Investigating the role of social relationships in children's emotional and behavioural difficulties

Elise Sellars

Magdalen College, University of Oxford

Supervisor: Professor Lucy Bowes

A thesis submitted for the degree of

Doctor of Philosophy

Trinity Term 2025

Abstract

Relationships with family and friends are foundational to children's emotional and behavioural development. Developmental and family systems frameworks highlight that children's emotional and behavioural difficulties arise, in part, through children's interactions across multiple interconnected systems in their lives, including their family and school. Importantly, children's interactions within one subsystem (e.g., the parent-child relationship), can influence their emotions and behaviours in ways which affect their interactions in other subsystems (e.g., their sibling or peer relationships). This can initiate cascading cycles that either support healthy development or escalate emotional and behavioural difficulties.

However, important gaps persist in our understanding of the influence of social relationships in children's emotional and behavioural difficulties, which this thesis aimed to address. First, while friendships are associated with children's better-than-expected functioning (i.e., resilience) following adversities such as maltreatment, the dynamic unfolding of these processes across development is not well understood. Furthermore, despite behavioural parenting programmes being the recommended strategy to reduce child behavioural difficulties, their effects on children's behaviour beyond the parent-child subsystem, including on the behaviour of other children in the family, and on children's sibling and peer relationships, are largely unexplored.

Therefore, grounded in a systems framework, this thesis aimed to: 1) determine individual differences in co-occurring patterns of children's emotional resilience, behavioural resilience, and friendship support, given their level of exposure to maltreatment; 2) examine the spillover effects of parenting programmes on sibling behaviour; and 3) consider the impact of parent training on children's interpersonal conflict. To address these gaps and allow for the study of both developmental processes, and the causal effects of intervening in the parent-child relationship, this thesis leveraged the complementary strengths of longitudinal

birth cohort data and individual-level pooled data from 15 randomised controlled trials of a behavioural parenting programme. Advanced quantitative methods, including group-based multi-trajectory modelling and latent transition analysis, were used to identify individual differences in patterns of outcomes over time.

Results from examining co-occurring resilience and friendship support trajectories showed that while there was variation in children's emotional and behavioural resilience, perceptions of friendship support were generally high, even among groups of children with more vulnerable resilience trajectories. Findings on the broader effects of behavioural parenting programmes highlight their potential to reduce sibling conflict where this is a concern. However, for most families, the programme did not reduce behaviour problems in more than one child per family and showed no effects on children's conflict with peers, highlighting potential boundaries of such programmes in their current format.

Across all studies, findings underscore the necessity of looking beyond single systems of functioning (e.g., the parent-child subsystem or friendships) for a complete understanding of the role of social relationships in children's emotional and behavioural difficulties. Findings also highlight the utility of person-centred analytic approaches in revealing individual differences in outcomes. This has important implications for future observational and intervention work wishing to take a systems approach to advance the study of children's relationships and behaviour.

Table of contents

List of tables

List of figures

Acknowledgements

Just as my thesis centres on the importance of supportive relationships, my DPhil experience has been enriched by the support of many wonderful people. First, thank you to my primary supervisor, Professor Lucy Bowes for always believing in me and supporting me to follow my interests. To my supervisory team, Dr Patty Leijten, Professor Bonamy Oliver, and Professor Frances Gardner, thank you for your insightful input throughout my DPhil. I am so grateful to you all for your collective guidance and for helping me to develop as a researcher.

I am also grateful to my Incredible Years co-authors for sharing their expertise with me and for their enthusiastic support of my research. Thank you to Professor Gaia Scerif, Professor Polly Waite, and Professor Pasco Fearon for the time invested in reading my work and providing valuable feedback at each DPhil milestone. I am also very grateful to the Grand Union Doctoral Training Partnership for their generous funding of my research.

Thank you to my fellow oRANGE lab members- working with you all is such a joy. To Athena, thank you for your uplifting friendship throughout our DPhils – I cannot imagine a better friend to accompany me through the highs and lows! To Liina, Merlin, and Karen in the PRECISION lab, thank you for making me so welcome during my research visit to the University of Amsterdam, and for your friendship beyond. And to my friends and colleagues in the Anna Watts office, thank you for creating such a positive workplace.

Finally, thank you to my family and friends for reminding me of the most important things in life. To my Mum, especially, thank you for a lifetime of love and encouragement. And to my partner, Levi, thank you for all the ways you make each day better. *Szeretlek*.

List of relevant publications

Published

1. **Sellars, E.**, Bowes, L., Oliver, B. R., Gardner, F., Axberg, U., Berry, V., Seabra-Santos, M. J., Hutchings, J., McGilloway, S., Menting, A. T. A., Overbeek, G., Scott, S., & Leijten, P. (2024). Effects of the Incredible Years parenting program on children's interpersonal conflict: An integrative data analysis. *Journal of Family Psychology, 38*(6), 847–857. https://doi.org/10.1037/fam0001236.

2. **Sellars, E.**, Bowes, L., Oliver, B. R., Gardner, F., Hutchings, J., McGilloway, Melendez-Torres, G.J., & Leijten, P. (2025). Effects of the Incredible Years parenting program on sibling conduct problems: A latent transition analysis. *JCPP Advances,* e70006. https://doi.org/10.1002/jcv2.70006

In press

3. **Sellars, E.**, Oliver, B. R., Leijten, P., Bowes, L. (in press). Trajectories of psychosocial functioning across maltreatment levels: A group-based modelling approach to resilience. *Development and Psychopathology.*

Declaration

All work in this thesis is original and is my own work, except where explicitly acknowledged in the text. Chapters 4 and 5 are based on published peer-reviewed journal articles that have been adapted, formatted, and edited for this thesis.

For all the empirical chapters in this thesis, I am the primary author. For each study, I was fully responsible for data management, data analysis, data processing, writing, editing and corrections. While I led all work presented in these chapters, the initial conceptualisation and design of the studies were developed in collaboration with my DPhil supervisory team. Proofreading of manuscripts prior to journal submission were completed in collaboration with study co-authors.

All empirical chapters are based on secondary data analyses. For Chapter 3, data collection and general dataset construction was completed by the ALSPAC study team at the University of Bristol. I accessed the ALSPAC data as a co-applicant on Professor Lucy Bowes' ALSPAC project proposal 'Understanding developmental trajectories of risk and resilience amongst children who experienced adverse childhood experiences' (B3990).

Chapters 4 and 5 utilised pooled individual participant data from trials of the Incredible Years parenting programme. This dataset was compiled by Dr Patty Leijten (University of Amsterdam) and Professor Frances Gardner (University of Oxford), as part of a project funded by the National Institute of Health Research Public Health Research Program (PI Frances Gardner, grant number: 12-3070-04). For the purposes of this thesis, I harmonised data from an additional trial, which finished after the original data pooling study (data provided by Dr Leijten), to integrate with the original dataset. All principal investigators of the original trials used in Chapter 4 (three trials), and 14 out of the 15 trials included in

Chapter 5, opted to be included as co-authors in the corresponding journal articles. Beyond providing data for the original pooling study, their role was reviewing the manuscript draft prior to publication.

Chapter 1: Introduction

Social relationships are key determinants of child development, associated with both concurrent and future wellbeing and psychopathology (Masten, 2024). A central tenet of developmental psychopathology is that children's emotional and behavioural difficulties arise, in part, through the continuous, bidirectional, interactions between a child and the different systems in which they are embedded (Masten, 2006; Sameroff, 1975). Such systems encompass children's family, school, and wider community. Extant research demonstrates that negative family and peer relationships are associated with children's increased risk for both concurrent and later emotional and behavioural difficulties (Buist et al., 2013; Parker et al., 2015; Patterson, 1982). Conversely, positive relationships are associated with fewer difficulties, and may even support children's better-than-expected mental health following early adversity (Fritz, de Graaff, et al., 2018).

This chapter provides an overview of the relevant literature. It begins with an overview of child emotional and behavioural difficulties, before reviewing the relevant literature on children's social relationships, concluding with a summary of the aims, research questions and chapters in this thesis. While my broad interest lies in children's psychological functioning, particular emphasis is placed on behavioural difficulties in this introduction and the following empirical chapters. This focus stems from behavioural difficulties receiving less funding and research attention than other forms of psychopathology (Burt et al., 2018). Furthermore, children with behavioural difficulties often elicit less sympathy from teachers, clinicians, and parents, despite facing similarly severe outcomes as those with other psychopathologies (Waller et al., 2025). This highlights the need to better understand interventions that can effectively reduce behavioural difficulties.

Consequently, two of my studies (Chapters 4 and 5) focus specifically on behavioural difficulties, and the effects of behavioural parenting programmes designed to reduce such difficulties. In contrast, Chapter 3 takes a broader approach by examining resilience to both emotional and behavioural problems in the context of adverse parent-child interactions. This reflects the understanding that children may show resilience in one mental health domain but not another, demonstrating the importance of studying both emotional and behavioural difficulties (Luthar & Cicchetti, 2000).

1.1 Overview of child emotional and behavioural difficulties

1.1.1 Definitions

Emotional difficulties, or internalising behaviours, include fearful, depressive, or withdrawn behaviours (American Psychiatric Association, 2013). These behaviours exist on a continuum and, when severe, may meet diagnostic criteria for anxiety or depressive disorders (American Psychiatric Association, 2013). Behavioural difficulties encompass a range of different externalising behaviours, including disruptive behaviours (also known as conduct problems). Examples of these behaviours include antisocial, aggressive, or rule-breaking actions. Such difficulties are also on a continuum and, if severe, may meet diagnostic criteria for conduct disorder (American Psychiatric Association, 2013).

Emotional and behavioural difficulties are typically studied separately, and interventions to reduce such difficulties in children differ. However, far from being mutually exclusive difficulties, comorbidity in emotional and behavioural problems is likely to be the norm, rather than the exception (Caspi & Moffitt, 2018).

1.1.2 Prevalence

Childhood emotional and behavioural difficulties are a public health concern, with United Kingdom prevalence rates estimated at 8% and 5%, respectively (Sadler et al., 2018), mirroring global trends (Polanczyk et al., 2015). Concerningly, prevalence and severity of emotional and behavioural difficulties in children have increased over recent decades (Armitage et al., 2024; Collishaw, 2015; Newlove-Delgado et al., 2022). Armitage et al. (2023) found that a cohort of children born in the early 2000s showed earlier and steeper increases in emotional problems, which persisted across development, compared to a cohort born in the early 1990s. Furthermore, during adolescence, the prevalence of clinical levels of emotional and behavioural difficulties was nearly twice as high in the 2000s cohort compared to the 1990s cohort (Patalay & Gage, 2019).

1.1.3 Long-term outcomes

Children's emotional and behavioural difficulties have immediate negative consequences, such as social and academic difficulties, and long-term negative consequences, including increased risk of adult mental health conditions, impaired social relationships, educational exclusion, unemployment, and poorer physical health (Bevilacqua et al., 2018; Costello & Maughan, 2015). Childhood depression increases the risk of adult depressive or anxiety disorders (Copeland et al., 2009, 2011, 2021), with some studies finding a twofold risk increase (Rohde et al., 2013). Cohort studies show that adolescents with early onset conduct problems were twice as likely to engage in substance abuse and risky sexual behaviour compared to their peers, even when accounting for confounding factors (Kretschmer et al., 2014).

Problems stemming from early behavioural and/or emotional difficulties impose substantial societal costs. Data from the Dunedin Multidisciplinary Health and Development

Study estimates that individuals with life-course persistent conduct problems, despite comprising only 9% of the population, accounted for 53% of all convictions and 16% of emergency department visits (Rivenbark et al., 2018). Importantly, for some children, early difficulties may shape negative interactions with parents, peers, or teachers, in ways that place them at subsequent risk for more enduring problems (Waller et al., 2025). Given the pervasive and costly effects of such problems, understanding the factors that influence children's emotional and behavioural difficulties is essential for guiding research, practice, and policy to support child wellbeing.

1.2 Parent-child relationships

The following sections (1.2–1.4) outline the role of relationships with family (parents, siblings) and peers in children's emotional and behavioural difficulties, beginning with parent-child relationships.

Parent-child interactions are essential for understanding the aetiology of children's emotional and behavioural difficulties, as emphasised in developmental psychopathology frameworks (Frick & Viding, 2009). Parenting practices (specific behaviours and strategies, such as discipline techniques, communication styles, and expressions of warmth; Bornstein, 2019) serve as building blocks for the parent-child relationship, shaping it in ways that can either support or impede child development. Decades of research have established links between parenting practices and child emotional and behavioural difficulties (Pinquart, 2017b, 2017a). Moreover, changing parent-child relationships and parenting practices are central to evidence-based interventions aimed at treating and preventing behavioural difficulties in children (Beelmann et al., 2023). This will be reviewed later in the chapter. This section outlines associations between parenting practices, parent-child relationships, and child emotional and behavioural difficulties, and theories that may explain these links.

1.2.1 Harsh parenting versus maltreatment: A note on definitions

The following sections include a focus on the contributions of harsh parenting to negative parent-child interactions. However, it is important to note that parental violence towards children can be defined as either 'child maltreatment' or 'harsh parenting', with the overlap versus distinction between the two constructs often unclear (Backhaus, Leijten, Meinck, et al., 2023). The World Health Organization defines child maltreatment as: "all forms of physical and/or emotional ill-treatment, sexual abuse, neglect or negligent treatment or commercial or other exploitation, resulting in actual or potential harm to the child's health, survival, development or dignity in the context of a relationship of responsibility, trust or power" (World Health Organization, 1999, p. 15).

Definitions of harsh parenting are less consistent. Some studies give examples of the behaviours that form their measurement of harsh parenting (e.g., smacking/hitting) as their definition, while others use terminology from child maltreatment definitions. Most studies reviewed in this 'parent-child relationships' section refer to harsh parenting as parental attempts to control the parent-child relationship using anger, coercion, aggression, or emotional reactions- encompassing both physical and verbal punishment (Backhaus, Leijten, Meinck, et al., 2023).

Although harsh parenting is sometimes considered less severe than child maltreatment, it has similarly harmful effects on children's mental health (Gershoff et al., 2018; Gilbert et al., 2009). Moreover, prevention strategies overlap, with parenting programmes such as Incredible Years used to reduce both harsh parenting and child maltreatment (Gardner & Leijten, 2017; Hurlburt et al., 2013). Overall, there is much to be decided in the research, policy, and clinical communities about distinctions versus overlap between child maltreatment and harsh parenting. The proceeding thesis section focuses on

harsh parenting as a contributor to negative parent-child interactions, while acknowledging that such practices may also encompass behaviours classified as maltreatment.

1.2.2 Links between parenting and child emotional and behavioural difficulties

Meta-analyses by Pinquart (2017a, 2017b) demonstrate associations between parenting practices and children's externalising and internalising problems. These studies focused on central parenting dimensions, such as: *warmth* - accepting, nurturing, and supportive behaviours; and *harsh control* - characterised by physical or verbal punishment, and intrusive behaviours. Pinquart (2017a) synthesised data from over 1, 400 studies (> 1 million children, mean age = 10 years, *SD* = 4), finding that greater parental warmth was associated with fewer externalising problems (cross-sectional: r = -.18; longitudinal: r = -.15), while greater parental harsh control was associated with more externalising problems (cross-sectional: r = .21; longitudinal: r = .17). Similar effect sizes and directions were observed for internalising problems in a separate meta-analysis (Pinquart, 2017b).

Both meta-analyses revealed bidirectional associations in longitudinal studies. For example, higher levels of internalising and externalising problems were associated with increases in parental harsh control and reductions in parental warmth. These findings support transactional models of parent-child relationships, where parents and children shape each other's behaviours (Sameroff, 1975).

1.2.3 Theoretical explanations

1.2.3.1 Attachment theory

Attachment theory (Ainsworth, 1989; Bowlby, 1973) emphasises the importance of a secure parent-child bond for children's emotional security and adaptive development. Secure attachments provide a 'safe base' for children to explore their environment. Children who do

not have a reliable caregiver who responds sensitively to their needs, particularly when distressed, may develop maladaptive behaviour patterns.

One mechanism which might link early attachment to later mental health is the child's internal working model, a cognitive-affective framework which shapes their perceptions of self-worth, competence in navigating their environment, and the availability and dependability of others (Sroufe et al., 2005). Securely attached children, approaching interactions with trust, may be more likely to receive positive responses, reinforcing their adaptive working models. Conversely, insecurely attached children may approach situations with mistrust and low confidence, increasing their likelihood of negative interactions that reinforce their maladaptive internal working models, contributing to behavioural and emotional difficulties (Fearon et al., 2010).

Attachment relationships may also shape children's emotion regulation strategies (Sroufe, 1979). Securely attached children may be better able to regulate their emotional responses, whereas insecurely attached children may have dysregulated emotion responses, which might increase their risk for mental health difficulties (Cassidy, 1994).

Meta-analyses support these links. From 69 studies, (N = 5, 947 children) Fearon et al. (2010) found that insecurely attached children showed higher levels of externalising behaviours than securely attached children (Cohen's d = 0.31). Groh et al. (2012) found a similar, but smaller effect on internalising symptoms (Cohen's d = 0.15) from 42 studies (N = 4, 614)- children rated as insecurely attached showed higher levels of internalising behaviour than those rated as securely attached. Authors suggest that the stronger association with externalising behaviour may reflect that insecurely attached children are more likely to use impulsive emotion regulation strategies, which are linked to externalising problems (Eisenberg et al., 2001). Alternatively, externalising problems might present first, resulting in

social and academic difficulties which then lead to later internalising difficulties (i.e., dual-failure model; Capaldi, 1992).

1.2.3.2 Social learning theory

Social learning theory (Bandura & Walters, 1977) emphasises the role of observational learning and reinforcement in shaping behaviour. It is particularly useful when explaining associations between parenting practices and child behavioural difficulties. For example, Patterson's coercive behaviour model (Patterson, 1982), grounded in social learning theory, identifies two key processes in families with child behaviour difficulties. First, parental harsh discipline may unintentionally teach children to also behave aggressively. Second, 'reinforcement traps' may occur when parent-child interactions unintentionally reward (and therefore, reinforce) aversive behaviour in each other, creating coercive cycles of interactions which become increasingly difficult to manage. Such cycles can lead to the development of behavioural difficulties in children. For example, a child's defiance of parental requests is reinforced if parents yield to disruptive behaviour, while parental harshness is reinforced if it secures child compliance (Kaehler et al., 2016). Coercive cycles not only escalate negative behaviours but also reduce opportunities for positive parent-child interactions, limiting reinforcement of prosocial behaviours (Gardner, 1987).

1.3 Sibling relationships

1.3.1 Links between sibling relationships and child emotional and behavioural difficulties

Several features of the sibling relationship suggest that it is likely to be formative for children's development. First, siblings feature prominently in the lives of most children; by middle childhood, children typically spend more time with their siblings than with their parents (McHale et al., 2007). Second, sibling relationships are unique in their frequent shifts

between conflict (e.g., physical or verbal aggression, hostility, and coercion) and warmth (e.g., affection, support; Kramer, 2004; R. Sanders, 2004). Despite their significance, sibling relationships are understudied compared to parent-child relationships (Holmes et al., 2024). A systematic review of family systems studies published in the top six family science journals from 2008 to 2018 found just 94 studies focused on siblings, compared to 2, 582 on parent-child relationships (Perez-Brena et al., 2022). This disparity is concerning, given the increasing recognition that sibling relationships influence children's development, for better or for worse (Pike et al., 2005; Tucker et al., 2013). Considering this, sibling relationships warrant focused attention. This section outlines associations between dimensions of the sibling relationship (sibling warmth and conflict) and individual child emotional and behavioural outcomes, and theories that explain these associations.

Higher levels of sibling conflict are consistently associated with an increased risk of mental health problems, whereas warmer sibling relationships are linked to a decreased risk and may even promote prosocial behaviour (Pike et al., 2005; Pike & Oliver, 2017). A meta-analysis by Buist et al. (2013) examined links between sibling relationship quality and internalising and externalising problems in children and adolescents. Thirty-four studies (cross-sectional and longitudinal) were included, providing 85 effect sizes from approximately 12, 000 children aged 4 to 18 years. Moderate effect sizes were found for between sibling conflict and internalising (r = .27) and externalising (r = .28) symptoms, suggesting more sibling conflict was associated with greater mental health problems. Smaller associations were found between sibling warmth and reduced psychopathology. More sibling warmth was linked to lower internalising (r = -.12) and externalising (r = -.14) symptoms. The authors suggest that the stronger effect of conflict aligns with evolutionary principles, where negative experiences may be more salient for survival than positive ones, and thus have a stronger influence on behaviour.

Buist et al.'s findings highlight the importance of sibling relationships, but do not address bidirectional influences, where individual child behaviour may also affect later sibling relationship quality. Understanding this distinction is important, because it helps to clarify whether sibling relationships actively shape individual child behaviour or merely reflect a child's prior behavioural profile. Pike and Oliver (2017) explored this using data from 2, 043 sibling dyads in middle childhood, in the Avon Longitudinal Study of Parents and Children. They employed cross-lagged analysis to examine the temporal directions of links between dyadic sibling relationships. This method allowed for the examination of the relative influence of individual child behaviour to sibling relationship quality over time and vice versa, while accounting for behavioural stability and cross-sectional associations. Results showed bidirectional effects: higher conduct problems predicted more sibling dyad negativity three years later, and greater sibling negativity predicted more conduct problems. Similarly, positive sibling relationships were associated with later individual prosocial behaviour, and vice versa. This study reinforces the importance of sibling relationships for child development. While individual characteristics do influence sibling dynamics, sibling relationships are not merely a reflection of each child's behaviour; they uniquely contribute to developmental outcomes. This has important clinical implications, indicating that improving either individual child behaviour *or* sibling relationships, may have positive, reciprocal effects on the other (Pike & Oliver, 2017). However, this is yet to be tested in interventions.

The importance of sibling relationships is further highlighted by findings that sibling support can buffer the effects of stressful life events on children's risk of psychopathology. For example, Gass et al. (2007) found that children with affectionate sibling relationships had fewer depressive symptoms two years after stressful life events than children with unsupportive sibling relationships. Notably, this relationship occurred regardless of quality of

the parent-child relationship. Authors posit that siblings, like parents, may provide security and comfort during difficult times, or provide distraction from stress.

1.3.2 Theoretical explanations

There is no single, unified theory to explain how sibling relationships influence children's mental health (Whiteman et al., 2011). The mechanisms underlying these associations are not fully understood, but are likely complex and intertwined with broader family dynamics that shape children's behaviour (Stormshak et al., 2009). Nonetheless, several theories, particularly those rooted in social learning processes, provide valuable insights.

1.3.2.1 Social learning theory

Social learning theory proposes that individuals acquire new behaviours through two key mechanisms: reinforcement and observation of other's behaviour. Within this framework, Patterson and Dishion's work laid the foundations for understanding of how conflictual sibling relationships may increase children's externalising behaviours (Patterson, 1984; Patterson et al., 1984). In his seminal work, *Siblings: Fellow travelers in coercive family processes* (Patterson, 1984), Patterson proposed that sibling conflict fosters externalising behaviour through the process of coercion. Coercion occurs when siblings use aggression to terminate conflicts, reinforcing aggressive behaviour. The coercion model suggests that siblings unintentionally 'train' this behaviour in one another, learning that aggressive responses lead to 'winning' arguments. Patterson et al. (1984) further demonstrated that these learned aggressive behaviours extend beyond the family, increasing the likelihood of externalising problems in social contexts, such as peer relationships. When sibling relationships serve as a training ground for hostile interactions, these coercive patterns can generalise, heightening the risk of broader behavioural problems. Conversely, warm sibling relationships may serve as resources for learning and reinforcing prosocial behaviours (Pike

et al., 2005). Siblings who engage in cooperative play may reinforce skills such as sharing, co-operation, and empathy, which can generalise to interactions with peers (Yeh & Lempers, 2004).

1.3.2.2 Attachment theory

Attachment theory also offers a framework to understand how sibling relationships may influence children's emotional and behavioural difficulties. Alongside primary caregiver attachment bonds, children may also form attachment bonds with siblings, due to their consistent presence in children's daily life (Ainsworth, 1989).

As with warm parent-child relationships, positive sibling relationships may foster secure attachment bonds, which enhances a child's sense of emotional security, reducing their risk of psychopathology. Conversely, negative sibling attachment bonds may lead to internalised feelings of unworthiness, contributing to risk of anxiety and depression. Sibling conflict may also shape children's perceptions of their broader social environment, fostering a belief that others are untrustworthy or hostile, contributing to externalising problems (Buist et al., 2013).

1.4 Peer relationships

1.4.1 Links between peer relationships and children's emotional and behavioural difficulties

The contribution of peer relationships, including friendships, to children's psychopathology has long been recognised. From a developmental psychopathology perspective, psychopathology arises in part from complex interactions between an individual and the multiple systems in which they are embedded. Peer relationships are major systems of interaction, as children spend a considerable amount of time with peers from preschool onwards (Masten, 2005).

Friendship is a multidimensional construct, encompassing the number of friends, the quality of those friendships (e.g., positive qualities such as closeness and support; negative qualities such as conflict), and the characteristics of friends (Hartup & Stevens, 1997). It is not just having friends that matters for children's development, but also the behavioural adjustment of those friends. Affiliations with depressed or antisocial peers may increase children's risk for subsequent emotional or behavioural difficulties, respectively, whereas high-quality friendships with prosocial peers are typically associated with healthy development (Bukowski & Adams, 2005). This section explores evidence for the influence of peer relationships on their emotional and behavioural difficulties and the theories which explain these influences.

