2. Introduces herself or himself to new people without being told.
3. Starts conversations rather than waiting for others to talk first.
4. Appropriately expresses feelings when wronged.
5. Shows interest in a variety of things.
6. Makes friends easily.
7. Receives criticism well.
8. Is self-confident in social situations such as parties or group outings.
9. Joins group activities without being told.
10. Is liked by others.

D. Responsibility sub-scale:

1. Appropriately questions household rules that may be unfair.
2. Gives compliments to friends or other children in the family.
3. Politely refuses unreasonable requests from others.
4. Asks permission before using another family member's property.
5. Invites others to your home.
6. Answers the phone appropriately.
7. Compromises in conflict situations by changing own ideas to reach agreement.
8. Congratulates family members on accomplishments.
9. Attends to speakers at meetings such as in church or youth groups.
10. Asks sales clerks for information or assistance.

2-2. Assessment questions for elementary scale (ages 6-10 years):

A. Self-Control sub-scale:

1. Speak in appropriate tone of voice.
2. Responds appropriately when hit by other children.
3. Politely refuses unreasonable requests.
4. Avoid trouble situations.
5. Receives criticism well.
6. Control temper when arguing other children.
7. Calmly ends disagreements with caregiver.
8. Controls temper in conflict with caregiver.
9. Responds appropriately to teasing.
10. Cooperate with family members without being asked.

B. Cooperation sub-scale:

1. Makes good use of free time at home.
2. Keeps room clean without reminder.
3. Congrats family members on accomplishments.
4. Put away toys/household property.
5. Volunteer to help family members.
6. Helps with household tasks.
7. Attempts household tasks without asking for help.
8. Gives compliments to friends/family.
9. Completes household tasks in reasonable time.
10. Uses time appropriately while waiting for help.

C. Assertion sub-scale:

1. Join group activities on their own.

2. Invite others to your home.
3. Makes friends easily.
4. Show interest in a variety of things.
5. Liked by others.
6. Starts conversations.
7. Self-confident in social situations.
8. Accepts friends' ideas for playing.
9. Easily changes from one activity to other.
10. Reports accidents to appropriate person.

D. Responsibility sub-scale:

1. Introduces self to new people.
2. Asks sales clerks for information/help.
3. Listens to speakers at meetings.
4. Politely refuses unreasonable requests.
5. Answers phone appropriately.
6. Questions unfair household rules.
7. Asks permission to use family members' property.
8. Requests permission to leave the house.
9. Acknowledges compliments from friends.
10. Reports accidents to appropriate person.

2-3. Assessment questions for secondary scale (ages 11+):

A. Self-Control sub-scale:

1. Politely refuses unreasonable requests from others.
2. Responds appropriately to teasing.
3. Responds appropriately when hit by other children.
4. Avoids trouble situations.
5. Controls temper in conflict with caregiver.
6. Calmly ends disagreements with caregiver.
7. Speaks in appropriate tone of voice at home.
8. Controls temper when arguing with other children.
9. Compromises by changing own ideas.
10. Receives criticism well.

B. Cooperation sub-scale:

1. Helps you with household tasks without being told.
2. Attempts household tasks before asking for your help.
3. Uses free time at home in an acceptable way.
4. Volunteers to help family members with tasks.
5. Keeps room clean and neat without being reminded.
6. Completes household tasks within a reasonable time.
7. Attends to your instructions.
8. Puts away belongings or other household property.
9. Uses time appropriately while waiting for your help with homework or some other task.
10. Asks sales clerks for information or assistance.

C. Assertion sub-scale:

1. Starts conversations rather than waiting for others to talk first.
2. Participates in organized activities such as sports or clubs.
3. Introduces himself or herself to new people without being told.
4. Invites others to your home.
5. Makes friends easily.
6. Acknowledges compliments or praise from friends.
7. Joins group activities without being told to.
8. Is self-confident in social situations such as parties or group outings.
9. Shows interest in a variety of things.
10. Appears self-confident in social interactions with opposite-sex friends.

D. Responsibility sub-scale:

1. Says nice things about himself or herself when appropriate.
2. Shows concern for friends and relatives of his or her own age.
3. Appropriately expresses feelings when wronged.
4. Follows rules when playing games with others.
5. Waits turns in games or other activities.
6. Informs you before going out with friends.
7. Follows household rules.
8. Reports accidents to appropriate persons.
9. Is liked by others.
10. Answers the phone appropriately.