The Oregon Youth Study, beginning in 1984, was one of the first longitudinal studies to explore the role of peer relationships in children's behavioural difficulties (Patterson et al., 1992). Following approximately 200 boys from lower-income neighbourhoods in Oregon from ages 9–10 into adulthood, the study found that affiliation with antisocial peers predicted increases in antisocial behaviour, even when controlling for pre-existing behaviour difficulties (Dishion et al., 1996). This occurred via transactional dynamics, where children with high levels of disruptive behaviour were more likely to befriend 'deviant' peers, forming friendships that reinforced and escalated disruptive behaviour. These peer influences had long-lasting effects, contributing to antisocial behaviour in early adulthood (Capaldi et al., 2001; Patterson et al., 1992). While this study focused on the behaviour of males in middle childhood, its findings have been replicated in other cohorts, including mixed gender (Woodward & Fergusson, 1999) and younger children (Snyder et al., 2005).

In addition to predicting behavioural difficulties, negative friendship qualities (e.g., conflict, criticism, jealousy, and rivalry) are also linked to children's emotional difficulties. Meta-analytic evidence from 233 studies (589 unique effects) found positive associations

between negative friendship quality and both concurrent (r = .26) and longitudinal (r = .20) depressive symptoms (Schwartz-Mette et al., 2020). Furthermore, initially high levels of depression predicted lower friendship quality (r = -.14), suggesting a bidirectional relationship, potentially due to behaviours such as excessive reassurance seeking placing a strain on friendships.

The association between friendship quality and emotional difficulties is nuanced. While positive aspects of friendship, such as closeness and support, typically predict wellbeing (Schwartz-Mette et al., 2020), certain forms of support may be counterproductive. For example, Stevens & Prinstein (2005) found that having a best friend with high levels of depressive symptoms predicted increases in an individual's depressive symptoms one year later.

1.4.2 Theoretical explanations

1.4.2.1 Deviancy training

Deviancy training refers to the process by which deviant behaviours (e.g., rule-breaking, aggression) are positively reinforced within friendships through mutual encouragement and normalisation of deviant behaviour (Dishion & Tipsord, 2011). This mechanism explains the links between affiliation with antisocial peers and increased behavioural difficulties. For example, in the Oregon Youth Study, deviancy training in adolescent dyads, operationalised as the rate at which boys provided positive reinforcement (e.g. laughing) during discussions of rule-breaking fully mediated the association between involvement with deviant peers at age 10, and increased engagement in new forms of problem behaviour (e.g. police arrests) at age 18 (Patterson et al., 2000). Indeed, this mechanism has consistently been linked to adverse outcomes such as substance abuse, aggression, and intimate partner violence (Ha et al., 2023; Piehler & Dishion, 2007).

1.4.2.2 Co-rumination

Co-rumination, the repeated discussion of problems within a dyadic friendship, characterised by mutual encouragement to dwell on issues, speculate about their causes, and focus on negative associated emotions, may explain associations between friendships with depressed peers and individual emotional difficulties (Rose, 2002). While sharing thoughts and feelings is typically associated with high-quality relationships, co-rumination may be maladaptive, as excessive problem-focused discussions may increase depressive symptoms. Longitudinal studies indicate a bidirectional association between co-rumination and internalising problems (Rose et al., 2007). Although effect sizes are typically small, this dynamic may escalate over longer periods, creating a 'snowball' effect, however this hypothesis is yet to be fully tested (Rose, 2021). Notably, co-rumination appears more frequent in females than males, which may be help explain the seemingly contradictory findings that girls have closer friendships but also higher levels of internalising problems than boys (Rose, 2021).

1.4.2.3 Summary of peer influence theories

Peer influence theories, such as deviancy training and co-rumination, are the dominant explanations for the association between friendships and individual development. However, the magnitude of peer influence across internalising and externalising behaviours has only recently been systematically studied. A meta-analysis of 60 longitudinal studies (233 effect sizes) found that youth with friends exhibiting specific behaviours were more likely to report increases in these same behaviours over time ($\beta = .08$ for both internalising and externalising behaviours; Giletta et al., 2021). While effect sizes were small, they may be underestimated. Most studies had a time lag exceeding six months between timepoints, but peer influence mechanisms are predicated on dynamic interactions that occur over a shorter timeframe, with immediate effects. Furthermore, baseline measures are unlikely to represent the true start of a friendship, meaning that influence on behaviour could have occurred prior to baseline.

Therefore, the influence of peers on children's behaviour may greater than currently recognised.

1.5 Theoretical frameworks: A systems approach

The previous sections reviewed evidence for the influence of parent, sibling, and peer relationships on child's emotional and behavioural difficulties, considering each relationship separately. However, in reality, children's relationships do not occur in isolation; rather they are embedded within broader social contexts, from their immediate family to their school and neighbourhood environments (Bronfenbrenner, 1979). These contexts function as interconnected systems, where interactions in one system can influence those in another. This occurs both within systems (e.g., within the family system, parent-child conflict may 'spillover' into a child's conflict with their sibling), and between systems (e.g., family relationship dynamics may shape children's peer interactions at school, and vice versa). To fully understand how social relationships contribute to children's emotional and behavioural difficulties, this thesis draws on family systems theory, which conceptualises families as dynamic, interdependent subsystems which influence each other (Minuchin, 1985), and developmental systems theory, which explains how relationship dynamics can transfer across contexts (Lerner, 2006).

Developmental systems theory also provides a framework for understanding variation in children's emotional and behavioural difficulties following adversity, such as harsh parenting and, at its extreme, maltreatment (Cicchetti, 2013). Specifically, it highlights how interactions in a child's wider environment (e.g., with peers) may support better-than-expected functioning despite adversity- a process referred to as resilience. The following section outlines these theoretical perspectives in more detail.

1.5.1 Family systems theory

1.5.1.1 Overview

My work is grounded in family systems theory (Minuchin, 1985), which evolved from general systems theory, a 20th-century transdisciplinary paradigm for understanding complex, interdependent systems (Bertalanffy, 1968). General systems theory views systems as organised wholes with interconnected elements that influence each other. Principles from the theory were first applied to families in the treatment for conditions like schizophrenia, shifting the focus from an individual's behaviour in isolation to considering behaviour within the broader family context (Bateson et al., 1956).

Minuchin's work in the 1980s advanced the application of family systems to child development research. Minuchin called for a holistic approach that extends beyond examining individual family dimensions (e.g. parent-child relationships) to consider the wider family system, including subsystems such as parent-child, parent-parent, sibling-sibling, and parent-sibling relationships (Minuchin, 1985). This perspective emphasises that individuals cannot be understood in isolation; family subsystems are interdependent, and behaviour within one dyad can indirectly affect others. It offers a comprehensive framework for studying children's emotional and behavioural development in the family context. Key principles of family systems theory, outlined in Minuchin's work (Minuchin, 1985), include:

1. Interdependence: Family systems are organised wholes, with subsystems influencing one another.
2. Bidirectional influence: Behaviour is shaped through circular, not linear, interactions. This can occur for both emotional and behavioural difficulties. For example, a child's behavioural problems may trigger harsh parenting, which exacerbates the child's behaviour in a negative feedback loop. With emotional problems, a child's fears may trigger overprotective parenting, further reinforcing the child's worries.

3. Stability and change: Parents might unwittingly use maladaptive strategies to try and maintain stability of interaction patterns when their child behaves in ways which depart from expected interaction patterns. For example, using harsh discipline to curtail a child's whining. However, families can change these patterns in response to external influences, such as a parenting intervention.

Central to family systems theory is the concept of feedback loops- causal links between subsystems (Weeland et al., 2021). Changes in one subsystem can influence others, creating either positive or negative feedback loops. For example, in the context of child disruptive behaviour, coercive interaction cycles between a parent and child may increase parental stress, straining other family relationships. Conversely, constructive discipline strategies that reduce a child's disruptive behaviour, may help to restore family balance (Weeland et al., 2021).

Although feedback loops within family systems have been less studied in relation to children's emotional problems, we know that children's emotional difficulties are a robust predictor of parental stress (Mcdonald et al., 1999) and that parental stress negatively affects interparental relationships (Zemp et al., 2017). Therefore, it is plausible that interventions targeting the parent-child subsystem to help reduce child emotional difficulties, could help reduce parental stress, leading to cascading positive effects on interparental relationships.

1.5.1.2 Longitudinal evidence

Increasing evidence supports the utility of taking a family systems approach to child development. For example, longitudinal studies demonstrate reciprocity in parent-child hostility: children with behavioural problems elicit harsh parenting, which then escalates their behaviour difficulties (Lansford et al., 2011; Speyer et al., 2022). This bidirectional dynamic is central to behavioural parenting programmes, which aim to disrupt such cycles and reduce child behavioural problems (Webster-Stratton, 2015). Large-scale longitudinal cross-cultural

cohort data also provides evidence for the bidirectional associations between children's emotional problems and parenting behaviour: increases in positive parenting behaviours (e.g., responsivity and warmth) precede reductions in child internalising problems, and increases in children's internalising problems precede reductions in positive parenting behaviours (Lansford et al., 2018). These associations have been found from early childhood onwards (Thompson et al., 2025).

Family subsystems also influence one another. For example, a lack of affection and high levels of hostility between mothers and their partners predicted high levels of negativity between sibling pairs (N = 3, 000) four years later (J. Dunn et al., 1999). Conversely, positive interparental relationships, marked by warmth and support, may spillover into positive sibling relationships. In support of this, a systematic review by Zemp et al. (2021) of 42 studies across six countries (N = 29, 746) found a small positive correlation between interparental relationship quality and sibling relationships (r = .14). Additionally, parental differential treatment (when one child receives more positive or negative attention than their sibling) may influence subsequent sibling relationships, increasing rivalry between siblings. For example, Shanahan et al. (2008) found that siblings whose parent-child relationships decreased in warmth relative to those of their sibling also reported less warmth in their sibling relationship across a five-year period.

1.5.2 Developmental systems theory

1.5.2.1 Overview

Family systems theory highlights the role of family interactions in shaping children's development, but children are also part of broader systems, such as schools and communities. Just as subsystems within a system are interlinked, children's behaviour can also carry relationship dynamics from one system to another, initiating cycles of interactions that either support development, or escalate problem behaviours. For example, negative parent-child

relationships increase the risk for peer victimisation, and vice versa, mediated by increases in internalising and externalising behaviour (Kaufman et al., 2019). Unmet social needs in the parent-child relationship are hypothesised to lead children to act out in ways that heighten their risk of peer exclusion; while peer difficulties might increase children's aggressive, withdrawn, or anxious, behaviour, resulting in negative parental responses (Kaufman et al., 2019).

Developmental systems theory accounts for the role of multiple systems in shaping child behaviour, proposing that development arises from ongoing interactions between genetic, biological, environmental, and cultural systems (Lerner, 2006). According to the theory, a child is embedded within various interdependent social systems, from their immediate family and school environments to broader community and government influences (Bronfenbrenner, 1979). Changes in one system may alter emotions and behaviours in ways that influence interactions in other systems (as in Kaufman et al., 2019). Thus, the emergence and maintenance of child emotional and behavioural difficulties is posited to result from transactional and iterative interactions between an in individual and the dynamic networks of systems they are part of.

1.5.2.2 Applying developmental systems theory to the study of resilience

Developmental systems theory offers a framework for understanding why children's emotional and behavioural functioning varies following adversity, such as maltreatment. While maltreatment is an established risk factor for psychopathology, not all maltreated children develop psychopathology (Cicchetti, 2013). Some children show better-than-expected functioning given their level of exposure to adversity- i.e., demonstrating resilience (Cicchetti, 2013; Collishaw et al., 2007). The current wave of resilience research, informed by developmental systems theory, views resilience as a dynamic and multisystemic process, dependent on time-varying interactions between children and their environments (Masten,

2021; Ungar & Theron, 2020). As such, resilience is context-dependent rather than a stable trait (Masten, 2021). Thus, low resilience at one timepoint does not preclude future resilience, and vice versa. Resilience cannot be directly measured; it is inferred from an individual's mental health and wellbeing following adversity. Importantly, resilience captures positive adaptation across multiple domains of functioning, for example emotional, cognitive, behavioural, and social domains (Masten, 2015). Following this multidimensional perspective, psychopathology in one domain (e.g., behavioural difficulties) does not preclude concurrent resilient functioning in another (e.g., emotional functioning; Luthar & Cicchetti, 2000). As such, for a complete understanding of an individual's resilient functioning, it is important to study multiple domains of adaptation over time.

A core tenet of a resilience theory is multifinality- the idea that children exposed to similar early adversities may diverge onto different developmental pathways depending on their interactions with key resilience factors. These factors operate across multiple ecological levels around the child, from individual psychological capacities (e.g., emotion-regulation abilities) to broader societal influences (e.g., national policies; Masten et al., 2021). Resilience factors can be classified as either promotive (main effects- associated with better functioning across risk levels) or protective (moderating effects- functioning when threat levels are heightened).

Resilience factors can also instigate developmental cascades, whereby early experiences create ripple effects across developmental domains (Masten & Cicchetti, 2010). Peer relationships seem particularly important in shaping these cascades, either amplifying or mitigating the impact of early adversity on children's risk for psychopathology. Positive peer relationships are associated with better-than- expected mental health following exposure to early adversity, including harsh parenting (Cahill et al., 2023; Van Harmelen et al., 2017). In contrast, an absence of friends, or associations with antisocial peers, can exacerbate

associations between harsh parenting and externalising problems (Criss et al., 2002; Lansford et al., 2003). This association remained even when controlling for child temperament and their ability to interpret social cues.

The mechanisms through which friendships support children's resilience following adversity in the home environment are not well understood. One possibility is that high-quality friendships serve as a context for 'remedial socialisation', providing opportunities to learn and practice skills not taught at home (Lansford et al., 2003). Relatedly, friendships may provide opportunities to update negative self-cognitions (for example, low self-esteem), which are harmed by experiences such as emotional abuse by parents (van Harmelen et al., 2016). Additionally, supportive friendships may encourage adaptive behaviours, such as help-seeking and coping (Gunnar, 2017). Finally, through interactions with prosocial peers, children may develop more positive impressions of, and connections to, teachers and school. This connection may, in turn, decrease their risk of externalising behaviours (Criss et al., 2002).

1.6 Interventions

Given the well-established associations between relationship difficulties and emotional and behavioural problems in children (Buist et al., 2013; Dishion & Tipsord, 2011; Pinquart, 2017b, 2017a), interventions often aim to improve relationships to alleviate these problems. Despite the interconnected nature of different relational systems, most interventions focus on changing interactions within a single system. One of the most well-studied approaches is behavioural parent training programmes, which seek to prevent and treat child behaviour difficulties by improving parenting practices and the parent-child relationship.

This section provides an overview of the theoretical foundations of behavioural parenting programmes, introduces Incredible Years as a well-researched example, and

outlines how family systems theory may help explain why there is variation in how families respond to parenting programmes.

1.6.1 Behavioural parenting programmes for child behavioural difficulties

Child behavioural difficulties (also known as disruptive behaviour/conduct problems) can make it challenging for parents to respond in ways which do not inadvertently reinforce such behaviour. For example, when a child's behaviour becomes very intense, it may be hard for parents to remain calm, or resist giving in to demands. Yet, these responses can reinforce children's disruptive behaviour, creating coercive cycles of parent-child interactions which increase the likelihood of both harsh parenting practices and elevated levels of child behavioural difficulties (Patterson, 1982; Pike & Oliver, 2017).

To interrupt these cycles, social learning-based (i.e., behavioural) parenting programmes aim to help parents improve the quality of parenting that their child receives, and in turn, the child's development and behaviour (Gardner & Leijten, 2017). The first formal programmes were developed in the 1960s by researchers such as Gerald Patterson, whose work in Oregon led to the theory of coercive cycles as a key mechanism in the development and maintenance of children's conduct problems (Patterson, 1982). Based on this theory and his clinical observations, Patterson designed and rigorously tested home-based interventions to help parents replace coercive interactions with more consistent and positive parenting practices (Wiltz & Patterson, 1974). Along with other researchers in the field (Kaehler et al., 2016), this work laid the foundation for modern group-based behavioural parenting programmes based on social learning theory principles, such as Incredible Years (Webster-Stratton, 2015), Parent Management Training-Oregon (Forgatch & Patterson, 2010) and the Triple P-Positive Parenting Programme (M. R. Sanders, 2012).

At their core, behavioural parent training programmes aim to break coercive cycles by strengthening parent-child relationships and promoting effective discipline techniques. These

programmes teach parents to build positive relationships with their child, reinforce positive child behaviour, and use nonviolent discipline techniques- positioning parenting behaviour as the mechanism of change. Indeed, changes in parenting behaviour, in particular mechanisms thought to contribute to reductions in coercive interactions (e.g., decreased use of harsh discipline and increased follow-through on discipline) mediate intervention effects on reductions in child disruptive behaviour (Laas Sigurðardóttir et al., 2024).

Behavioural parenting programmes are the recommended approach for preventing and treating child disruptive behaviour (Weisz & Kazdin, 2017), with their effectiveness demonstrated in hundreds of randomised controlled trials worldwide (Backhaus, Leijten, Jochim, et al., 2023; Beelmann et al., 2023). Randomised controlled trials are considered the 'gold standard' for evaluating intervention effects, because random assignment of families to either intervention or control conditions helps ensure that potential confounders (e.g., socio-economic status, parental mental health, and child problem severity) are evenly distributed across groups. This helps to strengthen causal inferences about the effects of parenting interventions on children's behavioural difficulties.

1.6.2 Incredible Years parenting programme

The Incredible Years parenting programme (Webster-Stratton, 2015) is one of the most rigorously evaluated behavioural parent training programmes for child disruptive behaviour (Leijten, Gardner, Landau, et al., 2018; Menting et al., 2013). It is endorsed by organisations such as the National Institute for Health and Care Excellence (UK), the Netherlands Youth Institute, and Blueprints (US).

Developed in the 1980s by Carolyn Webster-Stratton in Seattle, the Incredible Years programme was based on her doctoral and clinical work, which focused on the key role of parent-child interactions in shaping children's behavioural and emotional development (Webster-Stratton, 2015). Like many other social learning-based programmes, it draws on

Patterson's coercion hypothesis (Patterson, 1982) and Bandura's work on parental modelling (Bandura & Walters, 1977) to change child behaviour via changes in parenting practices. It also incorporates attachment theory (Bowlby, 1973), with strategies designed to help build warm parent-child relationships as a way to reduce child disruptive behaviour. Initially designed for parents of children aged 3–8 years old with conduct problems, it has since been expanded for preventive use in at-risk families and adapted for different age groups, including babies, toddlers, and school-aged children (Webster-Stratton, 2015).

Currently, the BASIC programme, designed for parents of children aged 2–12 years old, is the most well-researched and widely implemented version (Gardner & Leijten, 2017)**.** This thesis used data from the BASIC programme. Delivered in small groups of 10–14 parents, over 12–18 weekly sessions led by trained facilitators, it teaches parents techniques to foster warm parent-child relationships (e.g., joint play), encourage positive child behaviour (e.g., praise, rewards to show appreciation for their child's efforts to behave prosocially) and apply constructive non-violent discipline techniques to discourage negative child behaviour (e.g., clear limit setting, ignoring minor misdemeanours, and using time out for more severe disruptive behaviour). Techniques are tailored to children's ages and taught through discussion, video modelling, and role-play practice. A key aspect of the programme is its use of a collaborative delivery style: content is first presented to all members of the group, then leaders work with individual parents to help them identify key principles from the content that can be applied to their specific parenting goals (Gardner & Leijten, 2017).

The effectiveness of Incredible Years is well-documented (Leijten, Gardner, Landau, et al., 2018; Menting et al., 2013). An individual-participant data meta-analysis (where data from multiple trials is integrated at the individual level, as opposed to traditional trial level averages) of data from almost all randomised trial of Incredible Years in Europe (14 studies, N = 1, 799 families), found significant reductions in children's disruptive behaviour (β = -

.35). Importantly, moderator analyses using this pooled dataset suggest that families with a range of social or socioeconomic disadvantages, and those from ethnic minorities, are just as likely to benefit from the programme (provided, of course, that they have access to the programme). The programme may even reduce inequalities, as families with more severe child disruptive behaviour and parental depression benefitted more than families with less severe difficulties (Gardner et al., 2017).

1.6.3 Relationship enhancement versus behaviour management

Most established behavioural parent training programmes, such as Incredible Years, integrate both relationship enhancement (i.e., unconditional sensitivity reduces child disruptive behaviour- utilising attachment theory) and behaviour management strategies (i.e., conditional rewards reduce disruptiveness- based on social learning principles). Therefore, the focus is on both promoting stronger parent-child relationships and changing parenting practices. Such an approach stems from the Hanf two-stage model to address child behavioural difficulties, which posits that improving parent-child relationships amplifies the effects of behaviour management techniques. For example, parental praise may have more of an effect when delivered within a positive relationship context (Kaehler et al., 2016; Reitman & McMahon, 2012).

However, it is interesting to note that whether an integrated approach is superior to behaviour management alone depends on context. A meta-analysis of 156 studies (Leijten, Melendez-Torres, et al., 2018) found that, compared to behaviour management only programmes, integrated approaches were superior in treatment settings, but inferior in prevention settings. The authors propose that, in treatment settings, where child behavioural difficulties are generally more severe, distressed parent-child relationships may benefit from programme components fostering positivity and security. Conversely, in prevention settings, where child behavioural difficulties may be less severe and the parent-child relationship less

distressed, the additional focus may inadvertently reduce parental efficacy by presenting parents with less relevant content.

1.6.4 Heterogeneity in programme effects: What works for whom?

Behavioural parent training programmes are the evidence-based standard for preventing and treating child conduct problems. Yet, there is considerable heterogeneity in families' response to such programmes (Pelham et al., 2017; Van Aar et al., 2019). For example, in one Incredible Years trial, 82% of families showed minimal improvement in conduct problems (Cohen's $d = 0.12$), while 18% benefitted greatly (Cohen's $d = 1.45$; Van Aar et al., 2019). This variability may reflect the diverse range of pathways (i.e., equifinality) contributing to risk of conduct problems, which may influence intervention effectiveness. Furthermore, conduct problems encompass a range of disruptive behaviours, with numerous possible symptom profiles meeting the formal diagnosis of conduct disorders, some of which may be more amenable to intervention (Kazdin, 2010).

Beyond initial severity of child conduct problems, few individual child or family moderators consistently explain this variation (McMahon et al., 2021). Person-centred approaches offer new insights by considering family profiles. For example, in the Van Aar et al. (2019) study, families with high baseline levels of both disruptive child behaviour *and* harsh parenting showed the greatest decrease in child conduct problems- patterns not detected by traditional moderation analyses.

Further evidence comes from an individual-participant data meta-analysis encompassing social learning-based parenting programmes, encompassing 3, 252 families across 14 trials in seven European countries (Laas Sigurðardóttir et al., 2024). The study found a small, high-risk subgroup of families, characterised by comorbid child mental health difficulties and broader family difficulties (e.g., single parenthood, parental depression, low education), who were less likely to benefit from such interventions, despite having initially

high levels of disruptive child behaviour and harsh parenting. These findings emphasise the need for tailored approaches to better support high-risk families.

Despite these advances, key questions remain about how such programmes influence and are influenced by children's social relationships. For example, do programme effects extend beyond the parent-child relationship to shape children's relationships with others, such as their siblings and peers? The role of sibling behaviour in shaping programme outcomes also remains unclear, as does the effect of these interventions on multiple children within a family (Weeland et al., 2021). Addressing these gaps requires expanding focus beyond the parent-child subsystem. The next section considers the potential for a family systems approach to address these gaps and provide new insights into parenting programme effects.

1.6.5 Family systems approach to parenting programmes

Despite growing recognition of the importance of family systems, this perspective remains underutilised in family-based interventions (Teti & Fosco, 2021). However, researchers increasingly advocate for applying a family systems approach to behavioural parenting programmes for child disruptive behaviour, to advance our understanding of programme effects (Feinberg et al., 2012; Weeland et al., 2021). Recognising the heterogeneity in families' responses to parenting programmes, Weeland et al. (2021) propose that a family systems framework could help clarify why some families benefit from these programmes and others do not. They argue that the focus on the parent-child subsystem in many interventions limits understanding of other mechanisms of change. While changes in parenting practices are key mediators of programme effects (Laas Sigurðardóttir et al., 2024), the relationship between parenting practices and child behavioural problems is complex, and additional unmeasured variables may explain changes in both.

Family systems theory can guide hypotheses on these variables. For example, the functioning of other family members, such as siblings, may moderate or mediate programme

effects. Sibling conflict may reduce parent's abilities to implement new strategies, as sibling conflict is a known stressor for parents (Tucker & Kazura, 2013). Moreover, if parenting strategies are applied to only one child, sibling conflict may persist, undermining progress in managing disruptive behaviour (Scott & Dadds, 2009). Yet, studies seldom explore the role of family members beyond the parent-child relationship in interventions. Weeland et al. (2021) argue that incorporating family systems functioning into intervention design, while resource-intensive, could enhance intervention effectiveness. For example, assessing family dynamics before selecting an intervention could help tailor approaches to individual family needs.