3. Daily Living Skills

The Daily Living Skills measure used in this thesis was originally a subscale of the Vineland Adaptive Skills scale. The NSCAW administered this measure to children between the ages of 0 and 10 years old. Three different sets of assessments were available depending on the age of the child (0-2-year-old form/3-5-year-old form/6-10-year-old form). In this thesis, the standardized score of the daily living skills subscale has been used for the 3-5-year old form and the 6-10-year-old form.

Below is the entire Vineland questionnaire, and within these items, a few items put together yields the daily living skills scale utilized in this thesis. Information about which specific items are composed together to yield the daily living skills scale is not specified. The analyses for this thesis used the subscale as is in the single variable form prepared by the NSCAW data developers.

3-1. Assessment questions for children ages 3-5:

1. How is the child at dress oneself? How is the child with removing a front-opening coat, sweater, or shirt? What kind of help do you usually give the child with doing this? (0= Child *does not remove* front-opening coat, sweater, or shirt without assistance; 1=Child removes a front-opening coat, sweater, or shirt without assistance *about half of the time*; 2=Child *always* removes a front-opening coat, sweater, or shirt without assistance. (The child need not unbutton or unzip the garment but must remove it completely if fastens are not closed.))
2. How is the child with putting one's shoes on? What kind of help do you usually give the child with doing this? (0=Caregiver routinely puts shoes on the child; 1=Child is able to put shoes on correct feet *about half of the time*; 2= Child *regularly* puts his/her shoes on the correct feet but doesn't have to tie or buckle the shoes.)

3. How is the child with dressing oneself? What kind of help do you usually give him/her with doing this? (0=Child *does* dress self completely; 1=Child puts on underwear and clothes correctly and without assistance *sometimes*; 2=Child dresses self *completely and without assistance* except for tying shoelaces. Includes putting underwear and clothes on correctly (e.g., right side out, front in front, without the garment being tangled) and fastening all fasteners.)
4. How is the child with fasteners such as small buttons, snaps, and that little part of the zipper at the bottom of the coat? What kind of help do you usually give the child with these? (0= Child regularly requires assistance to fasten fasteners, including zippers and buttons, when dressing; 2= Child fastens all fasteners, including zippers, without assistance.)
5. How are the child's toileting skills? How is he with urinating in a toilet or potty chair? (0=Toilet training has not yet begun for the child; 1=Child only has partial bladder control; 2=Child always urinates in toilet or potty chair).
6. How is the child with asking to use the toilet? (0=Toilet training has not yet begun for the child; 1= Child asks to use the toilet or goes on his/her own *about half of the time*; 2=Child *always* asks to use the toilet or goes on his/her own initiative.)
7. How well does the child take care of one's toileting needs, such as wiping, flushing, washing his/her hands, AND rearranging his/her clothes without assistance or being reminded? (0=Child is not toilet trained, or is not permitted to perform toileting tasks without assistance; 2=Child usually cares for all toileting needs, including flushing the toilet, washing hands, and rearranging clothing without being reminded and without assistance.)
8. What does the child do if he/she is thirsty and wants a glass of water? How about helping fill himself/herself from the tap? (0=Child does not get water or fill glass unassisted; 1=Child gets drink of water without assistance *about half of the time*; 2= Child *always* gets drink of water unassisted by turning on the cold water and filling the glass though s/he may need help in getting a cup or glass from a high cupboard or by standing on a chair to reach the faucet.)
9. How is the child with blowing his/her nose when needed? (0= Child does not wipe and blow nose without being assisted; 2= Child *always* wipes and blows nose without being assisted or reminded.)
10. How is the child with covering his/her mouth and nose when coughing or sneezing? (0= Child does not cover mouth or nose when coughing or sneezing; 1= Child covers mouth and nose when coughing and sneezing *about half of the time*; 2=Child *usually* covers mouth and nose when coughing and sneezing without reminders.)
11. What would the child do if you asked him/her to put his/her toys or clothes away? (0=Child *must be told where* to put toys or clothes; 1=Child *sometimes* puts possessions away when asked; 2= Child *always* puts possessions away when asked.)
12. What does the child understand about clocks and what they are used for? (0=Child *does not know* what a clock is used for; 1=Child *sometimes* asks "What time is it" or when asked about what a clock is used for will answer "for telling time"; 2=Child *routinely* demonstrates understanding of either a standard or digital clock by indicating that a clock is for telling time or by pointing to a clock and asking "What time is it".)