The dynamic nature of family systems also means that interventions targeting one system can indirectly affect others (Patterson et al., 2004). For example, a parenting programme that improves parent-child relationships might inadvertently disrupt sibling dynamics if one child perceives unequal parental attention, fostering sibling rivalry (Weeland et al., 2021). Conversely, improvements in one parent-child dyad may spillover into the sibling relationship if that child's behaviour becomes more regulated, decreasing their likelihood of instigating or responding to conflict with their sibling (Pike & Oliver, 2017). Understanding these interconnected effects requires expanding intervention research beyond the parent-child relationship to consider broader family dynamics.

1.7 Thesis overview

1.7.1 Aims and research questions

As described throughout this chapter, relationships with family and peers are foundational to children's emotional and behavioural development. Harsh parenting and, in its extreme form, maltreatment, pose significant threats to children's wellbeing. Yet, children's outcomes following such adversity vary considerably. Resilience and developmental systems research highlights the role of environmental factors, particularly peer relationships, in influencing this

variation. These factors can either support or hinder children's resilience to emotional and behavioural difficulties. As children's interactions with peers change over time, so too may their emotional and behavioural resilience trajectories. However, no longitudinal studies have examined variation in emotional and behavioural resilience and friendship support in the context of child maltreatment. Addressing this gap is crucial, as it may help identify and support groups of young people at heightened risk for emotional and behavioural difficulties. Thus, the first aim of my thesis is:

Aim 1: To explore individual differences in children's resilience to child maltreatment.

This is addressed in **Research Question 1: How do children differ in their emotional and behavioural resilience, and level of friendship, given their exposure to child maltreatment?**

A comprehensive understanding of the role of social relationships in children's emotional and behavioural difficulties also requires examining family relationships. Parent-child relationships, in particular, play a critical role in shaping children's wellbeing. Building on this, behavioural parenting programmes, designed to strengthen parent-child relationships and improve parenting practices, are the recommended intervention for reducing child behaviour problems. However, their wider effects on the family system remain unclear. Specifically, although sibling behavioural difficulties often co-occur, the effects of parenting programmes on multiple children within a family are rarely examined. Given that most families have more than one child, it is important to determine whether programme effects 'spillover'- that is, whether improvements extend beyond the targeted child to their siblings. If so, the public health benefits of such interventions may be underestimated. Conversely, if sibling behavioral problems remain unchanged or even worsens, additional support strategies may be needed.

Additionally, although parenting programmes are established as effective in improving the parent-child relationship, less is known about their impact on children's broader social relationships. Because relational systems are interlinked, improvements in the parent-child relationship (resulting from parenting programmes) may also reduce conflict in children's other relationships, for example with their siblings and peers. Identifying the wider influence of parenting programmes on children's interactions is essential for determining whether they strengthen children's broader social relationships, or if additional support is needed.

To address gaps in our understanding of programme effects on both the wider family system and children's interactions with other children, the next two aims of my thesis are:

Aim 2: To examine the spillover effects of parenting programmes on sibling behaviour. This is addressed in **Research Question 2: How do behavioural problems co-occur in siblings, and do parent training programmes influence the behavioural problems of non-targeted siblings?**

Aim 3: To consider the role of parent training on children's interpersonal conflict. This is addressed in **Research Question 3: What is the influence of a behavioural parenting programme on children's conflict with their siblings and peers?**

1.7.2 Empirical chapters

The following section gives an overview of how each of the research aims and questions will be addressed through my empirical work. Table 1.1 provides a summary of the aims, research questions, and empirical studies in this thesis.

Table 1.1 Summary of thesis research aims, questions, and studies

Aim	Research question	Study	Method
Aim 1: To explore individual differences in children's resilience to child maltreatment	**RQ 1:** How do children differ in their emotional and behavioural resilience, and level of friendship, given their exposure to child maltreatment?	**Study 1 (Chapter 3):** Trajectories of psychosocial functioning across maltreatment levels: A group-based modelling approach to resilience	Secondary analysis of longitudinal birth cohort data using group-based multi-trajectory modelling
Aim 2: To examine the spillover effects of behavioural parenting programmes on sibling behaviour	**RQ 2**: How do behavioural problems co-occur in siblings, and do parent training programmes influence the behavioural problems of non-targeted siblings?	**Study 2 (Chapter 4):** Effects of the Incredible Years parenting programme on sibling behavioural problems: A latent transition analysis	Secondary analysis of pooled randomised controlled trial data using latent transition analysis
Aim 3: To consider the role of parent training on children's interpersonal conflict	**Research Question 3:** What is the influence of a behavioural parenting programme on children's conflict with their siblings and peers?	**Study 3 (Chapter 5):** Effects of the Incredible Years parenting programme on children's interpersonal conflict: An integrative data analysis	Secondary analysis of pooled randomised controlled trial data using multivariate multi-level models

Study 1 (Chapter 3): Trajectories of psychosocial functioning across maltreatment levels: A group-based modelling approach to resilience

Pre-registration link: https://osf.io/9kp2b

A paper based on findings in this chapter is in press at *Development and Psychopathology*

Addressing **Aim 1** (To explore individual differences in children's resilience to child maltreatment), this study applies a resilience framework to examine how children differ in their emotional and behavioural resilience, and level of friendship, given their exposure to child maltreatment. Drawing on data from over 6, 000 children in the Avon Longitudinal Study of Parents and Children, spanning birth to age 18 years, it employs group-based multi-trajectory modelling to track how these domains unfold in tandem across five points from childhood to adolescence. This study helps to identify high-risk children with worse-than-expected functioning, and, conversely, those demonstrating better-than-expected functioning, contributing to a deeper understanding of resilience processes across development.

Study 2 (Chapter 4): Effects of the Incredible Years parenting programme on sibling behaviour problems: A latent transition analysis

Adapted from: Sellars, E., Bowes, L., Oliver, B. R., Gardner, F., Hutchings, J., McGilloway, Melendez-Torres, G.J., & Leijten, P. (2025). Effects of the Incredible Years parenting program on sibling conduct problems: A latent transition analysis. *JCPP Advances.* https://doi.org/10.1002/jcv2.70006

Grounded in family systems theory, which emphasises understanding child behaviour within the broader family context, this study examines effects of the Incredible Years behavioural parenting programme on sibling dyads, thereby addressing **Aim 2** of this thesis (To examine spillover effects for behavioural parenting training for siblings). It used latent transition analysis, a person-centred approach, to explore whether the benefits of Incredible Years extend beyond the referred 'index' child to their sibling. Additionally, it investigated whether

the relative level of behavioural problems within the sibling dyad influences programme effects.

Study 3 (Chapter 5): Effects of the Incredible Years parenting programme on children's interpersonal conflict: An integrative data analysis

Adapted from: Sellars, E., Bowes, L., Oliver, B. R., Gardner, F., Axberg, U., Berry, V., Seabra-Santos, M. J., Hutchings, J., McGilloway, S., Menting, A. T. A., Overbeek, G., Scott, S., & Leijten, P. (2024). Effects of the Incredible Years parenting program on children's interpersonal conflict: An integrative data analysis. *Journal of Family Psychology, 38*(6), 847–857. https://doi.org/10.1037/fam0001236

The Incredible Years parenting programme is designed to improve parent-child relationships and is established as effective in reducing children's overall disruptive behaviour. However, little is known about how it might improve children's wider social relationships, such as children's conflict with their siblings and peers. Addressing **Aim 3** (To consider the role of parenting training on children's interpersonal conflict), this study used multi-level models and data from over 1, 400 families across 12 randomised controlled trials of Incredible Years in Europe, to examine its effects on children's interpersonal conflict. Findings provide insights into the influence of the programme on children's relationships with other children.

Of note, Studies 4 and 5 use data from the Incredible Years parenting programme due to data availability, rather than a specific interest in evaluating the programme itself. Instead, the Incredible Years data serves as a means to investigate spillover effects of behavioural parenting interventions- specifically, on sibling behaviour (Aim 2) and children's relationships with siblings and peers (Aim 3). The overarching goal of these studies is to examine spillover effects in the context of family systems theory, using causal evidence from parenting programmes, rather than within Incredible Years specifically. Indeed, the research

questions investigated in these studies could be applied to any other social learning theory-based programme.

1.7.3 Additional non-empirical chapters

Chapter 2: Methods

This section outlines the data sources and advanced statistical methods employed in this thesis, explaining their suitability for answering the research questions in this thesis.

Chapter 6: General Discussion

The final chapter synthesises findings across the three empirical studies, reflecting on the novel contributions of the thesis, general strengths and weaknesses of this thesis, its implications for research, practice, and policy, and recommendations for future research.

Chapter 2: Methods

The introductory chapter outlined the research aims and questions of this thesis, along with the empirical studies designed to address them:

Aim 1: To explore individual differences in children's resilience to child maltreatment.

RQ: How do children differ in their emotional and behavioural resilience, and level of friendship, given their exposure to child maltreatment?

Addressed in Chapter 3 (Study 1): Trajectories of psychosocial functioning across maltreatment levels: A group-based modelling approach to resilience.

Aim 2: To examine the spillover effects of parenting programmes on sibling behaviour.

RQ: How do conduct problems co-occur in siblings, and do behavioural parenting programmes influence the conduct problems of non-targeted siblings?

Addressed in Chapter 4 (Study 2): Effects of the Incredible Years parenting programme on sibling conduct problems: A latent transition analysis.

Aim 3: To consider the role of parent training on children's interpersonal conflict.

RQ: What is the influence of a behavioural parenting programme on children's conflict with their siblings and peers?

Addressed in Chapter 5 (Study 3): Effects of the Incredible Years parenting programme on children's interpersonal conflict: An integrated data analysis.

The aims of this thesis span different aspects of children's relationships, including maltreatment, friendships, and sibling interactions. It is unlikely that there is a single secondary dataset which comprehensively captures all these dimensions. Additionally, while Aim 1 focuses on understanding developmental processes, Aims 2 and 3 focus on intervening in parent-child relationships, requiring datasets designed with different goals. Therefore, this thesis draws on both observational (longitudinal) and experimental (parenting intervention

trial) data, leveraging their complementary strengths. Observational data provides rich insights into how developmental processes unfold across childhood, while intervention data allow for more rigorous tests of causality through experimental manipulation. Together, these approaches offer a more comprehensive framework through which to investigate the influence of social relationships in children's emotional and behavioural problems.

This chapter establishes the methodological foundation for Chapters 3–5 by outlining the datasets and statistical approaches used to address the research questions in this thesis. It begins with an overview of the two datasets used, then delves into key measurement issues salient to this research, before addressing broader considerations when analysing secondary data. It concludes with a rationale for moving beyond traditional main effect analyses.

2.1 Dataset overviews

2.1.1 Observational data: Avon Longitudinal Study of Parents and Children (ALSPAC)

To address Aim 1 of the thesis and explore individual differences in children's resilience to child maltreatment, Chapter 3 utilises data from the Avon Longitudinal Study of Parents and Children (ALSPAC). ALSPAC is an ongoing population-based birth cohort study, created by researchers at the University of Bristol to investigate the effects of a wide range of factors on children's health and development. All pregnant women resident in Avon, England (a former county encompassing Bristol and the surrounding areas), with expected delivery dates between April 1991 and December 1992 were invited to participate. The study cohort initially consisted of 14, 541 pregnancies, with 13, 988 children alive at 12 months of age. Extensive follow-up assessments were conducted from infancy through adulthood.

ALSPAC is one of the most comprehensive longitudinal studies of child development, collecting detailed assessments via parent-reports, child self-reports, clinical assessments, and

linked administrative records. To illustrate, between birth to 18 years old, there were 68 data collection timepoints, with 34 child-completed questionnaires, nine clinical assessments and 26 questionnaires about the child completed by the child's main caregiver (Boyd et al., 2013). Data collection is ongoing, following cohort members into adulthood. The study has also started to collect data from any offspring of the cohort children (Lawlor et al., 2019). Detailed sampling and data collection procedures are available in the cohort profile papers (Boyd et al., 2013; Northstone et al., 2019).

2.1.2 Intervention data: Incredible Years pooled dataset

Aims 2 and 3 focus on whether changes the parent-child relationship (via parental participation in a parenting programme) spillover into the wider family system and beyond. Addressing these aims required use of intervention data, specifically from randomised controlled trials. Randomised controlled trials offer a rigorous test of causality by actively manipulating specific variables (e.g., parenting practices) and assessing their effects on outcomes. Random assignment to intervention or control conditions creates groups that are, on average, comparable at baseline, minimising confounding and allowing post-intervention differences in outcome to be attributed to the intervention itself. As such, randomised controlled trials are widely regarded as the 'gold standard' for evaluating intervention effectiveness (Jones & Podolsky, 2015). For example, trials of parenting interventions enable researchers to test whether improving parenting practices and parent-child relationships leads to better child behavioural outcomes in a controlled setting.

However, randomised controlled trials often take place in specific settings with selective populations, which can limit generalisability. Furthermore, individual trials can be underpowered to detect nuanced effects. To address these limitations, Chapters 4 and 5 utilise a pooled dataset of individual level data from 15 randomised trials evaluating the Incredible Years parenting programme for children aged 0–12 years across seven European countries.

As outlined in Chapter 1, the focus of this thesis is not on evaluating effects of the Incredible Years programme specifically. Instead, this dataset provided a unique opportunity to assess spillover effects (discussed further in subsection 2.4.3), as this data is rarely available in parenting programme datasets. Studying spillover effects is also difficult in longitudinal data, which typically lacks comparable measures of parent-child, sibling, and peer relationships at corresponding timepoints.

Fourteen of the 15 trials in the dataset were from a previously established pooled dataset of all available Incredible Years trial data in Europe up to 2014 (Leijten et al., 2018). For this thesis, data from a 15th trial conducted in the Netherlands (Weeland et al., 2017) was added to the pooled dataset. The trial concluded after 2014, thus was not included in the original pooling study. All trials were conducted independently of the programme developer.

The overarching aim of the Leijten et al. (2018) study was to better understand potential benefits and harms of the Incredible Years programme by synthesising data across multiple trials at the individual participant level. The pooled dataset was created by each individual trial providing raw, anonymised individual item-level data on children's mental health (e.g., conduct problems, emotional problems, and attention deficit hyperactivity disorder), parenting practices, and parental mental health. Data were collected at baseline and immediately post-intervention (approximately 4–6 months after baseline). Socio-demographic factors were also collected at baseline.

The individual participant data approach synthesises individual-level data from randomised trials, enabling analysis of intervention effects at the individual rather than aggregate study level, while accounting for the multilevel structure of the data (i.e., individuals nested in trials). Because different Incredible Years trials used different measures of the same construct (e.g., child disruptive behaviour), Leijten et al. (2018) harmonised these measures to allow for synthesis of data across trials. This involved converting raw scale

scores on one measure to norm deviation scores (i.e., the number of standard deviations that the individual scores are above or below the population mean), and then converting these norm deviation scores to raw scale scores the chosen measure. For example, the Eyberg Child Behaviour Inventory (Robinson et al., 1980) was selected as the primary outcome measure for child disruptive behaviour, as it was used most frequently across trials.

The original pooled dataset (N = 1, 799) included 14 trials from: England (six), Wales (two), the Netherlands (two), and one each from Ireland, Norway, Portugal, and Sweden. Ten trials were indicated prevention or treatment trials targeting children with high levels of conduct problems. The remaining four were selective prevention trials, targeting families at risk of, but not necessarily experiencing, conduct problems (Leijten et al., 2018). The 15th trial, added to the dataset for this thesis, was an indicated prevention trial in the Netherlands (Weeland et al., 2017).

Pooling individual-level data is increasingly common in fields such as medicine (Riley et al., 2010), but remains relatively novel in psychology (Curran & Hussong, 2009), potentially due to the intensive process of data collation and harmonisation (Bertie et al., 2024; Riley et al., 2010). Nevertheless, the large and diverse samples enabled by pooling data conveys notable strengths, discussed throughout this chapter.

2.2 Measurement issues

This section outlines measurement issues relevant to this thesis, specifically concerning assessment of maltreatment (in Study 1) and behavioural difficulties within parenting programmes (in Studies 2 and 3). The intention is to provide a broad overview of these issues and explain how they informed the design of the studies. Specific limitations of the measures used in each empirical chapter are discussed within those chapters.

2.2.1 Maltreatment

2.2.1.1 General challenges in assessing maltreatment

Challenges abound in the measurement of child maltreatment. This is concerning, because how we measure constructs in violence research influences research findings, policy discussions, and prevention approaches (Backhaus et al., 2023). A core challenge lies in the discrepancies between different assessment methods. For example, different methods, such as prospective (e.g., parent-report, official records) and retrospective (e.g., self-reports in adolescence or adulthood), often identify different groups of individuals (Baldwin et al., 2019). For example, in ALSPAC, retrospective self-reports indicate a higher prevalence of maltreatment than caregiver reports: 20% of children retrospectively reported physical maltreatment that their caregivers had not reported prospectively, whereas only 4.6% of caregivers reported maltreatment that children did not later recall (Dunn et al., 2024). Furthermore, meta-analytic evidence suggests that associations between maltreatment and psychopathology are stronger when maltreatment is assessed retrospectively (Baldwin et al., 2024).

Discrepancies between measurement approaches likely arise from their unique strengths, limitations, and biases. Official records, such as child protection reports, are prospectively compiled by third parties who routinely collect data on child maltreatment. The primary strength of this method is that cases are typically validated, with low false positive rates. However, a major limitation of this approach is that child protection reports capture only the most severe cases, considerably underestimating prevalence rates (Radford et al., 2013). Additionally, systemic biases in child protection services mean that children from lower socioeconomic backgrounds and minority groups are overrepresented in maltreatment estimates derived from such reports (Ards et al., 2012).

Retrospective reports, in contrast, ask individuals about their childhood experiences via a survey or structured interview. This may capture cases missed by official records, as well as enabling researchers to better understand the consequences of childhood maltreatment without the considerable time and financial investment needed to undertake cohort studies (Baldwin et al., 2019). However, reports may be vulnerable to subjective interpretations of past experiences, and potential confounding by current mental health status (Baldwin et al., 2024). For example, individuals experiencing depressive symptoms may be more likely to recall and report childhood adversities, inflating associations between maltreatment and later outcomes.

Prospective parental reports offer a practical and temporally accurate approach to population-level maltreatment assessment, potentially overcoming some limitations of retrospective reports and official records. However, prospective measures may underreport prevalence rates, particularly for maltreatment types which may be more hidden by the perpetrators (Baldwin et al., 2019). Furthermore, heterogeneity in the contents of different parent-report maltreatment measures means that, if different emotional and physical parenting behaviours are captured in different instruments, a researcher's choice of instrument can significantly influence the prevalence rates and types of maltreatment identified (Backhaus et al., 2023).

A broader measurement issue is that violent parenting behaviour is typically measured as either 'harsh parenting' or 'child maltreatment', with the overlap versus distinction between the two, in both meaning and measurement, often unclear (Backhaus et al., 2023). Reinforcing this, a recent systematic review compared behaviours assessed in parent-report harsh parenting and maltreatment measures, finding a 73% overlap in the behaviours assessed in each instrument type (Backhaus et al., 2023). Such ambiguity is challenging, because if these are genuinely different constructs but similarly operationalised in measures, research

may have overestimated similarities in their consequences. Conversely, if instrument overlap reflects a true overlap in constructs, then maltreatment research may have inadvertently overlooked relevant evidence because it is labelled as harsh parenting, therefore potentially skewing prevalence estimates, which subsequently influences policy (Backhaus et al., 2023).

2.2.1.2 Maltreatment measures in ALSPAC

ALSPAC contains prospective and retrospective measures of maltreatment. Prospective parental reports, collected approximately annually from birth onwards via postal questionnaire, document emotional and physical cruelty towards the child by the mother or her partner. Child protection registration data from local Social Services flagged children investigated for suspected maltreatment prior to the age of six (Sidebotham & Heron, 2006). The retrospective measure asked cohort members at age 22 (via postal questionnaire) about any instances of maltreatment by a family member prior to age 11(E. C. Dunn et al., 2024).

Study 1 (Chapter 3) used prospective parental reports up to age six to assess maltreatment exposure. This method was chosen because it allowed for generation of a cumulative maltreatment score, crucial for examining how children's emotional and behavioural resilience varies across the maltreatment spectrum, using a residuals approach to assess resilience (Cahill et al., 2022). This approach (detailed in Chapter 3) captures individual differences in functioning that are not explained by maltreatment exposure. Operationally, this involves regressing mental health scores onto maltreatment exposure and obtaining the residual variance ('residuals'). Once reverse-coded, positive residuals indicate better-than-expected functioning (resilience), while negative residuals reflect worse-than-expected functioning (vulnerability).

Generating meaningful residuals scores, capturing a range of functioning from vulnerability to resilience, requires sufficient variation in both exposure (maltreatment) and outcome (emotional and behavioural problems) measures. Therefore, while not without

limitations, prospective parental reports were the most appropriate method available in ALSPAC to create the necessary cumulative maltreatment score for residuals-based resilience analysis.

2.2.1.3 Towards an ideal dataset

Ideally, a longitudinal cohort study would feature comparable, validated prospective and retrospective maltreatment measures to allow for triangulation and minimise single-informant bias. However, such optimal measures are rare in birth cohorts, including ALSPAC.

For example, the timing and specificity of ALSPAC's measures vary between their retrospective self-report and prospective parent-report measures. For example, ALSPAC's retrospective measure is derived from validated instruments (Bernstein et al., 2003; Koss & Gidycz, 1985) assessing specific maltreatment behaviours (e.g., physical acts like pushing, hitting, and causing bruises; emotional acts like threats and insults), however it is only administered at one timepoint at age 22 (E. C. Dunn et al., 2024). In contrast, prospective parental report measures are repeated annually, but rely on a single item per abuse subtype (asking whether parents were physically/emotionally cruel to their child). The inherent subjectivity of 'cruel' may influence the measure's validity, as differing parental interpretations may misclassify exposure, potentially skewing prevalence estimates and distorting associations with developmental outcomes.

Despite these limitations, ALSPAC was a suitable dataset for studying trajectories of resilience and friendship support across maltreatment levels (Chapter 3, Study 1) due to its repeated maltreatment measures (to generate residuals for resilience variables) and repeated, detailed measures of psychosocial variables within a large, representative sample. This is difficult to achieve in other comparable birth cohorts. First, as only a minority of children in a general population sample will, fortunately, have been maltreated, a large sample size like ALSPAC's was important to ensure a sufficient sample size for investigation. In contrast,

other longitudinal studies, such as the Dunedin Multidisciplinary Health and Development Study in New Zealand (Poulton et al., 2015), also includes repeated measures of maltreatment, but in a much smaller sample (N ≈ 1, 000). Similarly, while the UK-based Millennium Cohort Study has a comparable sample size to ALSPAC, it lacks a designated maltreatment measure (Chow et al., 2024; Farooq et al., 2024). Second, for psychosocial variables, the Millennium Cohort Study assesses friendship via a single item asking if cohort members have a best friend (Sellars, Oliver, et al., 2024), whereas ALSPAC contains five items capturing overall friendship quality (see Chapter 3). Similarly, the 1970 British Cohort Study (Power & Elliott, 2006) and 1958 National Child Development Study (Elliott & Shepherd, 2006) have mental health data, but lack detail on childhood friendships.

2.2.2 Behavioural difficulties in the context of interventions

This section discusses potential measurement issues in the assessment of child behavioural problems within the context of parenting interventions to reduce such behaviour, aligning with the focus of Studies 2 and 3 in this thesis. Some trials in the Incredible Years pooled dataset also included emotional problems as a secondary outcome, using the parent-reported emotional problems subscale of the Strengths and Difficulties Questionnaire (SDQ), developed by Goodman (1997). However, this section (and Studies 2 and 3) will focus on measurement of behavioural problems for several reasons. First, as outlined in Chapter 1, there is a need to specifically focus on understanding interventions to reduce children's behaviour problems. Second, the brevity of the SDQ (five items, three-point scale) may limit its sensitivity to detect subtle changes in response to a parenting intervention (Overbeek et al., 2021). Furthermore, parent reports may be less appropriate for assessing internalising problems, which may be less observable to parents relative to externalising problems (De Los Reyes et al., 2015). Finally, while the extent to which issues around parent-report of child emotional problems affects programme estimates is yet to be determined, both the pooled

dataset (Leijten, Gardner, Landau, et al., 2018), and parenting interventions for disruptive behaviour more generally (Kjøbli et al., 2023) show limited wider benefits on children's emotional problems.

2.2.2.1 Behavioural problems measures in the Incredible Years pooled dataset

The Eyberg Child Behaviour Inventory (ECBI) intensity scale (Robinson et al., 1980) was the primary measure of child behaviour problems in the Incredible Years pooled dataset. The ECBI is a widely used and well-validated 36-item parent-report questionnaire assessing the frequency and intensity of common disruptive behaviours in children aged 2–16 years within the home environment (e.g., "Acts defiant when told to do something", "Has temper tantrums"). Items are rated on a seven-point Likert scale (1 = *never* to 7 = *always*), with total scores ranging from 36 to 252; higher scores indicate more frequent behaviours. The ECBI was designed to briefly screen for behavioural problems, and provide a sensitive measure of change both during and after an intervention (Robinson et al., 1980). There are established clinical cut-offs for identifying children with significant behavioural difficulties (Burns & Patterson, 2001).