13. What about using the phone? When was the last time, if ever, that the child used the phone? If child uses phone, how much assistance does the child need to make local calls? (0= Child *is not permitted* to use a telephone; 1=Child is able to use phone to make local calls *with assistance*; 2= Child uses phone to make local calls *without assistance*. (Child may ask for dialing instructions from caregiver, but must dial and talk independently.))

14. Now I would like to ask you about the child's knowledge of different coins. What would he/she say a penny is worth? What about a nickel, a dime, and a quarter? (0=Child does not know the value, in cents, of any of the coins; 1= Child knows the value, in cents, of one, two, or three of the coins; 2= The child knows the value, in cents, of *all four* coins- quarter, dime, nickel, and penny.)

15. What is the child's understanding that hot is dangerous. That is, not to touch a hot stove or go near the fireplace? (0= Child does not demonstrate understanding that hot things are dangerous. A child who does not touch hot items because h/he cannot crawl or walk should be coded as a 0; 1= Child *sometimes* avoids matches and hot stoves or asks questions such as "Is that hot"; 2= Child *always* avoids matches, hot stoves, and pots or asks questions whether something is hot or safe to touch.)

3-2. Assessment questions for children ages 6-10:

1. How is the child at dress her/himself? How is he/she with small buttons, snaps, and that little part of the zipper at the bottom of the coat? What kind of help do you usually give him/her with dressing? (0= Child regularly requires assistance to fasten fasteners, including zippers and buttons, when dressing; 2= Child usually dresses her/himself correctly (clothes right side out, and not askew.) Fastens all fasteners, including zippers, without assistance.)

2. How well does the child take care of his/her toileting needs, such as getting to the bathroom, wiping, flushing, and washing his/her hands, without reminders? (0= Child is not toilet trained, or regularly requires assistance or reminders for toileting needs; 2= Child usually cares for all toileting needs, including flushing the toilet, washing hands, and rearranging clothes without being reminded and without assistance.)

3. How is the child at using silverware? A spoon? A fork? How does he/she manage spreading with a knife? Cutting? (0=Child does not regularly use silverware (including knife, fork, and spoon) competently, or has not yet been given silverware or is not permitted to use silverware. Child regularly requires assistance holding utensils properly or cutting and spreading with a knife; 2=Child uses a knife, fork, and spoon competently (rarely spilling). Knives are used for *both* spreading and cutting.)

4. Does the child ever go out to eat at a restaurant? If yes, who order his/her meal? If the child orders, how does he/she decide what to order? How well can he/she read a menu? (0= Child orders *without reading* the menu him/herself, or someone usually orders for the child; 1= Child *reads the menu* and orders an appropriate meal some of the time, or reads part of the menu and orders *part of a meal*; 2= Child can read a menu and *usually* orders an appropriate meal independently. Another person may clarify the menu (e.g., explain that certain foods com without the main course), but the child must make the selection and place the order. An appropriate meal must include dish, salad or vegetable, and beverage.)

5. If I were to ask the child what day of the week it is, what would he/she say? (For child who usually knows day of week, also ask: How about on the weekends, or times he's/she's not in school, like during summer vacation? (0= Child does not know the current day of the week, or has never been

asked; 1=Child can state the current day of the week only when school is in session, or only some of the time; 2= Child can usually state what day of the week it is, even when school is not in session.)

6. How is the child at telling time? Say it was 20 minutes after the hour, what time would (fill he/she) say? (Both clockface and digital clocks are acceptable.) (0= Child recognizes fewer than half the five-minute segments, or cannot tell time at all; 1=Child is able to state the correct time about half the time; 2= Child can state the correct time for all five-minute segments of the hour most of the time.)

7. Now I would like to ask you about the child's knowledge of money. What would he/she say a penny is worth? What about a nickel, a dime, and a quarter? (0=Child does not know the value, in cents, of any of the coins; 1= Child knows the value, in cents, of one, two or three of the coins; 2= The child knows the value, in cents of *all four* coins- quarter, dime, nickel and penny.)

8. Does the child ever have money of his/her own? If yes, what is the biggest thing he's/she's saved for and bought for himself/herself? (0=Child has never saved for anything, or has saved only at the caregiver's insistence, or has only saved for less than one week; 1= Child has voluntarily saved money for longer than one week and purchased a minor item; 2= Child has voluntarily saved money for longer than one week, and purchased a large item, such as a leather jacket, a bicycle, stereo, electronic game, or a trip of 2-days duration.)

9. Does the child ever use a telephone by herself/himself? If yes, when was the last time that the child made a long-distance telephone call? What about calling the operator for assistance? (0= Child is not permitted to use a telephone; 1= Child makes local calls but is not permitted to make long distance calls because of the cost; 2= Child uses phone to make local and long-distance calls, and knows how to call the operator, directory assistance, and emergency numbers when necessary. (Child may ask for dialing instructions from caregiver, but must be able to dial and talk independently.))

10. How would he/she use the phone in an emergency? What would he/she do? (0=Child has not been taught or does not know how to use 911 or the operator in an emergency; 1=Child can *occasionally or sometimes* remember the use of 911 or the operator when asked what to do in an emergency. (Child need not have been involved in an actual emergency to code as 1.); 2=Child knows how to use 911 or the operator correctly in the event of an emergency. (Child need not have been involved in an actual emergency to code as 2.))

11. What kind of supervision or help does the child need when using the stove or microwave? (0= Child has never used the stove or microwave to cook; 1= Child requires some supervision and input when using the stove or microwave; 2=Child uses the stove or microwave to cook independently. He/she turns the burners of the stove on and off, or sets the microwave without assistance. (Code as 2 if the child cooks independently, but is only allowed to do so when an adult is in the kitchen. Not supervising, but present.))

12. What's the most complicated dish that the child prepared on his/her own or mostly on his/her own? How often does he/she cook things like that, on his/her own? (0= Child does not prepare any foods that require mixing and cooking without assistance. The child helps others prepare such foods, but does not assume lead responsibility; 1= Child *is beginning* to prepare foods that require mixing and cooking, such as brownies, scrambled eggs, pancakes, and macaroni and cheese, independently. (The foods may come from packaged mixes. Also, if child assumes primary responsibility for preparation, but receives some adult assistance, code as 1; 2= Child *regularly* cooks foods that require mixing and cooking, such as brownies, scrambled eggs, pancakes, and macaroni and cheese independently. An

adult may be present in the home but may not assist. The child must open the container, mix the ingredients, and cook independently.)

13. What rooms, other than his/her own does the child clean? If child cleans some other room, ask: How much reminding does he/she need? (0= Child does not regularly clean any room other than his/her own; 1=Child regularly assumes responsibility for cleaning a room, e.g., the kitchen or bathroom, other than his/her own but often requires reminding; 2=Child regularly assumes responsibility for cleaning a room other than his or her own, e.g., the kitchen or bathroom with minimal reminding.)

14. What does the child know about dealing with strangers? (0= Child has not verbalized or demonstrated understanding of the danger and safe responses to the above situations; 1= Child has *some* understanding of the danger and safe responses to the above situations; 2= Child has verbalized or demonstrated an understanding that it is unsafe to accept rides, food or money from strangers. (The child need not have had actual experiences with strangers to be coded as a 2.)

15. How is the child with crossing the street alone? (0= Child is not permitted to leave home or cross the street alone, or does not cross streets safely; 1=The child can sometimes cross the street safely by her/himself, and demonstrates a beginning understanding of how to cross safely; 2= Child routinely and safely crosses the street *alone*. The child can be counted on to look both ways before crossing. Child routinely does this on a neighborhood street or road. (Code a 2 whether or not the streets crossed are busy.))

4. Age at initial placement

This measure has been derived from the existing NSCAW variables.

To carry out the calculation, I leveraged the investigation end date (for the report that got them into the study), the child's age in years, and the date of the first reported out-of-home placement.

- Step 1: I converted the investigation date variable from a string variable to a numeric date variable.
- Step 2: I created a new variable that has only the "year" from the new numeric variable created from Step 1.
- Step 3: I recoded syntax for the date of the first reported out-of-home placement variable to change negative values to system missing.
- Step 4: I subtracted the investigation date in years from first out-of-home placement year.
- Step 5: I computed child's age at initial out-of-home care placement by adding the difference between investigation date in years and first out of-home placement year to child's age in years at Time 1.

5. School engagement

The school engagement subscale is from the *Rochester Assessment Package for Schools*- Self-report instrument for middle school students (RAPS-SM). The NSCAW administered this measure to children that were 6 years and older. Questions 2, 4, 6, and 7 were reverse coded so that higher scores would reflect better school engagement. Then, a composite value of the 11 items was taken to represent the variable 'school engagement'.