2.2.2.2 Limitations of parent-reported measures

Parent-report of child disruptive behaviour is susceptible to informant bias. Parents may overestimate initial difficulties due to stress, or overestimate reductions in disruptive behaviour due to social desirability. While more resource-intensive, independent observations are less susceptible to these biases. This suggests there may be differences in estimates of programme effects depending on the measurement method. For example, an indicated prevention trial of the Incredible Years programme in the Netherlands found reductions in parent-reported, but not independently observed conduct problems (Weeland et al., 2017). However, interestingly, a meta-analysis of over 200 parent training studies found larger effect

sizes for observer-reported versus parent-reported change in child disruptive behaviour, with a weighted mean effect size 0.45 for parent-report and 0.72 for observations (Beelmann et al., 2023). However, authors note that observational data was limited in comparison to parent-report data (just 14% of the outcome data), and was predominantly from specialised observational tests, where effects might be inflated compared to naturalistic observations.

Parent-reported measures like the ECBI typically assess children's behaviour in the home. However, children's behaviour problems can be either context specific (if so, this is typically conceptualised more as a problem with the setting than the child's behaviour), or persist across settings (indicating more severe behaviour problems) (Dirks et al., 2012). Conduct disorder diagnosis, for example, requires cross-setting persistence of disruptive behaviour (American Psychiatric Association, 2013). Because behavioural parenting programmes are a recommended treatment for such disorders, it is therefore important to establish whether programme effects generalise to children's behaviour outside of the home or if additional support is needed.

Both individual trial and meta-analytic evidence suggests that parenting programmes do not typically have significant effects children's behaviour at school, as reported by teachers (Beelmann et al., 2023; Overbeek et al., 2021). This might be because programmes primarily alter parental stress and perception of child behaviour without substantial changes in the child's behaviour itself, or because changes are specific to parent-child interactions (see Chapter 6 for further discussion). There were too few trials with teacher-reported conduct problems to enable harmonisation in the Incredible Years pooled dataset. In this thesis, however, it would have been particularly helpful to have teacher reports of children's interactions with peers (Study 3), as parents may not accurately assess these (De Los Reyes et al., 2015)

2.2.2.3 Towards an ideal dataset

While parent-reported data offers insights into parental perceptions of children's behaviour at home, they are susceptible to informant bias and may not reflect children's behaviour in other contexts. Recognising that no single perfect measure of child behaviour exists, datasets would ideally include: multi-informant, multi-context assessments using diverse methods (ratings and observations), allowing for triangulation of each measure's strengths and limitations.

However, this comprehensive approach demands considerable researcher and participant resources, which may hinder such data collection during trials. Furthermore, the current lack of consensus on observational methods for parent-child interactions impedes data harmonisation. For example, while the Incredible Years pooled dataset would ideally include both parent and independent observer ratings of child disruptive behaviour, harmonisation of observational data was hindered by heterogeneity in both the content (e.g., compliance vs negative affect in children) and structure (e.g., Likert scales vs frequency) of observed behaviour measures across trials (Gardner et al., 2017; Leijten, Gardner, Landau, et al., 2018). To facilitate future data pooling, the field needs to agree on common observational methods. One promising option is the use online observation tools, such as Etch-a-Sketch online (Oliver & Pike, 2021), as a resource-efficient method to assess parent-child interactions. Finally, novel techniques such as ecological momentary assessment, which assess parent-child interactions several times a day in real-time via brief parent-report measures, hold considerable potential (Russell & Gajos, 2020). They can provide a fine-grained understanding of changes in family processes in real-time, offering new insights into how interventions work, and for whom. However, the quality and optimal application of different ecological momentary assessment instruments in parenting research, and how to capture and analyse data from multiple informants per family, remain to be determined (Keijsers et al., 2022).

Given the challenges in obtaining multi-informant, multi-context data in intervention research, using the Incredible Years pooled dataset was a practical option. What is potentially lost in the specificity of children's behaviour assessment due to the reliance on parent-report, is balanced by its unprecedently large and varied sample, availability of individual participant data, and the unique opportunity to examine family systems using causal evidence (outlined in subsection 2.4.3).

2.3 Further considerations when using secondary data

This section starts with a discussion of potential sources of bias when using secondary data, and ways to reduce their effects. It ends with specific considerations when analysing data pooled across multiple trials.

2.3.1 Sources of bias

When working with secondary data, it is important that researcher seek to mitigate potential biases arising from the data collection process, as well as biases that can be introduced by the researcher's decisions and practices during the analysis phase. These biases, if unaddressed, can impact the validity and interpretability of findings. This section outlines potential sources of bias, and how this thesis addresses them.

2.3.1.1 Selection bias and attrition

Selection bias due to attrition is a particular challenge in longitudinal research. Participant dropout can be either random or systematically related to social and biological characteristics that also influence study outcomes. Systematic loss to follow-up means that any conclusions drawn from the study are likely to be both less accurate and less generalisable to the wider population. For example, in ALSPAC, children from high-risk backgrounds (e.g., lower socio-economic status, maternal mental health issues) were more likely to drop out and had higher rates of disruptive behaviour disorders (Wolke et al., 2009). Cornish et al. (2021)

expanded on these findings, linking external health and education data to show that later-life factors relating to the cohort member (e.g., lower school attainment, depression, smoking) also predicted attrition. Although linked data is not routinely used in cohort studies, it is a useful way to characterise attrition. By definition, exploring associations between non-baseline study measures as predictors of non-response is not possible in those who have dropped out. However, linked data may help to determine whether specific analyses are likely to be biased if restricted to complete case analyses. While use of linked data was beyond the scope of this thesis, this represents an important area for future research utilising ALSPAC data.

Beyond characterising attrition, statistical methods, such as missing data approaches, help to address potential bias. Examples include maximum-likelihood and multiple imputation. Study 1 (Chapter 3) used group-based multi-trajectory modelling. This approach handles missing data by using maximum likelihood estimation under the missing at random assumption, meaning that missingness depends on observed variables but not directly on the missing values themselves (Nagin & Odgers, 2010). Unlike multiple imputation, estimation models do not fill in missing values. Instead, they estimate parameters using all available data points per participant. By incorporating partial information from cases with missing data, maximum likelihood estimation uses an iterative approach to adjust estimates to minimise discrepancies between predicted and observed values without discarding cases or imputing values (Enders, 2023). This makes estimation models a flexible and widely applicable approach for handling missing data across various analytic models.

Attrition can also present a challenge in intervention studies, where participants might not complete all sessions, or dropout entirely. If families who drop out differ systematically from those who remain (e.g., they face more severe problems), excluding them from analyses might lead biased results that overestimate the effectiveness of the intervention. Furthermore,

excluding participants based on treatment completion could unbalance intervention and control arms, making them no longer comparable in terms of baseline characteristics, therefore undermining the integrity of the randomisation process (Dumville et al., 2006). To reduce this potential bias when analysing Incredible Years data, Studies 2 and 3 used intention-to-treat analysis. This is a method in which participants are analysed in the groups to which they were randomised, irrespective of whether they received a full dose of the intervention. This helps to provide a more conservative estimate of programme effects (Hollis & Campbell, 1999).

2.3.1.2 Common rater bias

There is also potential for common rater bias in secondary data analyses, where using a single informant across multiple constructs may introduce measurement error. For example, if the same parent reports on both their child's behaviour and the quality of their child's friendships, associations between these variables may be inflated due to shared informant perceptions rather than true relationships. One way to mitigate this bias is by using different informants per construct. For example, Study 1 used child report data on perceived quality of their friendships, and parent-report of their child's emotional and behavioural problems. This approach reduces the likelihood that shared method variance influences findings, thereby strengthening the study's methodological rigour.

2.3.1.3 Researcher bias

Analysis of both observational and intervention data are vulnerable to questionable research practices, such as p-hacking (manipulating analyses to achieve statistically significant results), selectively reporting only significant findings, and hypothesising after results are known, which distort research outputs (Baldwin et al., 2022). Ordinary biases in human reasoning can drive these practices (Nosek et al., 2018). For example, confirmation bias may

lead researchers to favour analyses that support their expectations, while hindsight bias can result in presenting unexpected findings as if they were predicted. The risk of such biases is particularly high in large, complex datasets, where numerous analytic choices are possible. This analytic flexibility can lead to different conclusions depending on the choices made (Simmons et al., 2011).

These biases are also shaped by systemic factors, such as biases towards publication of statistically significant results. Therefore, responsibility for ensuring best practice in secondary data analyses lies not just with individual researchers but also with journals, funders, and research institutions (Munafò et al., 2017). Nevertheless, individual researchers can take meaningful steps to reduce the risk of questionable research practices in secondary data analysis. One increasingly used strategy is pre-registration, where researchers publicly document their study rationale, hypotheses, methods, and planned analyses in advance, either via platforms like the Open Science Framework or through journals offering Registered Reports (Nosek et al., 2018). By specifying research plans and hypotheses before results are known, pre-registration helps improve the credibility of research findings.

Although pre-registration can present challenges in secondary data analysis, such as when pre-registered analysis plans prove incompatible with the received data, guidance is increasingly available on how to mitigate these challenges (Baldwin et al., 2022). Moreover, pre-registered studies are more likely to successfully replicate (Allen & Mehler, 2019), suggesting that pre-registration is associated with stronger research practices. Accordingly, each study in this thesis was pre-registered on the Open Science Framework

Finally, using individual family-level data synthesised across trials in Studies 2 and 3 maximises transparency and reduces selective outcome reporting. For example, including all available data in the pooled datasets, regardless of whether findings from secondary outcomes (e.g., sibling data) were previously published, mitigates potential reporting biases.

This is especially relevant in group-based behavioural parenting programme research, where multiple secondary outcomes and multiple measures of the same construct are common both within and between trials (Furlong et al., 2012).

2.3.2 Analysing individual participant data

Analysing individual participant data from a pooled dataset requires careful consideration of its clustered and hierarchical structure. Families (level 1) are nested within trials (level 2), meaning that data from the same trial are likely more similar than data from different trials due to shared contextual factors (e.g., higher baseline conduct problems in treatment versus prevention trials), introducing dependency. This dependency violates key assumptions of regression models, such as sphericity (the assumption of equal variance in error terms), because error terms within the same trial are likely more correlated than those across trials. Ignoring this structure by treating units of analysis as independent observations can underestimate standard errors and inflate *p*-values (Field, 2012).

Study 2 (Chapter 4) and Study 3 (Chapter 5) used different approaches to account for the hierarchical structure of the data and ensure robust estimates of intervention effects. Study 2, which used latent transition analysis to explore intervention effects on changes in patterns of sibling behavioural problems, used clustered standard errors to account for data coming from three different trials. Multilevel structural equation modelling was considered as an alternative but deemed inappropriate due to the small number of level 2 clusters (trials), which may have led to unreliable parameter estimates (Leijten, Gardner, Melendez-Torres, Weeland, et al., 2019).

Study 3 (Chapter 5) examined the effects of the Incredible Years programme on children's interpersonal conflict. Multivariate multilevel models were used to account for the clustered and hierarchical nature of the pooled dataset. Multilevel models extend traditional linear models by including random intercepts, allowing baseline values of interpersonal

conflict to differ per trial. Consistent with previous studies using this dataset (Gardner et al., 2019; Leijten, Gardner, Landau, et al., 2018) models also included a fixed effect for condition, assuming consistent treatment effects across trials (i.e., fixed slopes).

2.4 Moving beyond main effects

A unifying theme across studies in this thesis is the exploration of individual differences, moving beyond traditional variable-level analyses focused on main effects. Studies 1 and 2 use person-centred analyses to identify distinct subgroups and developmental patterns. Studies 2 and 3 use pooled individual participant data to enhance statistical power and capture within-trial variation, moving beyond trial-level averages. Finally, Study 2 extends investigation of parenting programme effects beyond the traditional focus of main effects on the 'index' child, to include effects on siblings.

These methodological choices reflect a growing recognition in behavioural science that responses to an exposure or intervention vary across individuals (von Hippel & Schuetze, 2025). Examining this heterogeneity- when, where, and for whom treatments works best, is crucial for developing more effective and equitable intervention strategies (Bryan et al., 2021). This is particularly relevant for behavioural parenting programmes, where benefits vary per family (Laas Sigurðardóttir et al., 2024; Van Aar et al., 2019). Investigating heterogeneity is also vital in resilience research, where understanding which children, and under what conditions, function better or worse than expected following adversity can inform targeted support strategies (Handley et al., 2024). Therefore, when there is solid theory to suggest that heterogeneity may exist, and enough data to detect meaningful patterns, investigating heterogeneity is a meaningful way to advance research (von Hippel & Schuetze, 2025).

2.4.1 Person-centred analyses

Studies 1 (Chapter 3) and 2 (Chapter 4) utilise person-centered analytic approaches. Specifically, Study 1 (Chapter 3) used group-based multi-trajectory modelling (Nagin et al., 2018, 2024) to examine individual differences in emotional and behavioural resilience, and friendship support, across levels of prior maltreatment. This approach identifies distinct developmental trajectories across multiple domains, allowing for the identification of heterogeneous response patterns to adversity. This aligns with resilience theory, which emphasises variation in mental health outcomes following adversity (Masten, 2021). The longitudinal data and large sample size of ALSPAC suit these analyses, which require repeated measures and a sufficiently large sample to avoid small subgroups (e.g., fewer than 30 individuals) (Nagin, 2005).

Study 2 (Chapter 4) uses latent transition analysis to explore the effects of parent training on sibling behaviour problems. Existing evidence of the effects of the Incredible Years programme on non-targeted siblings comes exclusively from variable-centred analyses, which reported intervention main effects separately for the recruited (index) children and their non-targeted siblings (Gardner et al., 2006; Hutchings et al., 2007; McGilloway et al., 2012). However, this approach assumes families are a homogeneous sample, despite evidence that families with disruptive behaviour are highly heterogeneous (Pelham et al., 2017). Moreover, this approach overlooks increasing evidence, discussed in more detail in Chapter 4, that sibling behaviours are interlinked. Person-centred analytic approaches, such as latent transition analysis, which explore how variables (e.g. behavioural problems of siblings) relate *within* families, are more appropriate for studying programme effects on multiple children within the same family. These approaches assume that a population consists of smaller subgroups of families with distinct patterns of multiple variables (e.g., co-occurring sibling

behavioural problems), and that subgroups of families may differ in their response to an intervention.

2.4.2 Individual participant data

Studies 2 (Chapter 4) and 3 (Chapter 5) leverage the advantages of pooled data from an individual participant data meta-analysis (Leijten, Gardner, Landau, et al., 2018). Examining variation in patterns of families' co-occurring sibling conduct problems using latent transition analysis (Study 2), requires a sufficiently large dataset to detect meaningful variation in families' responses. While there is no set guideline for what a sufficient sample size is, smaller sample sizes may hinder the detection of smaller subgroups of individuals (Nylund-Gibson et al., 2023). As individual Incredible Years trials with sibling outcome measures each include approximately 100 families (Gardner et al., 2006; Hutchings et al., 2007; McGilloway et al., 2012), uncovering the 'correct' number of subgroups might be difficult using individual trial data. Therefore, the Incredible Years pooled dataset, which combines data from multiple trials, allows a larger sample for nuanced examination of sibling conduct problem patterns and how the Incredible Years programme influences these patterns- insights unobtainable from individual trials.

More broadly, an individual participant data approach offers notable advantages compared with either single trials or conventional meta-analyses that report trial-level averages. First, using individual participant data increases statistical power by combining data from multiple individual datasets (Curran & Hussong, 2009), enabling detection of small effects that individual trials may lack the power to identify. Furthermore, combining trials at the individual or family level preserves variation within trials, which is lost when populations are characterised only by average trial-level data (Gardner et al., 2017). This preservation of variability is critical, as aggregate data analyses can, for example, obscure important

moderating effects. Indeed, using the Incredible Years pooled dataset, Gardner et al. (2017) found evidence of a moderating effect of parental depression at an individual level (strongest intervention effects in children whose parents were more depressed), an effect which was not detected at the trial level. As such, the use of the Incredible Years pooled dataset in Study 3 (Chapter 5) enabled a well-powered sample to estimate programme effects on interpersonal conflict and to rigorously test baseline moderation effects.

Finally, studies examining parenting programme effects often rely on data from a single trial, limiting generalisability of findings, because trials are typically conducted in specific contexts and target particular levels of child disruptive behaviour. For instance, a treatment trial in an outpatient psychiatric clinic (Axberg & Broberg, 2012) addresses a different problem severity than an indicated prevention trial in a community setting for children of previously incarcerated mothers, targeting children at risk of disruptive behaviour (Menting et al., 2014). The pooled dataset combines data from diverse service settings (non-governmental organisations, Sure Start services, primary schools, and outpatient psychiatric clinics), regions, and countries, enhancing generalisability of findings from Chapters 4 and 5.

2.4.3 Family systems data

Aims 2 and 3 of this thesis seek to identify spillover effects of intervening in the parent-child relationship, both within and beyond the family system. As outlined in Chapter 1, although there is an increasing call to apply family systems theory to intervention data, research often overlooks this approach. However, such an approach has potential to help understand the wider benefits (or harms) of such interventions (Weeland et al., 2021), as well as explain the substantial variation between families in terms of programme effects (Van Aar et al., 2019).

The primary barrier to applying a family systems approach in intervention work is the lack of suitable data on programme effects beyond a single parent-child dyad per family. The Incredible Years pooled dataset (Leijten, Gardner, Landau, et al., 2018) was uniquely suited

to study family systems, because, at the time of writing, no other pooled intervention dataset contains data on both children's relationships with their parents, siblings, and peers, and data on the behaviour problems of two children per family. After completing Study 3 and before beginning Study 2, the potential use of newly created pooled dataset was considered. This dataset included behavioural parenting programmes beyond the Incredible Years programme (see Laas Sigurðardóttir et al. (2024)), however, unfortunately it lacked sibling data.

2.5 Summary

As a single dataset is unlikely to contain all the necessary data to study different aspects of social relationships on children's development, this thesis synthesises findings across ALSPAC and the Incredible Years datasets to better understand individual variation and spillover effects. ALSPAC was well suited to address Aim 1 of this thesis (to explore individual differences in children's resilience to child maltreatment), due to its rich longitudinal data on children's peer relationships, emotional and behavioural difficulties, and maltreatment exposure. Similarly, the Incredible Years pooled dataset provided a unique opportunity to assess effects of parent training on children's behaviour within and beyond the family system (addressing Aim 2: to examine spillover effects for behavioural parenting training for siblings and Aim 3: to consider the role of parenting training on children's interpersonal conflict) in a diverse and well-powered sample. Using both observational and experimental evidence provides a robust framework for examining the influence of social relationships in children's emotional and behavioural difficulties in the following empirical chapters.

Chapter 3: Trajectories of psychosocial functioning across maltreatment levels: A group-based modelling approach to resilience

3.1 Abstract

Background: Child maltreatment increases the risk of emotional and behavioural problems, yet many children demonstrate resilience, functioning better than expected given their level of maltreatment exposure. Although resilience is a dynamic process shaped by children's social support, including friendships, how resilience and friendship support unfold together across development remains unclear. To better understand this process, this study examined how patterns of emotional resilience, behavioural resilience, and friendship support co-develop across childhood and adolescence.

Method: This study used group-based multi-trajectory modelling with data from the Avon Longitudinal Study of Parents and Children (N = 6, 518, 51% female) to identify distinct patterns of emotional and behavioural resilience (doing better-than-expected given their level of maltreatment exposure) and friendship support, across five timepoints from ages 6 to 17 years.

Results: Five trajectory groups were identified, with nearly half the sample (46.7%) maintaining high emotional and behavioural resilience and friendship support across development. While resilience trajectories varied, friendship support was generally high across groups.

Conclusions: Most children followed trajectories of high resilience and perceived friendship support. Even among children with lower emotional and/or behavioural resilience trajectories, friendship support remained high, an encouraging finding. Future research

should examine how children's other relationships (e.g., with parents and siblings) unfold alongside resilience.

3.2 Introduction

Child maltreatment, including neglect and emotional, physical, or sexual abuse, is a well-established risk factor for significant and enduring mental health problems (Baldwin et al., 2023; Degli Esposti et al., 2020; Herbert et al., 2023). Indeed, up to a quarter of cases of some mental health conditions, such as anxiety, may be attributed to child maltreatment (Burghart & Backhaus, 2024). Most maltreatment is perpetrated by parents, with common behaviours involving physical and emotional abuse within the home (Devries et al., 2018). Despite the pervasive effects of maltreatment, outcomes vary considerably, with some children doing better-than-expected given their level of maltreatment exposure- i.e., demonstrating resilience (Cicchetti, 2013; Collishaw et al., 2007).

Resilience is understood as a dynamic process shaped by an individual's interactions with their environment, including factors such as friendship support (Fritz, de Graaff, et al., 2018; Kalisch et al., 2017). While existing research indicates that friendship may buffer against the detrimental effects of early life adversity on later mental health (van Harmelen et al., 2016; Van Harmelen et al., 2017), this likely represents only a partial understanding of a more intricate dynamic. For example, peer influence theories suggest that friendships with peers with mental health problems may negatively influence one's own mental health, due to issues such as negative friend dynamics or peer contagion (Dishion & Tipsord, 2011). Furthermore, resilience is a dynamic process, such that it is important to study the co-occurrence of relevant child characteristics (i.e., emotional and behavioural problems) and environmental factors (friendship support) over time, rather than simply assessing the predictive power of one factor on another. This is especially relevant as factors such as friendship support may fluctuate over time, either enhancing or diminishing resilience

(Kalisch et al., 2017). However, little is known about how resilience and friendship support evolve together across childhood and adolescence. Therefore, this study aimed to identify co-occurring developmental trajectories of children's emotional and behavioural resilience (doing better-than-expected given their level of maltreatment exposure) and friendship support, using data from the Avon Longitudinal Study of Parents and Children (ALSPAC). Studying co-occurring trajectories across development also enables the potential identification of developmental cascades. This is a process through which early experiences (e.g., friendship support) create ripple effects across various domains (e.g., resilience to mental health problems), altering the course of development (Masten & Cicchetti, 2010).

Resilience

Resilience research adopts a multisystemic perspective, defining resilience as "the process of multiple biological, psychological, social, and ecological systems interacting in ways that help individuals to regain, sustain, or improve their mental wellbeing when challenged by one or more risk factors" (Ungar & Theron, 2020, p.1). Resilience is thus not a stable individual trait, but rather emerges from an individual's experience with multiple, time-varying, and interacting systems (Kalisch et al., 2017). As such, low resilience at one timepoint does not necessarily preclude future resilience, and vice versa. Additionally, resilience is multidimensional, meaning an individual may exhibit resilience in one domain of functioning following adversity, but not another (Luthar & Cicchetti, 2000). Therefore, to enable a complete understanding of an individual's functioning, it is crucial to study resilience across multiple domains (e.g., in this study- emotional *and* behavioural problems).

Ways to conceptualise and measure resilience differ (Klika & Herrenkohl, 2013). Some research utilises questionnaires that aim to directly quantify resilience as a measure of stress coping ability, for example, the Connor-Davidson Resilience Scale (Connor & Davidson, 2003). While useful for assessing current functioning, such measures cannot fully

capture a central part of contemporary conceptualisations of resilience, which understands resilience as a dynamic process of adaptation to adversity across an individual's life- i.e., an individual's functioning relative to their level of adversity (Kalish et al., 2017). Assessing resilience through this lens inherently requires measuring both an individual's level of exposure to an earlier adversity and a measure of their current functioning. Therefore, to capture this dyadic element of resilience, this study used a residuals approach, whereby 'resilience' is seen as doing better than expected given a level of exposure to adversity. In this study, better-than-expected refers to emotional or behavioural functioning given an individual's level of exposure to maltreatment. Such an approach removes the need for arbitrary categorisation of resilience versus vulnerability, looking instead at full range of functioning. This approach has been applied in research examining resilience to adversities such as peer victimisation (Bowes et al., 2010), sibling victimisation (Sellars, Oliver, et al., 2024), parental depression (Padaigaitė-Gulbinienė et al., 2024), and harsh parenting (Van Harmelen et al., 2017). Recent research confirms the construct and predictive validity of this approach for assessing resilience to psychopathology in the ALSPAC cohort (Cahill et al., 2022).

Role of friendship support

Resilience research has identified protective factors linked to better-than-expected outcomes following adversity, including individual-level (e.g., high self-esteem), family-level (e.g., high family cohesion), and community-level (e.g., high social support) factors (Fritz, de Graaff, et al., 2018). One identified factor is friendship support, which refers to an individual's perception of the number of friends they have, and the degree to which individuals feel cared for, supported, and accepted by their friends (Reblin & Uchino, 2008).

Friendships play a crucial role in promoting children's social and emotional development (Hartup, 2022). This may be particularly important for maltreated children, as

several studies highlight that friendship helps mitigate vulnerability to psychopathology following childhood adversity. For example, friendship support was associated with lower subsequent risk of depression in adolescents who experienced early life stressors, including family adversity and peer victimisation (van Harmelen et al., 2016). Friendship support during adolescence also positively predicted resilient functioning following early negative family experiences, such as harsh parenting (Van Harmelen et al., 2017). Furthermore, improvements in friendships between ages 14 to 17 were associated with corresponding increases in resilience during the same period (Van Harmelen et al., 2021). Evidence from longitudinal birth cohort studies also demonstrates the importance of friendships. For example, in the ALSPAC cohort, higher levels of supportive peer relationships at age 15 were associated with lower levels of depression at age 18, including amongst those who experienced childhood emotional neglect (Glickman et al., 2021). Similarly, Cahill et al. (2023) found that high levels of friendship support at age 12 were associated with increased odds of belonging to a developmental trajectory characterised by resilience to adverse childhood experiences.