1. How often do you enjoy being in school? Would you say... (1=never, 2=sometimes, 3=often, or 4=almost always).
2. How often do you hate being in school?
3. How often do you try to do your best work in school?
4. How often do you find the school work too hard to understand?
5. How often do you find your classes interesting?
6. How often do you fail to complete or turn in your assignments?
7. How often do you get sent to the office, or have to stay after school, because you misbehaved?
8. How often do you get along with your teachers?
9. How often do you listen carefully or pay attention in school?
10. How often do you get your homework done?
11. How often do you get along with other students?

6. Neighborhood community environment

The Neighborhood Community Environment was administered to children of all ages. The scale was composed of 9 items, and a composite score was taken to represent the variable 'neighborhood community problems.'

1. Assaults and muggings? Would you say this is... (1= not a problem at all, 2= somewhat of a problem, or 3= a big problem) in your neighborhood?
2. Delinquent gangs or drug gangs? Would you say this is... (1= not a problem at all, 2= somewhat of a problem, or 3= a big problem) in your neighborhood?
3. Open drug use or drug dealing? Would you say this is... (1= not a problem at all, 2= somewhat of a problem, or 3= a big problem) in your neighborhood?
4. Unsupervised children? Would you say this is... (1= not a problem at all, 2= somewhat of a problem, or 3= a big problem) in your neighborhood?
5. Groups of teenagers hanging out in public places and making a nuisance of themselves? Would you say this is... (1= not a problem at all, 2= somewhat of a problem, or 3= a big problem) in your neighborhood?
6. Is your neighborhood... (1=safest, 2=about the same, or 3=not as safe) as most neighborhoods?
7. Does your neighborhood have... (1=more neighborhoods help each other, 2= about the same number of neighbors help each other, or 3= fewer neighbors help each other) than most neighborhoods?
8. Does your neighborhood have... (1=more involved parents, 2= about the same number of involved parents, or 3= fewer involved parents) than most neighborhoods?

9. Is your neighborhood... (1= a better place to live, 2= about the same, or 3= a worse place to live) than most neighborhoods?

7. Post-traumatic stress

Post-traumatic stress is a subscale of the *Trauma Symptom Checklist for Children* (Briere, 1989). The subscale raw scores as existing in the dataset has been used as is. The NSCAW administered this measure to children who were 8 years and older. Individual questionnaire items were not available for data users.

8. Incident of abuse

Minor, severe, and very severe incidents of abuse were measured by three dichotomous variables. The corresponding scale items for each variable are described below in Table 1. For each variable, a score of 1 was assigned if one or more of the acts described in the scale items have occurred, and a score of 0 was assigned when none of the acts described in the scale items have occurred (0=incident has not occurred, 1=incident has occurred).

Table 1. Description of measures on abuse

Type of abuse	Scale Items
Minor physical abuse	- Caregiver shook child - Caregiver hit child on bottom - Caregiver spanked child with hands - Caregiver slapped child on body - Caregiver pinched child
Severe physical abuse	- Caregiver hit/kicked child - Caregiver hit child on body - Caregiver threw down child - Caregiver slapped child on face
Very severe physical abuse	- Caregiver choked child - Caregiver hit child repeatedly - Caregiver burned child - Caregiver threatened child with gun

9. Caregiver type

Caregiver type is a derived measure in the NSCAW dataset. It is a dichotomous scale, with an assignment of 0 indicating the child was currently residing with a permanent caregiver, and an assignment of 1 indicating the child was currently residing at an out-of-home care setting.

10. Caregiver involvement

This scale measures relationship with parents and other significant adults, and was administered to children 11 years and older in the NSCAW. Information about which specific items are composed together to yield the caregiver involvement scale is not specified, but below is the full list of items for the entire module. The analyses for this thesis used the subscale ‘Caregiver Involvement’ as prepared by the NSCAW data developers. The caregiver referred to in the question items below is the current and primary caregiver of the child. All question items are answered on a 4-point scale (1=not at all true, 2=not very true, 3=sort of true, or 4=very true?)