The mechanisms through which supportive friends enhance resilience are not yet fully understood. One possibility is that friendships provide opportunities to update self-cognitions (how an individual thinks about themselves, including for example, attributes they would use to describe themselves; van Harmelen et al., 2010) which may be harmed following child maltreatment (van Harmelen et al., 2016). Negative self-cognitions mediate the relationship between childhood maltreatment and poor mental health (van Harmelen et al., 2010). As such, friendships may foster more positive self-cognitions by increasing self-esteem and feelings of self-efficacy (Bolger et al., 1998a; Fitzpatrick & Bussey, 2014). Additionally, friendships may help mitigate stress responses and promote adaptive behaviours such as help-seeking and coping (Gunnar, 2017).

Conversely, a lack of supportive friendships may increase psychopathology risk, particularly among maltreated children, who face heightened challenges in forming and maintaining peer relationships (Bolger et al., 1998b; Dodge et al., 1994; Rogosch & Cicchetti, 1994). Maltreated children may be especially vulnerable to 'social thinning', where their network of supportive relationships is either not fully established or diminishes over time (McCrory et al., 2022). This social vulnerability likely arises from several interconnected factors. For example, attachment theory posits that maltreatment may increase children's likelihood of developing internal working models of relationships that are characterised by rejection and mistrust, thereby hindering the development of later friendships (Cyr et al., 2010). These difficulties may be compounded by fewer opportunities within maltreating home environments to learn prosocial interaction skills. The implicit interpersonal grammar hypothesis (Dishion, 2016) further explains that maltreatment experiences might shape children's peer interactions directly through learned aggression and via a "grammar of coercion" (Dishion, 2016, p. 56). This involves the development of implicit beliefs that close relationships are untrustworthy and aggressive. Consequently, when children with these expectations interact with peers, they may be more likely to behave aggressively, impeding the development of supportive friendships. Indeed, childhood relational aggression mediates the effects of child maltreatment on adolescent negative peer interactions (Handley et al., 2019). Thus, through a combination of these factors, a reduction in the number and quality of maltreated children's friendships might instigate a transactional cascade, in which negative social interactions increase latent risk for psychopathology, further impairing children's likelihood of forming and maintaining friendships in a negative cycle (Viding et al., 2024).

Research gaps in the study of resilience and friendship support

While resilience research has typically conceptualised friendship support as associated with better-than-expected outcomes, and its absence with worse outcomes, this relationship is likely to be complex. Peer influence studies provide examples of the 'dark side' of friendship support for children's emotional and behavioural outcomes. For example, peer contagion is a mutual-influence process that occurs between an individual and a peer, which includes behaviours and emotions that may undermine an individual's development or cause harm to others (Dishion & Tipsord, 2011). One key mechanism of peer contagion is 'deviancy training', where deviant behaviours (e.g., rule-breaking and aggression) are encouraged through positive reinforcement within friendships, such as mutual encouragement and normalisation of such behaviour (Dishion & Tipsord, 2011). There is a substantial body of literature in support of the concept of deviancy training. For example, friendships characterised by deviant stories, endorsements of deviant attitudes and norm-violating behaviour predict growth in outcomes such as substance abuse, aggression, and intimate partner violence (Ha et al., 2023; Patterson et al., 2000; Piehler & Dishion, 2007).

Peer contagion also extends to emotional domains, such as depressive symptoms. Mechanisms driving this contagion include co-rumination (the excessive discussion of problems within the interpersonal context), which may amplify depressive tendencies within peer groups (Stevens & Prinstein, 2005). For example, higher levels of co-rumination within friendships are bidirectionally associated with higher levels of internalising symptoms (Rose, 2021). Thus, peer influence theories underscore the necessity of adopting a novel approach to the study of resilience and friendship support, one which acknowledges that friendship support is not always beneficial, to advance the field's understanding of resilience processes.

Furthermore, longitudinal studies of variation in emotional and behavioural resilience and friendship support are needed to address the following additional gaps in the resilience literature. First, prior research focused on how friendship support predicts functioning

following childhood adversity more broadly, which included a range of negative childhood experiences, such as household unemployment, parental separation, and harsh parenting practices (van Harmelen et al., 2016; Van Harmelen et al., 2017). Child maltreatment is a distinct, and severe, form of adversity. In these cases, friendship support, which offers low-conflict and safe interactions, may be particularly closely linked with resilience processes. Second, while resilience is recognised as a dynamic process influenced by an individual's interactions with their environment (Kalisch et al., 2017), little is known about how emotional and behavioural resilience to maltreatment and friendship support co-evolve from childhood to adolescence, with the exception of a study by van Harmelen et al. (2021), demonstrating the interplay between friendship support and resilience from ages 14–17. Most studies focus on the role of friendship support during adolescence (Cahill et al., 2023; Glickman et al., 2021; van Harmelen et al., 2016), as this a critical period of heightened peer influence (Collins & Laursen, 2000). However, although friendship is also important for children's earlier development (Dishion & Tipsord, 2011), how friendship and resilience change together in earlier childhood is not yet known. Furthermore, friendships fluctuate throughout development, especially during key transitions, such as the move from primary to secondary school, where friendship stability is often low (Ng-Knight et al., 2019). However, how such changes relate to resilience is underexplored. Additionally, previous studies typically utilised a maximum of two timepoints to study friendship and resilience, precluding understanding of potential developmental cascades.

Finally, previous studies have typically used variable-centred analyses, reporting population averages in mental health and friendship variables. Importantly, individual differences and distinct patterns over time are not captured with this approach. Yet, one of the hallmarks of outcomes following adversity is multifinality- the diversity of outcomes following an adverse event (Masten, 2024). Peer contagion literature also suggests that

friendship support from peers with high levels of disruptive behaviour/ depressive symptoms may increase vulnerability to mental-health difficulties for some children (Dishion et al., 1996; Rose, 2021). Person-centred approaches, such as group-based multi-trajectory modelling (Nagin et al., 2018), are particularly suited to identify patterns of development. For example, group-based multi-trajectory modelling may be an especially suitable method for capturing the diversity of possible developmental patterns, as it identifies subgroups within a population that follow similar trajectories for key variables (e.g., emotional resilience, behavioural resilience, and friendship support) over time.

The present study

Using group-based multi-trajectory modelling with ALSPAC data, this study aimed to identify variation in co-occurring developmental trajectories of children's emotional and behavioural resilience (doing better-than-expected given their level of maltreatment exposure) and perceived friendship support. Identifying these trajectories may offer valuable insights into how emotional and behavioural resilience and friendship co-develop across childhood and adolescence. Given the novelty of this approach, analyses were exploratory and data driven. Nonetheless, based on existing resilience research and peer influence theories, it was hypothesised that up to four distinct subgroups would emerge: (1) high emotional and behavioural resilience and high friendship support; (2) low emotional and behavioural resilience and low friendship support; (3) low behavioural resilience, but high emotional resilience and high friendship support (following peer deviancy literature); and (4) low emotional resilience, but high behavioural resilience and high friendship support (following emotional contagion theory).

3.3 Methods

3.3.1 Data source

ALSPAC is an ongoing population-based birth cohort study, designed to investigate influences on health and development across the life course (Boyd et al., 2013; Fraser et al., 2013). Pregnant women resident in Avon, UK, with expected dates of delivery between 1st April 1991 and 31st December 1992 were invited to take part in the study. The initial number of pregnancies enrolled was 14, 541, with 13, 988 children alive at 1 year of age. Please note that the study website contains details of all the data that is available through a fully searchable data dictionary and variable search tool (http://www.bristol.ac.uk/alspac/researchers/our-data/). Ethical approval for the study was granted by the ALSPAC Ethics and Law committee and the Local Research Ethics Committees. Informed consent for the use of data collected via questionnaires and clinics was obtained from participants following the recommendations of the ALSPAC Ethics and Law Committee at the time.

3.3.2 Participants

The analytic sample included 6, 518 children who met study inclusion criteria: (1) data were available on child maltreatment for at least one of six possible timepoints between 8 months and 6 years (to maximise sample size); and (2) data on emotional problems, behavioural problems, and friendship support (trajectory variables) for at least two of the possible five timepoints (from approximately 6 to 17 years old) for each measure, consistent with previous studies utilising trajectory modelling (Holst et al., 2023; Nivard et al., 2017). Compared to children in the analytic sample, excluded children (N = 7, 429) were more likely to be male, of non-White ethnicity, and have parents who were younger, with a lower socio-economic status, and higher levels of mental health difficulties (Table A.1, Appendix A).

3.3.3 Measures

1. Emotional and behavioural resilience

Measures of emotional and behavioural resilience were created using a residuals approach, which captures the extent to which an individual has better-than-expected, or worse-than-expected functioning, given their level of exposure to maltreatment. This section outlines the measures which composed the emotional and behavioural resilience variables (A. Maltreatment; B. Emotional and behavioural problems); and then explains how these measures were used to create the residuals scores which formed the emotional and behavioural resilience variables entering the trajectory analyses (C. Emotional and behavioural resilience- a residuals approach).

A. Maltreatment

Exposure to maltreatment was assessed through maternal reports of physical or emotional cruelty towards the child (yes/no), perpetrated by either the mother or her partner. Data were collected via postal questionnaires at six timepoints when children were approximately 8 months, 1 year 9 months, 2 years 9 months, 3 years 11 months, 5 years 1 month, and 6 years 1 month old. The first six years of life were chosen as the exposure period because this is a critical time when the risk of maltreatment is highest, and early childhood maltreatment is known to increase vulnerability to later psychopathology (E. C. Dunn et al., 2020; Jaffee, 2017).

In line with previous studies (E. C. Dunn et al., 2024; Khambati et al., 2018), at each timepoint and for each maltreatment category (emotional or physical), in this study children were considered maltreated if the mother responded “yes” to either her or her partner perpetrating that category of maltreatment. Therefore, exposure to either physical or emotional maltreatment was defined as at least one affirmative response by the mother in that particular maltreatment category, regardless of the perpetrator (s) identified. To

operationalise this, two binary variables were created for each timepoint: one for physical maltreatment and one for emotional maltreatment, where 0 = *no maltreatment* and 1 = *maltreated*. To ensure conservative coding, if a child had data on one maltreatment category but was missing data for the other maltreatment category at a given timepoint, the missing maltreatment category was coded as 0.

A cumulative maltreatment score was then created by summing the two binary variables (emotional and physical maltreatment) across all six timepoints. The maximum possible score was 12 (indicating reports of both emotional and physical maltreatment at all timepoints) and a minimum score of 0 (indicating no report of maltreatment at any timepoint). Using a cumulative score maximised the variance available for generating the resilience to emotional and behavioural problems variables used in the main analyses.

B. Emotional and behavioural problems

Emotional problems and behavioural problems were assessed using maternal reports from the Strengths and Difficulties Questionnaire (SDQ), a widely used instrument with established reliability and validity, including in community samples (Goodman, 1997). Data were collected via postal questionnaire at five timepoints when the children were approximately 6 years and 8 months, 9 years, 11 years, 13 years, and 16 years old. These timepoints were chosen as they follow the maltreatment exposure period and represent the maximum number of timepoints across middle childhood to adolescence which approximately match the available assessment timepoints for friendship support.

Mothers rated their child's behaviour over the past six months on a three-point scale (0 = *not true,* 1 = *somewhat true,* or 2 = *certainly true*). Following established guidelines (https://www.sdqinfo.org/py/sdqinfo/c0.py) behavioural problems (i.e., externalising problems) scores were calculated by summing the conduct problem subscale (five items, e.g., "Often has temper tantrums") and hyperactivity and inattention subscale (five items, e.g.,

"Restless, overactive, cannot stay still for long"), with a maximum score of 20. At each timepoint, if an individual was missing one of the subscales, their behavioural problems score was coded as missing.

Emotional problems scores were measured using the emotional problems subscale, which captures affective symptoms (five items, e.g., "Often seems worried"), with a maximum score of 10. To avoid confounding with the friendship support measure, the emotional problems subscale was not combined with the peer problems subscale (commonly combined to form an internalising problems subscale). For both emotional and behavioural problems, higher scores indicated greater difficulties.

C. Emotional and behavioural resilience- a residuals approach

A residuals approach was used to assess an individual's emotional and behavioural resilience given their level of maltreatment exposure. Conceptually, this approach decomposes variance in outcome variables (in this study, emotional and behavioural problems scores) into two components: (1) the variance explained by exposure to a particular adversity (in this case, child maltreatment) and (2) the residual variance, which is independent of exposure to the measured adversity. The residual component captures individual differences in the outcome variable which are not explained by exposure to the measured adversity (Ioannidis et al., 2020). As such, the residuals score reflects a full range of functioning, indicating the extent to which a cohort member has worse, or better, outcomes than predicted given their level of exposure to child maltreatment. This forms the study's measure of emotional and behavioural resilience.

A key strength of the residuals approach is that it accounts for variation in adversity exposure, aligning with the principle that resilience must be assessed relative to adversity (Masten, 2024). For example, two children may both show moderate levels of emotional difficulties, but if only one child has experienced severe maltreatment, then a residuals

approach would identify this child as demonstrating resilience (i.e., better-than-expected functioning given their maltreatment exposure), a distinction missed using raw scores alone (Ioannidis et al., 2020). To capture this nuance, the analytic sample included children across the full spectrum of maltreatment exposure, from none to severe, rather than restricting analyses to a subset of maltreated children. This not only allowed for the identification of children functioning better- or worse- than-expected for their level of adversity but also ensured sufficient variation in residuals scores to meaningfully measure emotional and behavioural resilience.

Residuals scores were generated for both emotional and behavioural problems at each of the five timepoints. To illustrate, outlined here is an example of how resilience to emotional problems was calculated per timepoint: First, emotional problem scores for that timepoint were regressed on the cumulative maltreatment exposure scores and the residuals were extracted. Residuals were then reverse coded, so that positive residuals indicated cohort members with fewer emotional problems than expected given their exposure to child maltreatment- i.e., demonstrating emotional resilience at this timepoint. Conversely, negative residual scores indicated children with greater than expected levels of emotional problems, reflecting vulnerability- i.e., lower level of emotional resilience. This process was conducted for each of the five emotional problems timepoints, and resulting residual scores were used in trajectory analyses as indicators of emotional resilience at each timepoint. The same procedure was applied to behavioural problems scores to generate behavioural resilience trajectory variables. Linear models were used across all timepoints.

2. Friendship

Children reported perceived friendship support using the shortened (five-item) version of the Cambridge Hormones and Moods Project Friendship questionnaire (Goodyer et al., 1990). Data were collected during clinic visits at five timepoints when the children were

approximately 8 years, 10 years, 12 years and 6 months, 13 years and 6 months, and 17 years and 6 months old.

Children were asked to rate the availability and quality of their friendships, using a four-point Likert scale: "Are you happy with the number of friends you've got" (0 = *unhappy*, 1 = *quite unhappy,* 2 = *quite happy,* 3 = *very happy*), "Do your friends understand you" (0 = *not at all*, 1 = *not often*, 2 = *sometimes,* 3 = *most of the time*); "Do you talk to your friends about problems" (0 = *not at all*, 1 = *not often,* 2 = *sometimes,* 3 = *most of the time*); "Do you see your friends outside of school" (0 = *hardly ever*, 1 = *less than once per week*, 2 = *at least once per week,* 3 = *almost every day*) and "Overall how happy are you with your friends" (0 = *unhappy*, 1 = *quite unhappy,* 2 = *quite happy,* 3 = *very happy*). In line with a previous ALSPAC study utilising this measure (Glickman et al., 2021), the five items were summed to create a total score ranging from 0 to 15, with higher scores indicating better perceived overall quality of friendship. For individuals missing either one or two items at a particular timepoint (i.e., up to 40% item-level missingness; Perley-Robertson et al., 2024), an individual's missing items were prorated as the mean of their available items before generating their total score. If an individual was missing more than two items at a particular timepoint, their total score for that timepoint was coded as missing.

3. Trajectory group characteristics

The following variables were used to describe trajectory groups, all collected through maternal self-report during pregnancy, except for child sex (from the birth certificate) and child birthweight (from medical records).

A. Family factors:

Binary indicators:

Socio-economic status: a. Mother's and partner's highest educational qualifications, dichotomised into (i) O-Levels or higher (advanced-level qualifications, university degree, or

ordinary-level qualifications) or (ii) lower than O-Levels (certificate of secondary school education, vocational, or none); b. Mother's household social class, dichotomised into (i) high (professional, managerial, or skilled professions) or (ii) low (partly or unskilled occupations); c. Mother's homeowner status, dichotomised into (i) mortgaged/owned or (ii) other (including rented).

Maternal smoking: Whether the mother had smoked tobacco during the first three months of pregnancy (yes/no).

Maternal alcohol use: Alcohol consumption during first three months of pregnancy (yes/no).

Continuous indicators:

Depression (maternal and partner): Assessed using the Edinburgh Postnatal Depression Scale (Cox et al., 1987) with scores ranging from 0 to 30 (higher scores indicate more depressive symptoms).

Maternal anxiety: Assessed using the anxiety items from the Crown-Crisp Experiential Index (Birtchnell et al., 1988), with scores ranging from 0 to 16 (higher scores indicate more anxiety symptoms).

Maternal age: Mother's age at delivery.

A. Child factors:

Binary indicators:

Sex: Female or male.

Ethnicity: White or non-White.

Continuous indicator:

Birthweight: Measured in grams.

3.3.4 Analytic strategy

Research questions, hypotheses, and analysis plan were pre-registered at https://osf.io/9kp2b.

Group-based multi-trajectory modelling was used to identify distinct trajectories of emotional

and behavioural resilience (given level of exposure to maltreatment) and friendship support. This person-centred approach, an application of finite mixture modelling, identifies clusters (i.e., groups) of individuals with similar trajectories across multiple repeated measures. Trajectory groups are not literal entities but represent key patterns within the study population. The goal is to identify the smallest number of groups that capture distinctive features of the study population- conceptualised as longitudinal latent strata (Nagin et al., 2018, 2024).

Trajectory models included three indicator variables, each assessed at five timepoints (henceforth referred to as T1–T5) from childhood to adolescence: (1) emotional resilience (i.e., emotional problems residuals scores- as outlined in the 'Measures' section); (2) behavioural resilience (i.e., behavioural problems residuals scores); and (3) perceived friendship support. This allowed trajectories of resilience and friendship to be jointly modelled across development. Continuous scores were used for all indicator variables.

To determine the optimal number of trajectory groups, models were run with increasing numbers of groups (1–9; a ten-group model did not converge). For each model, cubic, quadratic, and linear functions were evaluated. For all models, quadratic functions fit the data best. Model selection was based on established model fit indices, such as the sample size adjusted Bayesian information criterion, with smaller values (i.e., values closest to 0) indicating a better fit (Nagin, 2005). Model adequacy was assessed using average posterior probabilities and odds of correct classification. Following established guidelines (Klijn et al., 2017; Nagin et al., 2018), models with average posterior probability values greater than 0.70 and odds of correct classification values greater than 5.0 were considered good fits. Model interpretability and subgroup size was also considered. Analyses were conducted using the 'traj' procedure in Stata (B. L. Jones & Nagin, 2013). No variables were controlled during trajectory derivation, as doing so could affect true subgroup formation and classification.

Missing data were handled using full information maximum likelihood. As this method for handling missing data assumes that data is missing at random, prior to running trajectory analyses, logistic regressions were conducted to determine whether missingness in each of the study's indicator variables was associated with baseline study variables- i.e., missingness was explained by observed variables. Analyses confirmed that missingness for each indicator variable significantly correlated with multiple baseline variables, supporting the plausibility of the missing at random assumption, and the appropriateness of using full information maximum likelihood to address missing data.

The following results section reports the probability of trajectory group membership, indicating the proportion of the population in each trajectory group, and describes group characteristics (percentages and means).

3.4 Results

3.4.1 Descriptives

The analytic sample included 6, 518 children. Table 3.1 shows their socio-demographic and baseline parental factors.

Table 3.1 Socio-demographic and baseline parental factors

Variable	% or *M, SD*	Range (maximum)
Child factors		
Gender (male)	49.19	
Ethnicity (White)	96.39	
Family factors		
Maternal age at delivery (years)	29.22 (4.49)	<16–>43
Maternal education (< O-levels)	17.99	

Variable	% or *M, SD*	Range (maximum)
Paternal education (< O-levels)	22.36	
Household social class (low)	15.18	
Maternal homeownership status (mortgaged/owned)	84.23	
Maternal depression	6.34 (4.58)	0–28 (30)
Paternal depression	4.01 (3.77)	0–26 (30)
Maternal anxiety	4.67 (3.41)	0–6 (16)

Note. M = mean, *SD* = standard deviation.

N = 6, 518

Range included the sample range and possible maximum score in parenthesis for continuous variables.

Maternal and paternal education- O-levels ("Ordinary level" exams obtained by UK students at age 16).

Maternal and paternal depression assessed using the Edinburgh Postnatal Depression Scale.

Maternal anxiety assessed using the anxiety items from the Crown-Crisp Experiential Index.

Consistent with other ALSPAC studies measuring maltreatment in early childhood (E. C. Dunn et al., 2024; Khambati et al., 2018), 12.1% of the sample (*n* = 786) experienced any type of maltreatment for at least one timepoint. Among those who experienced maltreatment, 1.2% experienced physical maltreatment only, 8% experienced emotional maltreatment only, and 2.9% co-occurring physical and emotional maltreatment.

The cumulative maltreatment scores ranged from 0–10 (*M* = 0. 25, *SD* = 0. 86). Please see Table A.2, Appendix A, for the full distribution of these scores (*n* and percentages). For the 12.1% who scored >0 (i.e., experienced maltreatment for at least one timepoint), scores of 1 (6.5% of the sample) and 2 (2.5% of the sample) were the most common.

For each timepoint at which emotional and behavioural problems were assessed (T1–T5), maltreatment exposure was associated with higher levels of emotional and behavioural problems (p <.001; Table A.3 Appendix A). Descriptive statistics for the indicator variables entering the trajectory models (i.e., emotional resilience, behavioural resilience, and friendship support) are also available in Table A.4 Appendix A).

3.4.2 Main analyses

To identify the best fitting model for number of trajectory groups, models were run with one to nine classes. Fit statistic values (Table 3.2) indicated small, incremental improvements in model fit with increases in number of trajectory groups, with all models far exceeding minimum values for model adequacy statistics. Therefore, selection of a parsimonious model was prioritised (Nagin, 2005). A five-group model was selected as the most parsimonious model which captured meaningfully distinct trajectory groups, while avoiding subgroups with very small proportions (e.g., a six-trajectory group model contained a subgroup with just 2% of the sample).

Table 3.2 Model fit statistics

Number of groups	BIC_n	AIC	LL
1	-134443.73	-134403.04	-134391.04
2	-127991.80	-127917.19	-127895.19
3	-126068.06	-125959.54	-125959.54
4	-124024.55	-123882.12	-123840.12
5	**-123196.40**	**-123020.06**	**-122968.06**
6	-122629.30	-122419.05	-122357.05
7	-122271.25	-122027.09	-121955.09
8	-121910.41	-121632.34	-121632.34

Number of groups	BIC_n	AIC	LL
9	-121582.70	-121270.71	-121178.71

Note. BIC_n Bayesian information criterion adjusted for number of observations; AIC Akaike information criterion; LL log- likelihood.

Model with the best fit values in bold.

Fit indices are based on quadratic functions for all models.

Model adequacy statistics suggest that a five-group model fit the data well, with each group's average posterior probability and odds of correct classification value far exceeding 0.70 and 5, respectively (Table 3.3).

Table 3.3 Model adequacy statistics (five-group model)

Trajectory group	N (%)	A*ve*PP	OCC
#1	306 (4.7)	0.92	223.7
#2	497 (7.6)	0.90	107.7
#3	786 (12.1)	0.88	53.1
#4	1,888 (29.0)	0.86	15.6
#5	3,041 (46.7)	0.92	13.4

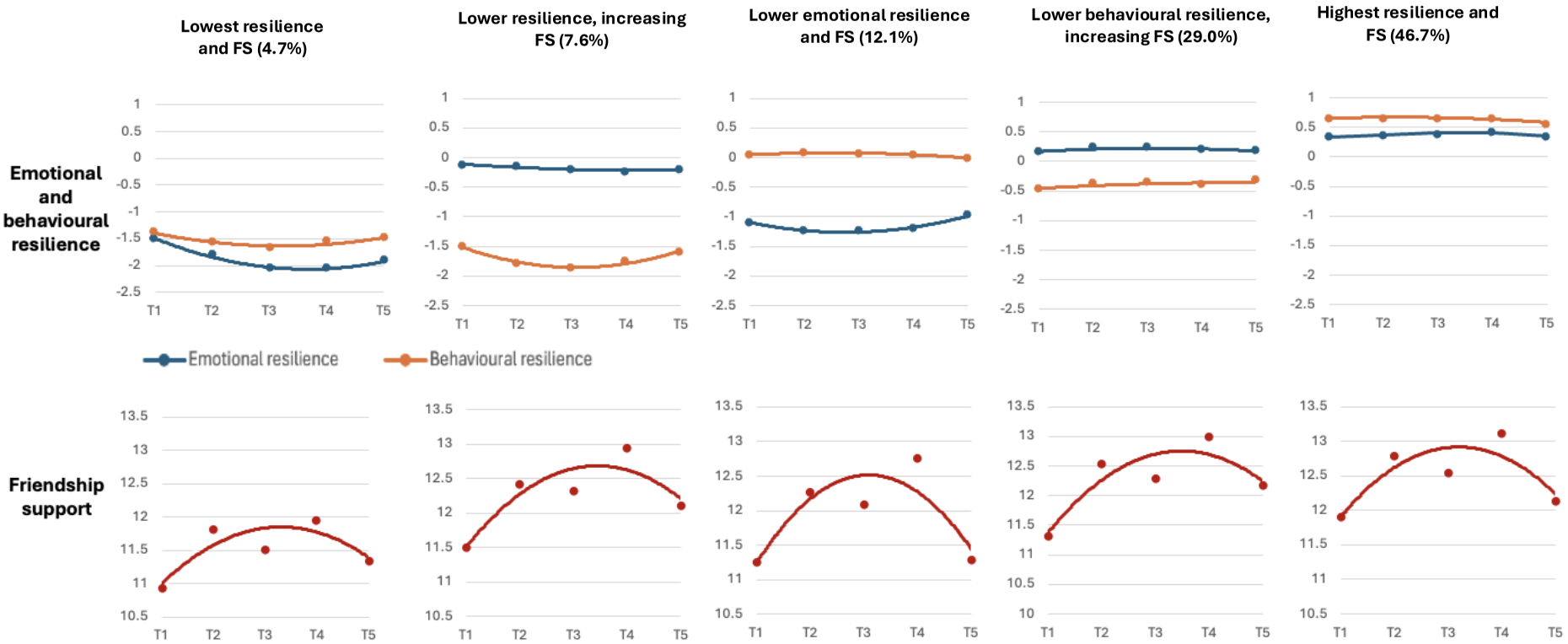
Note. A*ve*PP average posterior probability; OCC odds of correct classification.

Membership probability (AvePP) greater than 0.70 and OCC greater than 5 represent a good model fit.

Figure 3.1 shows the five groups of co-occurring trajectories of friendship support and emotional and behavioural resilience given level of exposure to maltreatment. The group labels "higher" or "lower" qualitatively describe relative differences in trajectories, rather than absolute cut-offs or categories of functioning. For example, while positive residuals

scores indicate greater resilience, and negative scores lower resilience, there are no predefined thresholds for ‘high’ or ‘low’ resilience. Similarly, higher friendship support scores indicate better perceived friendship quality, though no established cut-offs define ‘high’ or ‘low’ support. Notably, average friendship scores across all timepoints and subgroups range from 10-14 (out of 15). Therefore, groups labelled as having ‘lower’ friendship support are only lower in comparison to other trajectory groups.

Figure 3.1 Trajectories for the five-group model



Note. FS = friendship support

Positive residuals scores indicate higher resilience, negative scores indicate lower resilience

Higher friendship support values indicate higher overall quality of friendship.

The largest group (46.7%, *n* = 3, 041) showed high emotional and behavioural resilience alongside high levels of friendship support ('Highest resilience and FS'). This group consistently demonstrated the highest levels of all indicator variables across all timepoints. The second largest group (29.0%, *n* = 1, 888) showed low behavioural resilience but moderate emotional resilience, with increasing friendship support ('Lower behavioural resilience, increasing FS'). Another mixed-resilience group (12.1%, *n* = 786) showed the opposite resilience pattern- with low emotional resilience, moderate behavioural resilience, and lower friendship support ('Lower emotional resilience and FS'). A smaller group (7.6%, *n* = 497) showed low emotional resilience, very low behavioural resilience, and increasing friendship support ('Lower resilience, increasing FS'). The smallest group (4.7%, *n* = 306) showed very low emotional and behavioural resilience and the lowest levels of friendship support ('Lowest resilience and FS'). Overall, subgroups differed in their emotional and behavioural resilience trajectories across development, ranging from consistently positive residual scores in the 'Highest resilience and FS' group to consistently negative residual scores in the 'Lowest resilience and FS' group. In contrast, trajectories of friendship support were generally similar across groups, with high levels of perceived support and only minimal variation in patterns, such as slightly lower support or small increases over time in some groups.

Descriptive statistics (*M, SD* and %s) for socio-demographic and baseline parental factors across different trajectory groups are presented in Table 3.4. The most pronounced difference was child gender: 'Lower resilience, increasing FS' group, with particularly low behavioural resilience, had the highest proportion of males (67%), while the 'Lower emotional resilience and FS' group had the lowest proportion of males (32.19%). In addition, there were some small differences in family characteristics between groups. For example, the 'Lowest resilience and FS', and 'Lower resilience, increasing FS' groups had families with

indicators of lower socio-economic status and higher levels of parental mental health problems, maternal smoking and alcohol consumption, with these factors the most pronounced in the 'Lowest resilience and FS' group. In contrast, the 'Highest resilience and FS' group had families with the highest average socio-economic status (e.g., 15% of mothers with a low education level, compared to 29% in the 'Lowest resilience and FS' group) and the lowest parental mental health problems.

Table 3.4 Descriptive statistics per trajectory group

Variable	**Lowest resilience and FS (4.7%)**	**Lower resilience, increasing FS (7.6%)**	**Lower emotional resilience and FS (12.1%)**	**Lower behavioural resilience, increasing FS (29.0%)**	**Highest resilience and FS (46.7%)**
Child factors					
Gender (% male)	50.33	67.20	32.19	57.63	45.28
Ethnicity (% White)	94.08	95.88	96.96	96.48	96.55
Birthweight in grams (*M, SD)*	3371.41 (529.64)	3390.69 (539.48)	3403.11 (570.30)	3408.57 (550.42)	3442.48 (529.34)
Family factors					
Maternal age at delivery (years) *(M, SD)*	28.14 (4.82)	28.41 (4.57)	29.20 (4.51)	28.96 (4.55)	29.63 (4.37)
Maternal education (% < O-levels)	28.67	24.63	17.43	19.39	15.18
Paternal education (% < O-levels)	29.25	29.52	22.44	24.60	19.30

Variable	Lowest resilience and FS (4.7%)	Lower resilience, increasing FS (7.6%)	Lower emotional resilience and FS (12.1%)	Lower behavioural resilience, increasing FS (29.0%)	Highest resilience and FS (46.7%)
Household social class (% low)	21.60	18.47	15.87	15.26	13.82
Maternal homeownership status (% mortgaged/ owned)	73.29	77.85	83.53	82.56	87.57
Maternal depression (*M, SD*)	9.10 (5.12)	7.78 (4.90)	7.44 (4.66)	6.62 (4.58)	5.58 (4.23)
Paternal depression (*M, SD*)	5.64 (4.39)	4.34 (3.92)	4.36 (3.73)	4.08 (3.66)	3.69 (3.70)
Maternal anxiety *(M, SD)*	6.57 (3.74)	5.58 (3.67)	5.58 (3.41)	4.82 (3.43)	3.99 (3.13)
Maternal smoking (% yes)	29.70	25.46	15.87	20.05	13.12
Maternal alcohol consumption (% yes)	52.17	57.46	57.44	59.36	54.92

Note. M = Mean, *SD* = Standard deviation, FS = Friendship support.

Maternal and paternal education- O-levels ("Ordinary level" exams obtained by UK students at age 16).

Maternal and paternal depression assessed using the Edinburgh Postnatal Depression Scale.

Maternal anxiety assessed using the anxiety items from the Crown-Crisp Experiential Index.

3.5 Discussion

This study examined co-occurring trajectories of emotional and behavioural resilience (considered as better-than-expected functioning given level of maltreatment exposure) and friendship support, from ages 6 to 17 years. Five distinct subgroups were identified. Resilience patterns varied across groups (Figure 3.1), consistent with the concept of multifinality (Masten, 2024) and the domain-specific nature of resilience (Luthar & Cicchetti, 2000). In contrast, there was little variation in friendship support trajectory patterns: overall, levels of perceived support were high across groups, with minimal variation between groups (i.e., some groups with a trajectory of slightly lower support, or small increases in perceived support over time).

Most children showed high emotional and behavioural resilience and friendship support. That almost half of the children in the sample showed this pattern of resilience aligns with heartening findings that resilience across domains is the most common response to adversity (Bonanno, 2021; Collishaw et al., 2007; Masten, 2014), while emphasising the need to better understand when this is not the case.

Two groups of children showed mixed patterns of resilience. Children in one group exhibited low emotional resilience but relative behavioural resilience and lower friendship support ('Lower emotional resilience and FS', 12.1%). Children in the other subgroup showed low behavioural resilience but higher emotional resilience and increasing friendship support ('Lower behavioural resilience, increasing FS', 29.0%). Peer-influence theories may help explain these patterns. For example, the persistent low behavioural resilience of children in the 'Lower behavioural resilience, increasing FS' group, despite small rises in friendship support, might reflect deviancy training, particularly as 57% of this group were boys, and this process is well-documented in male friendships (Dishion et al., 1996; Poulin et al., 1999). Conversely, the low emotional resilience of children in the 'Lower emotional resilience and

FS' group', despite average friendship scores at each timepoint exceeding 10 (out of a possible 15), may stem from co-rumination (Rose, 2002). This process is more common in girls, and nearly three-quarters of this group were female (Table 3.4). However, like many cohort studies, ALSPAC does not include data on friends' emotional or behavioural functioning, so these interpretations are only speculative. Future research should incorporate peer-level data into trajectory models to help clarify how friends' behaviour shapes resilience processes.

Some children showed an unexpected pattern of very low behavioural and low emotional resilience, with increasing friendship support ('Lower resilience, increasing FS' group (7.6%)). One potential explanation for this is that these children's support needs may be greater than can be met by the benefits of increasingly supportive friendships. This aligns with a multisystemic view of resilience, which emphasises the necessity of support systems at multiple levels of the socio-ecological system (e.g., family, school, wider community) to facilitate children's wellbeing (Masten et al., 2021; Ungar & Theron, 2020). Given the increased vulnerability of boys to deviancy training (Dishion et al., 1996; Poulin et al., 1999), the high proportion (67%) of boys in this group could suggest that deviancy training is a contributing factor, particularly to their low behavioural resilience. Nevertheless, it is likely that multiple factors are involved. Indeed, this pattern could equally reflect gender differences in prevalence of mental health problems unrelated to social support, where girls show higher rates of internalising problems, and boys higher externalising problems (Knowles et al., 2025; Yang et al., 2024). This may also explain the patterns in the two mixed resilience subgroups.

Most baseline characteristics were similar across groups (Table 3.4). However, children in the two trajectory groups with the lowest levels of resilience had the highest levels of potential stressors, such as lower socio-economic status and elevated parental mental health problems. While these findings are descriptive and should not be overinterpreted, they

align with evidence that adverse childhood experiences often co-occur (Brown et al., 2019). In the context of such cumulative stressors, individual protective factors (e.g., friendship support) may be insufficient to facilitate resilience (Jaffee et al., 2007; Vanderbilt-Adriance & Shaw, 2008).

In terms of developmental trends, friendship support declined across all groups between T2 (10 years) and T3 (12 years), and again from T4 (13 years 6 months) to T5 (17 years). These decreases align with educational transitions in England, where children move from primary to secondary school, and then to further education. Such transitions are periods of heightened friendship instability (McMillan et al., 2025). For example, fewer than a quarter of children maintain the same best friend across the primary- to- secondary school transition (Ng-Knight et al., 2019). While ALSPAC does not directly assess friendship stability, stable friendships are associated with better friendship quality (Poulin & Chan, 2010). This suggests that the small declines in friendship support evident in the trajectory groups may reflect normative shifts in friendship stability.

Despite minor fluctuations (e.g., some groups with lower/increasing trajectories), friendship support was generally high across subgroups, with no evidence of the negative developmental cascades that maltreated children may be at risk of (Viding et al., 2024). There are several possible explanations for this. One possibility is that children genuinely perceived high levels of friendship support across development, even among those with lower levels of resilience. In the context of maltreatment, this is particularly encouraging, suggesting that not all maltreated children perceive friendship difficulties. Alternatively, it may be that the measure did not sufficiently capture variation in children's perceptions of friendships. For example, other aspects of friendship (e.g., reciprocity), not assessed in ALSPAC, might show greater variation across subgroups. For example, reciprocal friendships may be especially important for maltreated children, offering a sense of security and self-worth that

maltreatment undermines (van Harmelen et al., 2010). Reciprocated friendships may also provide opportunities to learn and practice social skills not taught at home (Lansford et al., 2003). Nevertheless, meta-analytic evidence indicates that perceived friendships may still be a strong predictor of mental health outcomes, even in the absence of reciprocity data (Schwartz-Mette et al., 2020).

Additionally, beyond friendship quality, friends' behaviour may have a stronger influence on an individual's behavioural/emotional resilience, aligning with the peer influence processes of deviancy training (Dishion & Tipsord, 2011) and co-rumination (Rose, 2021). Indeed, children whose friends exhibit internalising/externalising behaviours are more likely to report increases in these same behaviours over time (Giletta et al., 2021). This study's friendship measure may not have fully captured these negative friendship dynamics, which might show greater variation between subgroups.

Using a residuals approach to measure resilience is a key strength of this study, with just one previous study using a residuals approach to plot resilience trajectories following early life adversity (Cahill et al., 2023). Because the residuals approach accounts for exposure to maltreatment, this allows for individuals with moderate mental health difficulties following maltreatment to be included as demonstrating resilience, offering a more complete understanding of emotional/behavioural functioning than binary definitions of resilience based on current functioning only (e.g., an absence of psychopathology; Klika & Herrenkohl, 2013).

A further strength of the residuals approach is its analysis of functioning within the full ALSPAC sample, encompassing a complete range of maltreatment exposure, including those unexposed. However, a potential limitation is that high resilience subgroups might simply contain higher numbers of non-maltreated children. Additional post-hoc (not pre-registered) analyses investigated this. Indeed, the 'Highest resilience and FS' group had a

lower percentage of maltreated children (11%), compared to other lower resilience groups (e.g., 21% in the 'Lowest resilience and FS' group) (Table B.1, Appendix B). Encouragingly, however, focusing only on children exposed to maltreatment (N = 786; Table B.2, Appendix B) within each subgroup shows that most maltreated children fell within the highest resilience subgroups, reinforcing the finding that resilience is the most common response following adversity. Moreover, these children had the highest cumulative maltreatment scores, indicating that the highest resilience subgroup does indeed contain children functioning better-than-expected despite maltreatment. Similar baseline child and family characteristics (per subgroup) across the whole sample (Table 3.4) and subsample of children exposed to maltreatment (Table B.2, Appendix B) further support studying resilience in the full sample. With key implications for future research, this suggests that children exposed to maltreatment are not a group with such distinct characteristics that they must be studied in isolation, rather they share similar baseline characteristics with the broader population.

More broadly, using person-centred methodology enabled the identification of more detailed patterns of resilience and friendship support, such as the two mixed resilience groups, that would likely be overlooked in a variable-centred approaches. This highlights nuances in how resilience and friendship support co-occur- for example, high friendship support can co-occur with low levels of resilience in one mental health domain, but relative resilience in another, a new finding for the literature. ALSPAC's longitudinal data also allowed for tracking of resilience and friendship support across development, including key educational transitions, extending prior research that focused mainly on adolescence. Finally, use of multiple informants (self-reported friendship support, caregiver report of emotional and behavioural problems) reduced the risk of common-rater bias.

Study findings also have implications for future research. While friendships are important for children's development, resilience arises from multiple, interacting systems

(Fritz, Fried, et al., 2018; Ioannidis et al., 2020). For example, warm parent-child and sibling relationships also contribute to children's resilience (Bowes et al., 2010). Although friendship support was high across all subgroups, this may not be the case for family relationships. While examining these relationships was beyond the scope of the present study, future research should consider how resilience trajectories co-occur with trajectories of parent-child and sibling relationships. However, few longitudinal datasets include repeated measures of adversity exposure, mental health, and family/peer relationship variables, limiting current ability to study these processes across development (Shanahan et al., 2024).

Despite its strengths, this study has several limitations. First, generalisability of findings is limited by most participants in the ALSPAC cohort being of White ethnicity, and also of higher socio-economic status than the British population- for example, at enrolment, 79% of ALSPAC families owned their own home, compared to 63% of families in Britain (Fraser et al., 2013). Additionally, as with all longitudinal studies, attrition may limit generalisability of the findings. Although full-information maximum likelihood was used to handle missing data in the included sample, it cannot account for excluded participants. Excluded participants had higher levels of baseline risk factors for later mental health problems (e.g., parental mental health problems (Rajyaguru et al., 2021); Table A1, Appendix A), so the identified resilience trajectories may not fully reflect the experiences of children growing up with more risk factors for mental health problems.

Second, because the residuals approach operationalises resilience as better functioning than would be expected given an individual's level of maltreatment, resulting residual scores are inherently tied to the prevalence of maltreatment within this sample. Therefore, resilience trajectories may not generalise to populations with different prevalence rates. However, as ALSPAC's maltreatment prevalence rates are similar to other United Kingdom cohorts, such

as the Millennium Cohort Study and the E-Risk Study (Farooq et al., 2024), findings may be generalisable at least within this context.

The measures used to generate resilience trajectory variables also have limitations. Maltreatment exposure was assessed using prospective maternal reports (six timepoints from 8 months–6 years), which may underestimate prevalence rates due to underreporting (Baldwin et al., 2019). While debate continues regarding the optimal method for assessing maltreatment (Baldwin et al., 2019, 2024), this study prioritised prospective reports because repeated assessments enabled generation of a cumulative maltreatment score, ensuring more available variation when generating residuals. Alternative indicators of maltreatment in ALSPAC, such as child protection registration data, were deemed unsuitable, as they only capture the most severe cases (Sidebotham & Heron, 2006), and have high attrition (Khambati et al., 2018). ALSPAC's retrospective measure (which asked cohort members at age 22 to recall maltreatment by family members before age 11) may have revealed cases not reported by parents. However, it was not as appropriate for this study, because, as a single timepoint measure, it precluded generation of a cumulative score, as well as overlapping with the time period covered by trajectory variables.

Additionally, ALSPAC's measures of maltreatment consisted of two items per timepoint, assessing whether parents were physically or emotionally cruel to their child. This might not capture the full range of specific maltreating behaviors (e.g., neglect, sexual abuse, or specific forms of psychological aggression; Backhaus et al. 2023). Therefore, it will be important for future studies examining trajectories of resilience given early life maltreatment to use more comprehensive instruments to assess maltreatment exposure.

Finally, this study focused on maltreatment prior to age six, as this is a developmentally sensitive period during which maltreatment may be particularly harmful (Jaffee, 2017).

However, maltreatment will continue throughout childhood for some children (Bigler et al., 2025). Therefore, unmeasured maltreatment, along with other adversities, may confound resilience measures.

3.6 Conclusions

This the first longitudinal analysis to explore variations in both resilience and friendship support in the context of child maltreatment, directly addressing Aim 1 of this thesis. While resilience patterns differed across groups, friendship support trajectories showed less variation, with relatively high levels across all groups. Most children followed trajectories of high resilience and friendship support, and even among those showing more vulnerable trajectories, perceived friendship support remained high- an encouraging finding. However, it remains to be determined whether this is also the case for other salient relationships in children's lives, such as with parents or siblings.

As outlined above and in Chapter 1, a comprehensive understanding of the influence of social relationships on children's development must also consider family relationships. While this chapter focused on friendships within a developmental systems framework, the next two chapters take a different approach, using causal evidence from parenting programmes to explore family system processes. Specifically, they investigate how intervening in the parent-child relationship influence children's behaviour within and beyond the family, addressing Aims 2 and 3 of this thesis.

Chapter 4: Effects of the Incredible Years parenting programme on sibling conduct problems: A latent transition analysis*

4.1 Abstract

Background: Behavioural parenting programmes are a primary strategy used to reduce children's conduct problems. Although behaviour problems in siblings may co-occur, behavioural parenting programme trials typically report outcomes for one child per family (the index child), with potential programme effects on any non-targeted sibling largely neglected. This study examined co-occurring patterns of index child and non-targeted sibling conduct problems, and how parental participation in the Incredible Years programme changes these patterns.

Methods: This study used individual participant data pooled across three randomised trials of the Incredible Years parenting programme in England, Wales, and Ireland, with data for the index child and one non-targeted sibling (N = 240 families, 480 children; index child: M age = 4.73, SD = 1.44, range 2–9 years, 62% male; non-targeted sibling: M age = 5.94 years, SD = 3.15, range 6 months–15 years, 49% male). Latent transition analysis was used to identify latent classes at both baseline and posttest based on families' combinations of index child and non-targeted sibling conduct problems.

Results: Two classes were identified with distinct patterns of co-occurring sibling dyad conduct problems: one with moderate clinical levels of index child conduct problems and non-clinical levels for the non-targeted sibling (80% of families); and one with severe clinical levels for both children (20% of families). In terms of the effects of Incredible Years, most

intervention families maintained their patterns of sibling dyad conduct problems, but with lower levels across classes. Most intervention families reported improvements predominantly for the index child. However, a minority of families with severe baseline levels of conduct problems in both children moved to a class with non-clinical levels for both children. **Conclusions:** For most families, Incredible Years had limited effects on non-targeted sibling disruptive behaviour. However, Incredible Years may reduce co-occurring sibling conduct problems for a small number of families with initially severe levels in both children. Future research should consider how to support families where more than one child may have severe conduct problems, to ensure that intervention benefits extend beyond the index child.

*** Adapted from:** Sellars, E., Bowes, L., Oliver, B. R., Gardner, F., Hutchings, J., McGilloway, Melendez-Torres, G.J., & Leijten, P. (2025). Effects of the Incredible Years parenting program on sibling conduct problems: A latent transition analysis. *JCPP Advances.* https://doi.org/10.1002/jcv2.70006

4.2 Introduction

Although siblings can be very different, evidence accumulates for an association between the behaviour problems (i.e., conduct problems) of siblings (Defoe et al., 2013). This co-occurrence is especially likely in families referred to treatment for one child's conduct problems (Brestan et al., 1997; Smorti et al., 2021). Consequently, within families participating in a parenting programme aimed at reducing child conduct problems, there may be more than one child with elevated levels of conduct problems. However, intervention effects on children's conduct problems are typically reported for just one child per family (i.e., the 'index' child, usually defined as the child who has been referred, or with the most severe conduct problems in the family). This raises questions about possible intervention effects on the wider family system: for example, does only the index child benefit, or do siblings benefit too? Does the relative level of conduct problems in siblings within the same

family make a difference to programme effects? These are crucial questions given that most families have multiple children. If parenting programmes benefit more than one child per family, their current public health impact might be underestimated. Conversely, if the conduct problems of siblings do not reduce, existing programmes may need to be adapted to ensure their benefits extend beyond the index child.

Sibling conduct problems

Several mechanisms may explain how siblings mutually develop patterns of conduct problems. First, genetic factors are likely to contribute, as biological (non-identical) siblings are 50% genetically similar, and conduct problems are heritable (Ferguson, 2010). Second, siblings may share experiences of coercive interactions with parents, especially because sibling conflict is a known stressor for parents (Tucker & Kazura, 2013), and parental stress increases the likelihood of parents implementing harsh parenting practices (Dănilă et al., 2024). Third, siblings may directly influence each other's conduct problems by virtue of their everyday interactions. For example, siblings can 'train' conduct problems in each other, learning that behaving in an increasingly aggressive manner towards their sibling results in 'winning' an argument with them (Patterson, 1984). Fourth, siblings may collude to form alliances which promote conduct problems and undermine parental authority (Bullock & Dishion, 2002). Sibling collusion is predicated on a pattern of mutual positive reinforcement of 'deviant talk'- for example, a sibling providing laughter/interest when another sibling breaks a family rule, reinforcing child conduct problems. Indeed, longitudinal evidence confirms that siblings may have unique influences on each other's behaviour. For example, in a sample of over 400 Dutch children, Defoe et al. (2013) found longitudinal paths from older sibling behaviour problems to younger sibling behaviour problems one year later. Importantly, these paths remained significant when controlling for significant paths from

mother-child negative interactions and friend behaviour problems to child behaviour problems.

Despite similarities between siblings, they may also differ in their level of conduct problems (Oliver & Pike, 2018). Behavioural genetics research highlights the influence of the non-shared environment on these differences (Plomin & Daniels, 2011). For example, negative parental differential treatment, whereby parents direct more hostility toward one child compared to their sibling, is associated with sibling behaviour differences. Meta-analytic evidence from 13 samples of over 7, 000 sibling pairs suggests that the sibling who received less parental warmth and more hostility, relative to their sibling, also showed higher levels of externalising problems (Eradus et al., 2024). Negative differential treatment may be particularly pertinent in the context of a child with high levels of conduct problems, who may be subject to harsher parental discipline levels than their sibling, thereby reinforcing the cycle of coercive parent-child interactions, and further entrenching differential treatment. Non-shared environmental effects may also reside in experiences outside of the home, such as differences between siblings in their interactions with peers (Plomin & Daniels, 2011). Additionally, siblings may differ in their levels of conduct problems if, when one sibling has high levels of conduct problems, the other sibling assumes a caring role to help ensure the smooth functioning of the family system. One child may also observe the negative consequences of their sibling's conduct problems (e.g., harsh parental discipline) and choose to refrain from similar behaviours (Daniel et al., 2018).