1. When I'm with my caregiver, I feel good. How true is this?
2. When I'm with my caregiver, I feel mad. How true is this?
3. When I'm with my caregiver, I feel unhappy. How true is this?
4. My caregiver enjoys spending time with me. How true is this?
5. My caregiver does a lot to help me. How true is this?
6. My caregiver doesn't seem to have enough time for me. How true is this?
7. My caregiver doesn't seem to know how I feel about things. How true is this?
8. My caregiver trusts me. How true is this?
9. My caregiver doesn't let me make any of my own decisions. How true is this?
10. My caregiver is fair with me. How true is this?
11. My caregiver doesn't think I can do very much. How true is this?
12. I don't know what my caregiver wants from me. How true is this?

Appendix H. Unusual fit indices

Appendix H sheds light on the unusual (e.g., TLI and CFI are at 1.00 and RMSEA is at 0.000) fit indices that are observed for the models in Study Two by providing a more in-depth explanation of the model fit indices.

1. Tucker Lewis Index (TLI) & Comparative Fit Index (CFI)

The Tucker Lewis Index (TLI) and the Comparative Fit Index (CFI) are commonly used simultaneously. The TLI is computed as follows, where Df refers to the degrees of freedom of the model.

$$\frac{\frac{x^2}{Df(\text{Null model})} - \frac{x^2}{Df(\text{Proposed model})}}{\frac{x^2}{Df(\text{Null model})} - 1}$$

For the TLI, a smaller x^2 to Df ratio indicates better model fit. This ratio and model fit are dependent on the complexity of the model and will be penalized when the model is too complex. In plain numbers, a TLI close to 0 indicates poor model fit, while a TLI close to 1 indicates good model fit. Usually, values above .90 are considered acceptable. Sometimes, a TLI may fall below 0 and also go above 1. These are called out of range values, and in this case, values below 0 can be truncated to equal 0 and be interpreted as poor model fit. On the other hand, values above 1 can be truncated to equal 1 and are interpreted as good model fit. Anderson and Gerbing (1984) report that such unusual values typically occur in studies with small sample sizes (as this thesis) but should not be a cause for concern.

The CFI is computed as follows, where $d = x^2 - Df$. As above, Df refers to the degrees of freedom of the model.

$$\frac{d(\text{Null model}) - d(\text{Proposed model})}{d(\text{Null model})}$$

The CFI is interpreted in the same way as the TLI. Similar to the TLI, the model fit of the CFI is penalized for additional parameters estimated. While TLI values may range from negative to values above 1 in unusual cases, CFI values are always within the 0 to 1 range. Both TLI and CFI produce values indicating better fitting models when the degree of freedom is large for the estimated model. TLI and CFI fit indices are also most suitable to use in circumstances with large sample sizes. In small sample sizes, it is recommended that the chi-square test is used as a better method for judging model fit, rather than the TLI and CFI. The use of TLI and CFI indices in small sample and/or degree of freedom SEM models are not recommended. Although this thesis does use the TLI and CFI indices of model fit, it is used in conjunction with the chi-square test of model fit as well.

2. Root Mean Square Error of Approximation (RMSEA)

The RMSEA is computed as follows, where N refers to the sample size and Df refers to the degrees of freedom of the model.

$$\frac{\sqrt{(x^2 - df)}}{\sqrt{[df(N - 1)]}}$$

Smaller RMSEA values are considered an indicator of better model fit, and a value smaller than .08 is considered acceptable. The RMSEA value for many models in the thesis was 0.000. This occurs when the χ^2 value is less than the df . The RMSEA is penalized for complexity when the χ^2 to df ratio becomes larger. Like the CFI and TLI, the RMSEA does not perform well in small sample and df models.

Collectively, the literature indicates that values of 1.000 for the TLI and CFI and values of 0.000 for the RMSEA are likely to occur in situations where the sample size and degrees of freedom is small. However, it should not be a source for concern.

Appendix I. Syntax for research question 1

In Appendix I, the *Mplus* syntax for the multiple-group growth curve model used to answer research question 1 in Study Two is presented. Exclamation marks are used to describe each command.