Parenting programmes to reduce child conduct problems: effects beyond the index child?

When thinking about how to prevent or treat child conduct problems, hundreds of randomised trials have demonstrated that behavioural parenting programmes are an effective intervention to reduce child conduct problems (Beelmann et al., 2023). For example, there is robust

evidence that the well-known Incredible Years parenting programme can effectively reduce child conduct problems (Leijten, Gardner, Landau, et al., 2018), and is recommended, therefore, by several influential bodies (e.g., the National Institute for Health and Care Excellence in the United Kingdom) for the prevention and treatment of conduct problems. As with other behavioural parenting programmes, Incredible Years teaches parents to engage more positively with their child and reduce patterns of coercive interaction in which they and their child unwittingly reinforce aversive behaviour in each other. Coercion can create cycles of interactions that become increasingly difficult to manage, often leading to the development of child conduct problems (Patterson, 1982).

Family systems theory, which emphasises the interdependence of relationships within a family (Minuchin, 1985), offers a useful conceptual framework to understand the ways in which parenting programmes that target the behaviour of the index child may also help to reduce the conduct problems of a non-targeted sibling. For example, parents' increased ability to avoid or break coercive interactions with the index child, may allow them to also do so with their other children (Weeland et al., 2021). In addition, given the bidirectional relationship between sibling relationship quality and individual child behaviour (Pike & Oliver, 2017), reduced index child conduct problems may benefit the sibling relationship, and the subsequent behaviour of both the index child and their sibling. Last, because parent-child conflict is positively associated with sibling conflict (McHale et al., 2024), a reduction in coercive parent-index child interactions may also reduce problem behaviour in the non-targeted sibling. Indeed, three small Incredible Years trials which included non-targeted siblings reported either immediate (Gardner et al., 2006; Hutchings et al., 2007) or delayed (McGilloway et al., 2014) intervention effects in this group. Similar findings were reported in an older trial of Parent-Child Interaction Therapy (Brestan et al., 1997).

It is possible that in some families, the conduct problems of the non-targeted sibling worsen following parental participation in a parenting programme. Indeed, differential treatment of siblings by parents is a known risk factor for the development of conduct problems in the non-favoured sibling. Consequently, if changes in parenting behaviour (such as praising desirable child behaviour) are predominantly applied within the parent-index child relationship, the non-targeted sibling may perceive that the index child receives more attention and praise for their improved behaviour. This, in turn, may lead to feelings of exclusion and sibling rivalry, and subsequent increases in non-targeted sibling conduct problems (Weeland et al., 2021).

Research gaps in the study of parenting programme effects on non-targeted siblings

The few Incredible Years trials that reported non-targeted sibling outcomes used a variable-centered approach, separately analysing intervention main effects for the index child and their sibling (Gardner et al., 2006; Hutchings et al., 2007; McGilloway et al., 2014). This approach overlooks the interlinked nature of sibling conduct problems and focuses on population-level relationships between variables. As such, it remains unclear what co-occurring patterns of sibling dyad conduct problems might exist, and whether there is heterogeneity in sibling dyad responses to Incredible Years.

Latent transition analysis, a person-centred approach (i.e., focusing on how variables relate within families), is well-suited for addressing these research gaps. Latent transition analysis identifies subgroups (latent classes) of families distinct in their co-occurring patterns of indicator variables (e.g., index child and non-targeted sibling conduct problem scores). It then models how families transition between these subgroups from baseline to posttest in the presence of a covariate (e.g., intervention status), revealing variation in how families respond to the intervention. For example, one baseline class might consist of families where both siblings have severe conduct problems, with most transitioning to a posttest group where both

exhibit non-clinical levels. However, a minority may transition to a group where only the index child's conduct problems improve. Such nuanced patterns, which would be obscured in variable-centred approaches, are crucial for understanding heterogeneity in families' responses to Incredible Years and potentially tailoring the intervention accordingly. Person-centered approaches have been shown to effectively identify and explain heterogeneity in family responses to parenting programmes (Pelham et al., 2017; Van Aar et al., 2019).

Identifying differences between families in changes to patterns of the behaviour of two children requires a sufficiently large sample size. Synthesising individual family level data across trials into one integrated data set achieves this, as variance both between and within trials can be used to estimate differential programme benefits, increasing statistical power and generalisability relative to data from an individual trial (Curran & Hussong, 2009).

The Present Study

The aims of this study were to: (1) examine patterns of co-occurring patterns of index child and sibling conduct problems; and (2) ascertain the influence of parental participation in the Incredible Years parenting programme on change in these co-occurring patterns. Differences were expected between families in the co-occurrence of children's conduct problems, and variation in how sibling dyads respond to the intervention.

4.3 Methods

4.3.1 Design and Procedure

This study used a pre-existing set of individual family level data from 15 randomised trials on the effects of the Incredible Years parenting programme for children aged 0-12 years (Leijten, Gardner, Landau, et al., 2018; Sellars, Bowes, et al., 2024). Trials were included from European countries only to help ensure relative homogeneity in the usual services that

children received across trials, thus supporting the comparability of the pooled data. All trials were conducted by researchers independent of the programme developer.

Data was included from trials in which both of the following criteria were met: (a) families were recruited based on the conduct problems of one child (the index child) per family; and (b) the trial collected baseline and posttest (defined as first measurement point after intervention termination) conduct problem data for the index child and a non-targeted sibling. Three trials were eligible for inclusion (Table 4.1).

Within these trials, 64% of families were included in the current study. The remaining 36% were excluded because they did not have sibling data for both baseline and posttest assessments. In comparison to included families, excluded families had siblings that were on average younger, and parents were more likely to be a teen or single parent than families included in the current study (Table C.1, Appendix C).

All trials recruited families from community service settings, based on high levels of conduct problems in the index child. When families had more than two children, trial researchers selected which non-targeted sibling to collect data from using the following criteria: Trial #1 (Gardner et al., 2006) collected conduct problem data for the sibling whom parents considered to be 'the next most difficult'; trials #2 (Hutchings et al., 2007) and #3 (McGilloway et al., 2012) collected data from the sibling who was closest in age to the index child. Each trial received ethical approval from its respective internal Ethical Review Board, and the protocol for the original pooling study protocol was reviewed by the Departmental Research Ethics Committee of the Department of Social Policy and Intervention, University of Oxford.

Table 4.1 Overview of trial characteristics

Trial	Lead author (year)	Country	Setting	Families	Index child age (Mean)	Sibling age (Mean)	Index child baseline conduct problems (Mean)	Sibling baseline conduct problems (Mean)	% Low income	% Ethnic minority
1	Gardner et al. (2006)	England	Community services	40	2–9 (6.35)	2–13 (5.70)	55–199 (158.74)	58–191 (121.00)	62	0
2	Hutchings et al. (2007)	Wales	Community services	106	3–4 (3.89)	0–15 (5.23)	75–218 (145.57)	53–225 (126.70)	80	1
3	McGilloway et al. (2012)	Ireland	Community services	94	2–7 (5.00)	2–14 (6.67)	87–235 (159.64)	46–222 (113.51)	44	5

Note. Numbers reported in this study differ from those reported in individual trials, due to its inclusion criteria (and because some families might not have more than one child). Possible range of ECBI conduct problem scores is 36–252. An average community sample score is 109, scores >131 indicate clinical levels of conduct problems i.e., above the 80th percentile (Burns & Patterson, 2001)

4.3.2 Participants

The total sample across the three trials included 240 families (175 intervention and 65 control; two trials used a 2:1 allocation). Index children were aged 2–9 years old (M = 4.73 years, SD = 1.44) and predominantly male (62%). Non-targeted siblings were aged 6 months -15 years (M = 5.94 years, SD = 3.15) and 49% male. Because of this wide age range, sensitivity analyses were conducted to see if findings depended on sibling age (see 'Post-hoc analyses' results section). The non-targeted sibling was older than the target child in 60% of dyads. The mean age gap between siblings was 2.14 years (SD = 2.15). Same gender dyads accounted for 48% of the sample (of which 63% were brother-brother dyads). At baseline, 78% of index children and 34% of the non-targeted siblings scored above the 80th percentile on the ECB, see Burns & Patterson (2001) for norm scores.

Parents were aged 19–55 years (M = 32.50 years, SD = 6.18). The socioeconomic status of families was diverse (63% low income; 51% low educational level; 52% no employed parent in the household). The sample was not diverse in terms of including families from an ethnic minority (2.6%), reflecting the localities in which the trials were conducted. Data was used from one parent (98% mothers) because most trials included data from one parent only. There were no statistically significant differences between conditions at baseline (Table C.2, Appendix C).

4.3.3 Intervention and control condition

The Incredible Years parenting programme aims to reduce children's conduct problems by teaching parenting techniques to build warm and nurturing parent-child relationships, encourage positive child behaviour, and discourage negative child behaviour (Webster-Stratton, 2015). The programme is delivered solely to parents; children do not attend the sessions. Two group leaders and parents work together on how different strategies can best be

used with children of different ages (e.g., ‘time-out’ for younger children and removal of privileges for older children). Techniques are taught using practice-based methods, including discussions of videos modelling parenting strategies and role-play exercises. A key aspect of the programme is its use of a collaborative delivery style. Content is first presented to all members of the group, then leaders work with individual parents to help them identify key principles from the content that can be applied to their specific parenting situations and goals. Parenting goals may or may not include the behaviour of children in the home other than the index child. While the programme does not contain specific materials which address the generalisation of skills to all children in the family, certain elements, such as the ‘praise’ section, encourage parents to extend praise to others in the family, such as partners and siblings. The extent to which parents are encouraged to apply the strategies learned in the programme with all children in the family depends on the group leaders, group dynamics, and the goals of individual parents. The number of sessions ranged from 12 (trials #2 and #3) to 14 (trial #1). Of the parents who attended at least one session (87%), parents attended on average 72% of sessions. All trials used waitlist controls.

4.3.4 Measures

Conduct problems in the index child and their sibling

All trials measured index child and sibling conduct problems at baseline and posttest using the parent-reported Eyberg Child Behavior Inventory Intensity Scale (ECBI; Robinson et al., 1980), a well-established measure of child disruptive behaviour. Possible total scores range from 36–252 with higher scores indicating greater levels of disruptive behaviour. The internal consistency for both index child and sibling measures were high (α .93–95).

4.3.5 Analytic strategy

This study's research questions, hypotheses, and analysis plan were pre-registered at https://osf.io/s9t5g. Latent transition analysis was used as a person-centred approach to describe and classify families into classes (i.e., subgroups) distinct in their co-occurring patterns of index child and non-targeted sibling conduct problem scores. Classes were described separately for baseline and posttest data respectively. Latent transition analysis could then be used to estimate families' transitions from baseline to posttest classes, and how these might vary according to intervention status.

Analyses were conducted in Mplus version 8.10 (Muthén & Muthén, 2018). First, sequential latent class solutions were estimated (two–four classes) on baseline and posttest index child and sibling conduct problem data simultaneously, to determine the optimal number of latent classes in the data. Clustered standard errors were used to account for data coming from three different trials. Indicator variances were fixed to be equal across classes and waves to preserve interpretability between classes and waves. Within-class indicator means were not required to be equal across waves, as examination of the class solutions indicated sibling dyad conduct problems decreased across all classes at posttest.

The optimal latent class solution was chosen using a combination of fit indices (Table 4.2) and theoretically informed judgement. The focus was mainly on the degree to which improvement in model fit slowed down when testing models with more classes. Smaller Akaike information criterion (AIC), Bayesian information criterion (BIC), and sample size adjusted Bayesian information criterion (aBIC) values suggest improved model fit, whereas a larger entropy value indicates more accurate and precise classification of families. The bootstrap likelihood ratio test was not used as it is not available for clustered data.

How intervention status predicted movement between classes was examined by testing a one-step interaction model between class membership at baseline and intervention status in predicting class membership at posttest. Probabilities of movement between classes for intervention and control families were directly estimated using a probability parametrisation. Full information maximum likelihood was used to account for missing data.

4.4 Results

4.4.1 Descriptives

The correlation between index child and sibling conduct problem (ECBI total scores) at baseline was low (r = .07) and statistically non-significant; at posttest, the correlation was moderate and significant (r = .32, p <.001). The intervention reduced index child conduct problems (β = -0.53, 95% CI -0.84 to -0.38, p <.001). There was a smaller, non-significant main effect of the intervention on sibling conduct problems (β = -0.10, 95% CI -0.37 to 0.17, p = .344).

4.4.2 Subgroups of co-occurring patterns of sibling dyad conduct problems

Between two and four latent class solutions were tested (Table 4.2). Increasing model complexity did not result in large improvements in model fit. Although a four-class solution indicated some minor improvements in model fit, it produced a class with just two families, suggesting overextraction of classes. Furthermore, BIC generated the best value at two classes, which has been proposed as the best metric for model comparisons (Nylund et al., 2007). With these factors in mind, a two-class solution was chosen.

Table 4.2 Model fit of the latent transition analysis

Model size	AIC	BIC	aBIC	Baseline entropy	Posttest entropy
2 class	9033	9096	9039	0.77	0.78
3 class	9038	9149	9047	0.87	0.83
4 class	8971	9145	8986	0.86	0.83

Note. AIC: Akaike information criterion, BIC: Bayesian information criterion, aBIC: sample size adjusted Bayesian information criterion. Model fit without the covariate.

The largest group at baseline (N = 192, 80% families; Table 4.3) included families where index child conduct problems were of a clinical level (M = 150, 131 is considered the clinical cut-off; Burns & Patterson, 2001) and non-targeted sibling conduct problems were not (M = 108). The smaller baseline group (N = 48, 20% of families) included families where conduct problems were severe for both children ($M_{target\ child}$ = 166; $M_{sibling}$ = 171).

Table 4.3 Baseline probability for each class

Variable	Class 1	Class 2
Baseline probability	80%	20%
Index child conduct problems		
Baseline *M*	150.12	165.95
Posttest *M*	123.11	148.04
$S^{2\,a}$	1073.84	1073.84
Sibling conduct problems		
Baseline *M*	107.66	171.37
Posttest *M*	98.24	167.98
$S^{2\,a}$	774.94	774.94

Note. M = mean, S = variance. For model with the covariate.

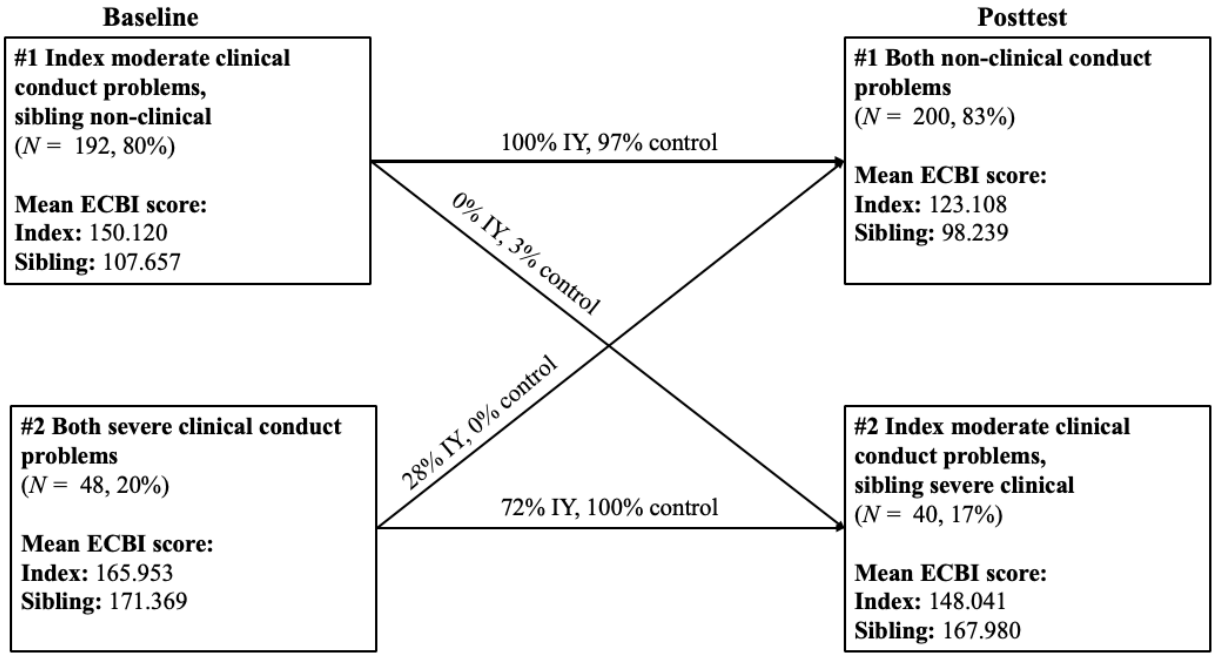
[a] Variance was held constant.

Class distributions were largely similar at posttest. Similar patterns were observed at posttest, but with lower levels of conduct problems across classes (Figure 4.1).

4.4.3 Programme effects on change in co-occurring patterns of sibling conduct problems

All intervention families in baseline class #1 remained in a class with more severe index child than sibling conduct problems at posttest, although mean index child conduct problems were no longer at a clinical level (Figure 4.1). Intervention families in class #2 had a 72% likelihood of remaining in a posttest class with a similar pattern of sibling dyad conduct problems at posttest, but with mean index conduct problems now at moderate clinical levels. However, families in this class also had a 28% likelihood of transitioning to a class defined by a different pattern of sibling dyad conduct problems, with non-clinical conduct problem levels for both siblings.

Figure 4.1 Intervention effects on families' transitions between classes



Note. Class labels refer to the mean levels of index child and non-targeted sibling conduct problems in that class.

4.4.4 Post-hoc analyses (not pre-registered)

The age range of non-targeted siblings in the study was 6 months–15 years (M = 5.94 years, SD = 3.15). This raised several potential issues. First, the ECBI is not designed to measure conduct problems in children under the age of two. Second, the Incredible Years programme is not designed for parents with children over the age of 12. However, descriptive statistics for the small number of siblings under the age of two (n = 18; 8% of families, with just one child younger than one year old (6 months)) and over the age of 12 (n = 6; 3% of families) did not differ from the main sample. Furthermore, sensitivity analyses excluding these families from the study sample did not change the main effects (Table D.1, Appendix D). Therefore, to maximise the study sample, these families were retained in latent transition models.

Descriptive statistics for sibling dyad and family characteristics across different transition patterns were also examined (Tables E.1 and E.2, Appendix E). Child characteristics, such as sibling dyad age gap and gender, were similar across the different transition patterns. Family characteristics were generally similar across transition patterns. However, intervention families with the greatest reductions in conduct problems across the sibling dyad (group 5, Table E.2, Appendix E) attended slightly more Incredible Years sessions (an average of 10 sessions) than families following different transition patterns (seven or eight sessions).

4.5 Discussion

This study examined how sibling dyads are distinct in their co-occurring patterns of conduct problems and how these patterns change in response to parental participation in the Incredible Years programme. One subgroup was identified at baseline characterised by moderate clinical levels of index child conduct problems and non-clinical levels of non-targeted child conduct problems (80% of families), and one characterised by severe levels of conduct problems for both siblings (20% of families). Most intervention families maintained their patterns of co-occurring sibling dyad conduct problems at posttest, but with lower levels of sibling dyad conduct problems across classes. The majority of intervention families saw improvements in conduct problems predominantly for the index child. However, consistent with study hypotheses, sibling dyads responded to the intervention in different ways. Among intervention families with the most severe clinical conduct problems in the sibling dyad at baseline, a small minority moved to a class characterised by non-clinical levels of conduct problems for both siblings, while most stayed in the same class.

The finding that conduct problems reduced mainly in index children may be because in most families, the index child was perceived by parents as having the most severe conduct problems, so therefore parents may have prioritised strategies to reduce the index child's

conduct problems. Additionally, the generally low levels of baseline conduct problems in the non-targeted siblings might mean that, for many children, their scores would not reduce further.

Some families with severe conduct problems in both children benefited considerably from the intervention, transitioning to a posttest class characterised by non-clinical levels of conduct problems for *both* children. This is in line with previous research which has repeatedly found that the strongest parenting intervention benefits are observed for families where there is more scope for behaviour change to occur (Van Aar et al., 2019). However, it is important to note that most families with severe conduct problems in both children (72%), did not follow this transition pattern, remaining in a posttest class characterised by moderate or severe clinical levels of conduct problems in the index child and non-targeted sibling respectively. This suggests that the main effects typically seen in such interventions may mask the fact that many families do not benefit from the intervention (relative to the control condition, where most families also report improvements), while a small group of families benefit greatly.

There are several explanations as to why only some families with severe clinical levels of conduct problems in both children benefit from the intervention, in terms of reductions in conduct problems for both children. First, it may be that in families where there was no reduction in non-targeted sibling conduct problems, parents predominantly applied the skills and strategies acquired during the Incredible Years programme to address the behaviour of the index child. Therefore, the non-targeted sibling may not have received enough of the newly acquired parenting skills to elicit a change in their level of conduct problems at this timepoint. In contrast, families where both children benefitted from the intervention may have applied their newly acquired parenting skills equally to both children.

Notably, families where both children benefitted from the programme attended, on average, slightly more intervention sessions (Table E.2, Appendix E). These findings should be interpreted with caution, given their exploratory nature and the small number of families following this transition pattern. Nevertheless, attending more sessions may have helped parents generalise their newly acquired parenting skills to both children. Unfortunately, this could not be explored in this study, due to collection of parenting behaviour data for the index child only.

It is also not clear to what extent group leaders supported parents in generalising new behaviour patterns to siblings. As the programme does not contain formal materials on this, leader encouragement is likely to be crucial. Indeed, previous research demonstrates that leader skills play a key role in fostering parent behaviour change in Incredible Years (Eames et al., 2010). Leader encouragement may be particularly important for families experiencing additional stressors (e.g., household unemployment) because, while socio-economic disadvantage does not moderate the effectiveness of Incredible Years for one child per family (Gardner et al., 2019), contextual stressors may preclude the possibility of parents putting their skills into practice beyond the index child. To enhance understanding of the importance of leader support in generalisation of skills, future trials could consider monitoring this as part of programme implementation fidelity.

Differences in programme attendance also highlight the importance of ensuring equitable access to programmes to ensure programme benefits extend to more than one child per family. This is because barriers to programme attendance, such as childcare, may be compounded for families where multiple children have disruptive behaviour. Strategies might include embedding wraparound support (e.g., childcare, transport) for in-person sessions (Berry et al., 2022) or offering online programmes. A recent meta-analysis of randomised trials confirmed online delivery (with professional guidance) as an effective, non-inferior

alternative to in-person delivery (Leijten et al., 2024). However, the effects of online programmes on the behaviour of multiple children per family remains to be established.

This is the first study to examine co-occurring patterns of sibling conduct problems and how parental participation in a parenting programme might change these patterns, providing a novel contribution to the field's understanding of the effects parenting programmes on family members beyond the index child. This helps to inform the potential public health impact of such programmes, indicating that although in most families, non-targeted sibling conduct problems do not reduce to the same extent as those of the index child, Incredible Years influences the behaviour of non-targeted siblings for a minority of families with severe problems at baseline. This is in line with earlier findings that Incredible Years results in co-occurring improvements in index child conduct problems and maternal depressive symptoms in a small subgroup of families with the most severe problems (Leijten, Gardner, Melendez-Torres, Weeland, et al., 2019).

The finding that 20% of families had severe levels of conduct problems in both children at baseline, despite being recruited to trials due to conduct problems in the index child, also has implications for practice. For example, it is important to consider how to effectively support these families to ensure that intervention benefits generalise beyond the index child. This is particularly pertinent, considering the finding that almost three-quarters of families with severe clinical conduct problems in both children maintained clinical levels of these problems.

The use of individual family-level data synthesised across trials helped maximise transparency and reduce selective outcome reporting, by including all available data in the pooled dataset. Synthesising data across several trials also provided a sufficiently large sample size to utilise a person-centred approach to analyses, enabling the identification of subgroups of index child and non-targeted siblings with different patterns of co-occurring

conduct problems. This is a key strength of this study, as had only the overall effects of Incredible Years on index child and non-targeted sibling conduct problems been examined, the small subgroup of intervention families who went from severe levels of conduct problems for both children to non-clinical levels of conduct problems for both children would have been missed. To extend this finding, future research could also assess the magnitude of changes in sibling conduct problems, which was precluded by sample size in the current study.

This study also has limitations. Although integrated data from several trials was used, only a small number of trials included sibling data. This reflects the general tendency in the behavioural parenting programme literature to focus on only one child per family, rather than programme effects on the wider family system (Weeland et al., 2021). Relatedly, all trials were indicated prevention trials conducted in community services, therefore it remains to be determined whether findings generalise to selective prevention or treatment settings. It may also be beneficial to consider data from more than two children in a family; however, to date, only one parenting programme study has included data for more than two children per family (Menting et al., 2014). Additionally, 36% of families were excluded from the study because they did not have sibling data for both baseline and posttest assessments. The pooled dataset does not contain information on whether this data was missing because families only had one child, or whether families did have more than one child, but did not complete the sibling conduct problem measures. Excluded families were more likely to have caregivers who were teen or single parents- both potential risk factors for child conduct problems. Consequently, if these excluded families had two children, the prevalence of families with severe conduct problems in both children at baseline (20% of the sample) may have been underestimated.