TITLE: MULTIGROUP LGC;

DATA: FILE IS FINAL15.dat;

VARIABLE:

NAMES ARE NSCAWID NANALW34 NSCAWPSU STRATUM PROBTOT1 PROBTOT3
PROBTOT4 AGE_NEW2 PVN_STD PVE_STD AGEATOOHP SELF COOP RESP ASSERT
CGDPERM SE1 CHDGENDR NEI TRAUMA YCM_AM YCM_AS YCM_AV YRC_INA;

!NSCAWID NANALW34 NSCAWPSU STRATUM – these variables are the ID variable and weight variables that need to be used to apply the complex weights to the analysis. PROBTOT1 PROBTOT3 PROBTOT4- these are the problem behavior measures. AGE_NEW2- this is the grouping variable to indicate what age group each child belonged to. PVN_STD PVE_STD- these variables are the daily living skills measures. AGEATOOHP- this measure is the ‘age at first out-of-home placement’ variable. SELF COOP RESP ASSERT- these variables are the four socioemotional subscales. CGDPERM- this is the caregiver type variable. SE1- this is the school engagement variable. CHDGENDR- this variable indicates child gender. NEI- this variable indicates neighborhood community environment. TRAUMA- this is the post-traumatic stress symptoms measure. YCM_AM YCM_AS YCM_AV- these variables measure incidents of abuse in the past year. YRC_INA- this variable measures caregiver involvement.

IDVARIABLE IS NSCAWID;

USEVARIABLES ARE PROBTOT1 PROBTOT3 PROBTOT4;

!These are the variables used for the analysis.

MISSING ARE ALL (-999);

WEIGHT IS NANALW34;

CLUSTER IS NSCAWPSU;

STRATIFICATION IS STRATUM;

!These commands apply the complex weights to the analysis.

GROUPING IS AGE_NEW2 (2= EARLY, 3= MIDDLE, 4=ADOLESCENT);

!This command specifies the different groups that make the analysis ‘multiple-group’.

ANALYSIS:

ESTIMATOR=MLR;

TYPE=COMPLEX;

!This section specifies that missing data will be dealt with using the MLR estimator, and that analyses will be run with complex samples module.

MODEL:

I S| PROBTOT1@0 PROBTOT3@1 PROBTOT4@2;

!This section describes the model for analysis.

OUTPUT: STDYX TECH4;

Appendix J. Preliminary models of regressing race and ethnicity, age, and gender for each age group

Appendix J includes the preliminary models run to examine whether race and ethnicity, age, and gender, did not significantly affect the intercept or slope of the problem behavior slope. This has been done because including them as covariates will reduce the already limited amount of statistical power, and I did not want to include them unless it was necessary to do so. As the tables below show, gender, age, and White race were not significant on the intercept and slope for the early childhood and adolescent group. However, for the middle childhood group, gender was significant on the intercept. As such, it was determined that gender should be controlled for in the models for the middle childhood group, and was thus included in the models as shown in Section 6.3.3.2.

Table 1. Controlling for covariates: Early Childhood group

Variable	Intercept (Std. Estimate, <i>p</i>)	Slope (Std. Estimate, <i>p</i>)	Model fit Indices
Gender	-0.015, <i>p</i> =.050	-0.187, <i>p</i> =.516	$\chi^2=3.454(4)$, <i>p</i> =.485, RMSEA: 0.000
Age in years	0.204, <i>p</i> =.931	-0.131, <i>p</i> =.653	CFI/TLI: 1.000/1.000
White race	0.322, <i>p</i> =.293	-0.323, <i>p</i> =.326	SRMR: 0.043

Table 2. Controlling for covariates: Middle Childhood group

Variable	Intercept (Std. Estimate, <i>p</i>)	Slope (Std. Estimate, <i>p</i>)	Model fit Indices
Gender	-0.198*, <i>p</i> =.014	-0.152, <i>p</i> =.412	$\chi^2=1.177(4)$, <i>p</i> =.882, RMSEA: 0.000
Age in years	0.173, <i>p</i> =.101	-0.022, <i>p</i> =.907	CFI/TLI: 1.000/1.000
White race	-0.138, <i>p</i> =.224	0.099, <i>p</i> =.729	SRMR: 0.015

Table 3. Controlling for covariates: Adolescent group

Variable	Intercept (Std. Estimate, <i>p</i>)	Slope (Std. Estimate, <i>p</i>)	Model fit Indices
Gender	0.016, <i>p</i> =.895	0.016, <i>p</i> =.895	$\chi^2=1.381(4)$, <i>p</i> =.848, RMSEA: 0.000
Age in years	-0.152, <i>p</i> =.248	-0.152, <i>p</i> =.248	CFI/TLI: 1.000/1.000
White race	0.024, <i>p</i> =.847	-0.054, <i>p</i> =.784	SRMR: 0.019

Appendix K. Syntax for research question 2

Appendix K presents the syntax for the conditional growth curve models that was used for the second research question of Study Two. The first model for the early childhood age group is presented here. As in Appendix I, exclamation marks are used to describe each command.

TITLE: RQ2- MODEL 1- EARLY;

DATA: FILE IS FINAL15.dat;

VARIABLE:

NAMES ARE NSCAWID PROBTOT1 PROBTOT3 PROBTOT4 NANALW34 NSCAWPSU
STRATUM AGE_NEW2 PVN_STD AGEATOOHP SELF1 COOP CGDPERM SE1 PVE_STD
CHDGENDR NEI TRAUMA RESP ASSERT YCM_AM YCM_AS YCM_AV YRC_INA;

IDVARIABLE IS NSCAWID;

USEVARIABLES ARE PROBTOT1 PROBTOT3 PROBTOT4 PVN_STD AGEATOOHP;

MISSING ARE ALL (-999);

WEIGHT IS NANALW34;

CLUSTER IS NSCAWPSU;

STRATIFICATION IS STRATUM;

SUBPOPULATION IS AGE_NEW2==2;

!This command specifies which age group this analysis will be run on.

ANALYSIS:

ESTIMATOR=MLR;

TYPE=COMPLEX;

MODEL:

I S| PROBTOT1@0 PROBTOT3@1 PROBTOT4@2;

I ON PVN_STD AGEATOOHP;

S ON PVN_STD AGEATOOHP;

OUTPUT: STDYX TECH4;

Appendix L. Syntax for research question 3

Appendix L presents the syntax for the moderated mediation path analysis model that was used for the third research question of Study Two. As in Appendix I and K, exclamation marks are used to describe each command.

TITLE: MODERATED MEDIATION;

DATA: FILE IS FINAL15.dat;

VARIABLE:

NAMES ARE NSCAWID PROBTOT1 PROBTOT3 Y NANALW34 NSCAWPSU STRATUM
AGE_NEW2 PVN_STD AGEATOOH SELF1 COOP CGDPERM SE1 PVE_STD CHDGENDR NEI W
RESP ASSERT X B C M;

IDVARIABLE IS NSCAWID;

MISSING ARE ALL (-999);

WEIGHT IS NANALW34;

CLUSTER IS NSCAWPSU;

STRATIFICATION IS STRATUM;

USEVARIABLES ARE X B C M W Y XW BW CW;

!X= Minor incident of abuse in the past year

!B= Severe incident of abuse in the past year

!C= Very severe incident of abuse in the past year

!M= Child perceived caregiver involvement

!Y= Problem behavior at Time 3

!W= Post traumatic stress symptoms

SUBPOPULATION IS AGE_NEW2==4;

DEFINE:

XW=X*W;

BW=B*W;

CW=C*W;

! These commands define the interaction terms.

ANALYSIS:

ESTIMATOR=MLR;

TYPE=COMPLEX;

MODEL:

[Y] (b0);

Y ON M (b1);

Y ON X (cdash1);

Y ON B (cdash2);

Y on C (cdash3);

!These commands define the direct effects of the mediating and independent variables on the dependent variable (Problem behavior scores at Time 3).

[M] (a0);

M ON X (a1);

M ON B (a2);

M ON C (a3);

!These commands define the direct effects of the incidents of abuse on Child perceived caregiver involvement.

M ON W (a4);

!This command defines the direct effect of Post traumatic stress symptoms on Child perceived caregiver involvement.

M ON XW (a5);

M ON BW (a6);

M ON CW (a7);

!These commands define the direct effect of the defined interaction terms on Child perceived caregiver involvement.

MODEL CONSTRAINT: NEW (a1b1 a2b1 a3b1 TOTALX TOTALB TOTALC);

a1b1 = a1*b1; !Indirect effect of minor incident of abuse on Y via M

a2b1= a2*b1; !Indirect effect of severe incident of abuse on Y via M

$a3b1 = a3 * b1$; !Indirect effect of very severe incident of abuse on Y via M

$TOTALX = a1 * b1 + cdash1$; !Total effect of minor incident of abuse on Y

$TOTALB = a2 * b1 + cdash2$; !Total effect of severe incident of abuse on Y

$TOTALC = a3 * b1 + cdash3$; !Total effect of very severe incident of abuse on Y

OUTPUT: STDYX MODINDICES;