There are also limitations related to the study measures. Conduct problems in sibling dyads were assessed solely through parent-report, as observational ratings of non-targeted

sibling behaviour were not collected in the trials comprising the pooled dataset. However, a recent meta-analysis on the effects of parenting programmes on child disruptive behaviour found similar effect sizes for parent-rated and observed effects (Beelmann et al., 2023). Nonetheless, when parents rate the disruptive behaviour of more than one child in their family, this may be subject to contrast effects, whereby parents perceive the disruptive behaviour of siblings as more different than it is. Therefore, it may be beneficial to corroborate these findings with observational measures of sibling dyad disruptive behaviour.

Additionally, while this analytic approach described variations in family responses to Incredible Years, the sample may not have been sufficiently large to reveal additional response patterns. The use of only two indicators (index child and sibling ECBI) may also play a role. Larger samples with more diverse indicators of children's behaviour may reveal further response patterns. Finally, due to data limitations, this study could only explore the immediate effects of the intervention on co-occurring sibling conduct problems. While meta-analytic evidence suggests that reductions in index child conduct problems may sustain up to three years post-intervention (van Aar et al., 2017), it is not known whether the identified post-interventions patterns of sibling conduct problems maintain or change over the longer-term.

4.6 Conclusion

This chapter explored how conduct problems co-occur in siblings, and the influence of a behavioural parenting programme on non-targeted sibling conduct problems (RQ2 of this thesis). At baseline, most families had moderate clinical levels of index child conduct problems and non-clinical levels for the non-targeted sibling, while a minority had severe clinical levels for both children. Incredible Years primarily reduced conduct problems in the index child. Although some families had two children with severe conduct problems, only a small number of these families benefitted from Incredible Years in terms of *both* children

having non-clinical levels of conduct problems following the intervention. Consequently, the non-targeted sibling is not guaranteed to benefit from Incredible Years.

For this thesis, these findings help to establish that there are only limited spillover effects of a parenting programme on the behavioural problems of non-targeted siblings, directly addressing Aim 2 of this thesis. More broadly, this study represents a preliminary step in advancing the field's understanding the effects of parenting programmes beyond the index child, to be expanded upon in future studies. Salient areas include the need to better understand how to support families to ensure that, where applicable, the benefits of such programmes extend to more than one child per family.

The next chapter of this thesis builds this study's findings. Using the same pooled dataset and a family systems framework, it shifts focus to examine programme effects on the index child's relationships with other children. Specifically, it explores whether programme participation influences children's conflict with their siblings and peers (RQ3), complementing this chapter's findings by providing further insights into whether parenting programmes benefits extend beyond improving the parent-index child relationship.

Chapter 5: Effects of the Incredible Years parenting programme on children's interpersonal conflict: An integrative data analysis*

5.1 Abstract

Background: Behavioural parenting programmes, such as Incredible Years, are designed to improve parent-child relationships and are well-established as effective in reducing children's overall behaviour problems. However, little is known about the effects of parenting programmes beyond the parent-child subsystem, for example, on children's interactions with their siblings and peers. The aim of this study was to examine, for the first time, the effects of the Incredible Years parenting programme on children's levels of interpersonal conflict with their parents, siblings, and peers.

Method: This study used individual participant level data pooled across 12 randomised trials in Europe, comprising a total of 1, 409 families (child age 1–11 years (M = 5.53 years, SD = 1.56) and 61% male; 60% low-income families, and 30% from an ethnic minority). Multilevel models were used to explore the effects of Incredible Years on children's conflict with parents, siblings, and peers.

Results: The Incredible Years programme reduced children's conflict with their parents (β = -.21), but there were no main effects of the programme on conflict with siblings or peers. Moderation analyses showed that Incredible Years reduced conflict in sibling relationships for the 22% families with the most severe sibling conflict at baseline.

Conclusions: High-quality behavioural parenting programmes, such as Incredible Years, can effectively reduce children's conflict within the home (i.e., with parents and siblings), especially when initial levels of sibling conflict are high, but do not have broader benefits on children's interpersonal conflict outside of the home (i.e., with peers).

*** Adapted from:** Sellars, E., Bowes, L., Oliver, B. R., Gardner, F., Axberg, U., Berry, V., Seabra-Santos, M. J., Hutchings, J., McGilloway, S., Menting, A. T. A., Overbeek, G., Scott, S., & Leijten, P. (2024). Effects of the Incredible Years parenting program on children's interpersonal conflict: An integrative data analysis. *Journal of Family Psychology, 38*(6), 847–857. https://doi.org/10.1037/fam0001236

5.2 Introduction

Behavioural parenting programmes are effective in reducing early behavioural problems in children (Weisz & Kazdin, 2017). Most established programmes, such as the Incredible Years parenting programme (Webster-Stratton, 2015), teach parents to reduce coercive parent-child interaction patterns in which parents and children unwittingly reinforce aversive behaviour in each other. Coercion creates cycles of interactions that become increasingly difficult to manage and which can lead to the development of behavioural problems in children (Patterson, 1982). The effectiveness of such programmes in reducing overall levels of behavioural problems in children has been shown in numerous trials (Leijten, Gardner, Landau, et al., 2018; Menting et al., 2013). However, these kinds of problems encompass a range of disruptive behaviours, and less is known about how specific aspects of behaviour, such as children's interpersonal conflict, are affected by parenting programmes.

The term 'interpersonal conflict' is used to refer to the negative aspects of children's relationships with others, including their parents, siblings, and peers. This might include defiance and anger toward, or arguing/ fighting with, others, and can occur within the home or the child's wider environment. The specific types of conflict can differ depending on the nature of the relationship between the child and the person with whom the conflict occurs. In hierarchical relationships between a parent and child, conflict with parents might take the form of non-compliance, such as defying parental requests (Leijten, Gardner, Melendez-

Torres, et al., 2018). In relationships between children (siblings or peers), on the other hand, conflict might be more likely to take the form of physical or verbal arguments (Tucker et al., 2013). Exploring the effects of a parenting programme on children's levels of conflict within different relationships, above and beyond conflict with their parents, enables a more comprehensive understanding of intervention effects on children's behaviour both within and beyond the family system.

Sibling and peer conflict

Conflict within sibling relationships is a common problem (Brady & Stoneman, 1988; Kramer, 2004) which parents report finding difficult to manage (Pickering & Sanders, 2017). This is concerning because extensive evidence suggests that children's conflict with siblings is a significant risk factor for both concurrent and later adjustment problems. For example, a meta-analysis of 34 studies (85 effect sizes from approximately 12, 000 children) found that sibling relationships characterised by high levels of conflict were significantly associated with high levels of internalising and externalising problems for both siblings (Buist et al., 2013). Longitudinal studies further support this, demonstrating that children experiencing high levels of sibling conflict are at much greater risk of subsequent externalising problems (Pike & Oliver, 2017), with this association even enduring into adolescence (Stocker et al., 2002). One explanation for this may be that sibling conflict 'teaches' children to behave in antisocial ways (Patterson, 1984). For example, if one child learns that escalating aggression results in 'winning' an argument with their sibling, then their disruptive behaviour will be reinforced.

It is also well documented that children's peer relationships influence their social and behavioural development (Parker et al., 2015). Indeed, longitudinal research demonstrates that early peer relationship difficulties predict later adolescent psychopathology risk (Bornstein et al., 2010). For example, Woodward & Fergusson (1999) found that children

with higher levels of peer problems were more likely to experience substance abuse problems and criminal offending at age 18. It may be that conflict with peers leads to externalising behaviours via the fostering of friendships with similarly aggressive peers, who reinforce each other's disruptive behaviour- a well-established process known as peer deviancy training (Dishion et al., 2016).

Research gaps in the study of parenting programme effects on children's interpersonal conflict

Despite the myriad negative outcomes associated with children's violence towards others, remarkably little is known about the effects of parenting programmes for child behavioural problems on children's levels of interpersonal conflict. A limited number of such programmes have measured behaviour problems in the sibling of the target child as an additional intervention outcome (Gardner et al., 2006; Hutchings et al., 2007), and indeed Chapter 4 reports on parenting programmes effects on two children per family. However, the relationship between siblings is rarely studied in the context of parenting programmes for child behavioural problems (Weeland et al., 2021) and, to date, conflict between siblings has not previously been assessed as a specific programme outcome. Furthermore, a meta-analysis of parenting interventions specifically to improve sibling relationships identified just eight studies, concluding that this area is limited in terms of the number, size, and robustness of studies, compared to other family interventions (Leijten, Melendez-Torres, et al., 2021).

Several behavioural parenting programme trials which included children's peer problems as an additional programme outcome found that programmes are usually not effective at reducing children's peer problems. Although one trial of the Incredible Years parenting programme for pre-school aged children in community services found immediate post-intervention reductions in peer problems (Morpeth et al., 2017), these reductions are not seen in trials reporting longer-term outcomes. For example, Incredible Years trials, in both

community and outpatient psychiatric clinic settings, found no reductions in children's peer problems at one to two years post-intervention (Overbeek et al., 2021; Scott, 2005). These findings, which have also been reported for other behavioural parenting programmes, such as Triple P (Doyle et al., 2018), may be due, at least in part, to the use of the Strengths and Difficulties Questionnaire (SDQ) 'Peer Problems' subscale (Goodman, 1997) in these studies. In addition to a general issue that the SDQ may not have sufficient sensitivity to detect subtle intervention effects (Overbeek et al., 2021), this specific subscale includes a range of items (e.g., 'Rather solitary, tends to play alone') which might be less likely to be influenced by parenting programmes for child behavioural problems. Furthermore, the subscale contains items which assess children's peer relationships in general (e.g., whether children have friends, and victimisation experiences) rather than peer conflict specifically. Therefore, it is not known whether such programmes would effectively reduce children's peer problems if a measure specifically assessing children's conflict with peers was used.

Why might parenting programmes influence children's conflict with siblings and peers?

Previous research on parenting programmes for child behavioural problems has not assessed their effects on sibling conflict, nor focused specifically on children's conflict with peers. There is a need, therefore, to explore the effects of such programmes on children's levels of conflict with other children. For example, it might be expected that parenting programmes for child behavioural problems should also lead to improvements in children's relationships with their siblings. First, there may be a direct effect: the parenting techniques taught in such programmes (e.g. adequate non-violent discipline techniques) may also help parents respond to arguments between siblings more effectively, reducing sibling conflict. Additionally, if parents apply the parenting skills learnt in the intervention (e.g., praising positive child behaviour and effective limit setting) to other children in the family, then the sibling's behaviour might also improve, thereby reducing sibling conflict. Second, there may be

indirect effects: in line with family systems theory (in which dyadic relationships within a family are embedded in a network of interconnected family relationships, rather than occurring in isolation; Minuchin, 1985) parenting programmes targeting one subsystem within the family (such as the parent-child relationship) may evoke changes in another subsystem (e.g., between siblings), because the subsystems are interconnected. For example, once the parent-child relationship improves and children can practice behaviour in the context of a positive relationship, children might transfer this positive behaviour to their interactions with siblings. Given the lack of existing programmes for sibling conflict (Leijten, Melendez-Torres, et al., 2021) and the negative outcomes associated with sibling conflict, it is important to explore whether parenting programmes aimed at reducing child behavioural problems also help to improve sibling relationships and, if not, whether more specific programmes may be needed.

Such parenting programmes might also reduce children's conflict with their peers. This is because there can be a spillover between children's behaviour with their parents and peers, such that children with difficult relationships with their parents may learn fewer adaptive socialisation strategies, increasing the likelihood of behaving antisocially towards peers (Kaufman et al., 2019). Consistent with this, improvements in parenting behaviours are associated with children's improved social competence (Sandler et al., 2011). In the context of peer conflict, this improved social competence may help children to remain calm in peer settings, should the potential for conflict arise. However, this is yet to be tested in an intervention. As such, it is not clear whether there are differential effects of such programmes on children's interpersonal conflict with peers, which is likely to occur in settings outside of the home, when compared to conflict with family members. It is possible that any reductions in children's conflict with peers will be smaller than those relating to conflict with family members, given that parenting programmes focus primarily on improving family interactions.

It is important to explore this to understand whether parenting programmes have the potential to reduce children's conflict outside of the home, or whether separate/ additional support might be needed. This is particularly relevant for children referred for treatment of more severe behavioural difficulties, who are likely to behave disruptively in multiple contexts (e.g., home and school). Indeed, a diagnosis of conduct disorder requires disruptive behaviour to be present in multiple settings (American Psychiatric Association, 2013).

The present study

This study aimed to identify the effects of the Incredible Years parenting programme on children's interpersonal conflict by analysing pooled data from randomised controlled trials evaluating the Incredible Years parenting programme in Europe. Multiple trials have demonstrated the programme's effectiveness in reducing behavioural problems in children (Leijten, Gardner, Landau, et al., 2018; Menting et al., 2013), and it is recommended by influential bodies (NICE (UK), NJI (The Netherlands), and Blueprints (USA)) for the prevention and treatment of behavioural problems.

Like other established behavioural group parenting programmes following the Hanf model (Reitman & McMahon, 2012), Incredible Years focuses on parenting techniques to build warm parent-child relationships (e.g., responsive play) and to encourage positive child behaviour (e.g., praise, rewards) and to discourage negative child behaviour (e.g., limit-setting, and constructive discipline techniques). Specifically, the programme supports parents to use skills and strategies such as empathy, attention, problem solving, and encouragement. To discourage negative child behaviour it teaches use of clear limits, household rules, consistent follow-through, and ignoring, distracting or redirecting minor disruptions. For instances of severe child disruptive behaviour, it advises selective use of consequences, such as time-out and loss of privileges (Gardner & Leijten, 2017).

It is standard practice for group leaders and parents work together on how different strategies can best be used with children of different ages (such as time-out for younger children and removing privileges for older children). Techniques are taught via practice-based methods, including discussions of videos modelling parenting strategies and role-play practice. An important aspect of the programme is its use of a collaborative delivery style that helps parents to recognise their skills and empowers them to identify key principles from the content which can be applied to their parenting goals (Gardner & Leijten, 2017). For example, in relation to children's interpersonal conflict, parenting goals may include manging children's conflict with their siblings and/or peers.

Existing evidence for programme effects on children's conflict with others is typically available from individual trials (Overbeek et al., 2021). As outlined in Chapter 2, the use of individual-level pooled data enables increased statistical power, allowing small programme effects to be detected and estimated precisely, by synthesising individual participant data from multiple trials on the same parenting programme (Curran & Hussong, 2009). An additional advantage of this approach is the utilisation of data across several countries and a diverse range of contexts (from psychiatric clinics to community services), versus a single setting, thereby substantially increasing the generalisability of findings.

5.3 Methods

5.3.1 Design and procedure

This study used individual family level data from 15 randomised trials on the effects of the Incredible Years parenting programme for children aged 0-12 years across seven countries in Europe (England, Ireland, Norway, Portugal, Sweden, The Netherlands, and Wales). Fourteen trials were from a previously pooled dataset of a complete set of available Incredible Years trial data in Europe, up to 2014 (see Leijten, Gardner, Landau, et al. (2018) and Chapter 2

(Methods) of this thesis for a detailed description of this dataset). For the purposes of this study, data from a 15th trial (Weeland et al., 2017), which ended after 2014, was added to the pooled dataset, following the same harmonisation procedures as in Leijten, Gardner, Landau, et al. (2018). Trials were included from European countries only to help ensure relative homogeneity in the usual services that children received across trials, thus supporting the comparability of the pooled data. All trials were conducted by researchers independent of the programme developer.

The inclusion criterion was families who, at both baseline and at posttest (defined as first measurement point intervention termination), completed at least seven of the nine items (i.e., more than 70%) which assessed children's conflict with others in the Eyberg Children's Behavior Inventory (ECBI; Robinson et al., 1980). The content of these items is described below in the 'measures' section. Twelve of the 15 trials were eligible for inclusion. Three trials (Hutchings et al., 2017; Scott et al., 2001; Seabra-Santos et al., 2016) were excluded due to the absence of item-level ECBI data on children's interpersonal conflict.

Details of included trial characteristics are shown in Table 5.1. Seven trials were indicated prevention (Trials #3, #6, #7, #8, #10, #11, #12) and two were treatment trials (#1, #2), which included children screened for high levels of behavioural problems. Three trials were selective prevention trials (#4, #5, #9) which targeted families at risk of, but not necessarily currently experiencing, behavioural problems. Each trial received ethical approval from its respective Internal Ethical Review Board, and the protocol for the original pooling study protocol was reviewed by the Departmental Research Ethics Committee of the Department of Social Policy and Intervention, University of Oxford.

Table 5.1 Overview of trial and family characteristics

Trial	Authors (year)	Country	Setting	Behaviour problem screening	Number of families	Child age (Mean)	Baseline conflict with parents [a] (Mean)	Baseline conflict with siblings [a] (Mean)	Baseline conflict with peers [a] (Mean)	% Low income	% Ethnic minority
1	Larsson et al. (2009)	Norway	Outpatient psychiatric clinics	Yes	68	3–8 (6.60)	4.61	3.65	3.85	26	1
2	Axberg & Broberg (2012)	Sweden	Outpatient psychiatric clinics	Yes	45	3–8 (5.93)	4.80	4.62	3.22	35	0
3	McGilloway et al. (2012)	Ireland	Community services	Yes	137	2–7 (4.82)	4.77	4.44	3.32	45	6
4	Menting et al. (2014)	The Netherlands	Community services	No	81	1–11 (6.41)	2.90	3.51	2.30	91	77

Trial	Authors (year)	Country	Setting	Behaviour problem screening	Number of families	Child age (Mean)	Baseline conflict with parents [a] (Mean)	Baseline conflict with siblings [a] (Mean)	Baseline conflict with peers [a] (Mean)	% Low income	% Ethnic minority
5	Leijten et al. (2017)	The Netherlands	Outpatient psychiatric clinics and schools	Yes & No	89	2–8 (5.77)	3.63	3.66	2.57	71	56
6	Hutchings et al. (2007)	Wales	Community services	Yes	81	3–4 (3.82)	3.40	3.64	2.77	80	1
7	Morpeth et al. (2017)	England	Community services	Yes	160	2–4 (3.68)	4.16	3.49	2.69	64	52
8	Scott, Sylva, et al. (2010)	England	Schools	Yes	75	4–6 (5.18)	3.39	3.70	2.63	40	36

Trial	Authors (year)	Country	Setting	Behaviour problem screening	Number of families	Child age (Mean)	Baseline conflict with parents [a] (Mean)	Baseline conflict with siblings [a] (Mean)	Baseline conflict with peers [a] (Mean)	% Low income	% Ethnic minority
9	Scott, O'Connor, et al. (2010)	England	Schools	No	114	4–6 (5.42)	2.67	3.45	2.62	42	70
10	Scott et al. (2013)	England	Schools	Yes	142	5–7 (6.10)	4.05	4.40	2.87	77	16
11	Gardner et al. (2006)	England	Community services	Yes	53	2–9 (6.17)	4.93	5.14	3.79	62	2
12	Weeland et al. (2017)	The Netherlands	Community services	Yes	364	3–8 (6.29)	3.73	3.58	2.66	[b]	24

Note. Numbers reported in this study may differ from those reported in individual trials, due to this study's inclusion criterion.

[a] Possible range of scores for children's conflict are 1–7, with a higher score indicating a higher level of conflict.

[b] No income data collected.

5.3.2 Participants

The pooled sample from the 12 trials included 1, 409 families–854 in the intervention condition and 555 in the control condition (some trials used a 2:1 allocation). Children were predominantly male (61%) and aged 1–11 years (M = 5.53 years, SD = 1.56). Primary caregivers were aged 19–63 years (M = 34.67 years, SD = 6.65). The socioeconomic status of families was diverse, including: 60% low income; 31% low educational level; 29% single parent; 8% teen parents; 36% no employed parent in the household; and 30% reported to be from an ethnic minority. Data was used from the primary caregiver (97% mothers) because most trials included data from one parent only.

There were very few statistically significant differences between conditions within each original trial (Table F.1, Appendix F). However, when pooling the data across trials and applying the inclusion criterion, there were some statistically significant (p <.05) differences between conditions for the baseline characteristics of child age, child ECBI score (excluding conflict items), parent age, parent education level, parental depressive symptoms, and single parent status (Table F.2, Appendix F). These differences are likely to reflect the inclusion criterion used for this study (completed at least 70% of the interpersonal conflict items at both baseline and posttest). The baseline characteristics identified as differing significantly between conditions were then controlled for in subsequent analyses.

Missing data analyses (Table F.3, Appendix F) showed that there were few significant differences for child characteristics between those meeting the study inclusion criterion (N = 1, 409) and those excluded (N = 408, >30% missingness for interpersonal conflict items (i.e., did not complete three or more items) at either baseline or posttest. However, primary caregivers in families excluded from the study were more likely to be from a low-income household, be a teen parent, be a single parent, have a low level of education, and be from an ethnic minority.

5.3.3 Intervention and control condition

Families in the intervention condition were offered the Incredible Years parenting programme (Webster-Stratton, 2015). The number of sessions ranged from 12–18 across trials, depending on when the trial was conducted and its context- early versions and prevention versions consist of fewer sessions. The most frequent number of sessions offered was 12. A total of 87% of parents attended at least one session and this group attended, on average, 76% of the sessions (across trials, the average percentage of sessions attended was 65–92%). Control conditions were either: waitlist (seven trials), care as usual (three trials), or minimal intervention (two trials).

5.3.4 Measures

For the purposes of this study, nine items assessing children's conflict with others were selected from the Intensity Scale of the ECBI. The ECBI is a well-established measure of disruptive behaviour (i.e., behavioural problems) in children and includes 36-items on a seven-point Likert scale (1 = *never* to 7 = *always*) to indicate problem behaviour frequency. This was completed in every trial by the primary caregiver (i.e., primary parent) at both baseline and posttest. The means of relevant ECBI items were computed to generate three variables corresponding to the child's conflict with their parents, siblings, and peers, respectively.

'Conflict with parents' was assessed using the mean of five ECBI items assessing conflict between the child and their parent: "Acts defiant when told to do something"; "Argues with parents about rules"; "Gets angry when doesn't get own way"; "Sasses adults"; and "Hits parents" (Internal consistency: baseline $\alpha = .82$, posttest $\alpha = .83$).

'Conflict with siblings' was assessed using the mean of two ECBI items assessing sibling conflict: "verbally fights with sisters and brothers" and "physically fights with sisters and brothers" ($r = .71$ at baseline, $r = .74$ posttest).

‘Conflict with peers’ was assessed using the mean of two ECBI items assessing conflict with friends: “verbally fights with friends his/her own age” and “physically fights with friends his/her own age” (r = .58 at baseline, r = .57 posttest)

5.3.5 Analytic strategy

This study’s research questions, hypotheses, and analysis plan were pre-registered at https://osf.io/f795m. Data were analysed using R, version 4.1.1 (R Core Team, 2021). Multilevel modelling was used to capture the hierarchical structure of the data, as families (Level 1) are nested within trials (Level 2). Intention-to-treat principles (using data from all families, including those who did not attend any sessions) were followed. Continuous variables were grand mean-centred. Due to the low percentage of missing data for interpersonal conflict items in the starting sample (<1%), no additional methods were used to account for missing data. No meaningful power analysis could be conducted, as statistical power in multilevel analyses depends on parameters which are often unknown prior to analysis (Leijten, Wijngaards-de Meij, et al., 2021). However, these analyses are likely to be better powered than those of individual trials, as the pooled dataset has a much larger sample size than that of a typical individual trial.

Three multivariate multilevel analyses, one for each interpersonal conflict type, were conducted to examine the extent to which the intervention condition (Incredible Years or Control) predicted the mean level of conflict with parents, siblings, and peers respectively at posttest (T2).

As an example, highlighted here are the variables included in the model for conflict with parents: (a) outcome: conflict with parents at T2; (b) covariates: all baseline (T1) measures of conflict (with parents, with siblings, with peers); T2 conflict with siblings and T2 conflict with peers; child and family characteristics identified as differing significantly between conditions at T1(child age, child ECBI score (excluding conflict items), parent age,

parent education level and single parent status)*; (c) fixed effect for the predictor variable-intervention condition (Incredible Years or Control); (d) random effects for the trial level (trial ID).

Analyses were then repeated for the outcomes of conflict with siblings and conflict with peers. Assumptions were checked, and the models were run both with and without 17 outliers (T2 conflict values three standard deviations above or below the T2 mean for that particular conflict type), providing similar results for all conflict outcomes. Results including outliers are presented below and excluding outliers in Table F.4 in Appendix F.

*Parental depressive symptoms also differed significantly at baseline between intervention and control conditions. However, trials #7 and #12 (37.2% of the pooled sample) included no measure of parental depression. Imputing this variable was not advisable because it was entirely missing from two trials. To avoid excluding these trials in analyses, parental depressive symptoms was excluded as a covariate in the main analyses. Sensitivity analyses, including parental depressive symptoms as a covariate, were also conducted. Results were comparable to the main analysis and are presented in Appendix G Tables G.1, G.2, and G.3.

5.4 Results

5.4.1 Descriptives

Table 5.2 shows the baseline and posttest interpersonal conflict scores for children by group. For both conditions, baseline mean levels of conflict were similar for conflict with parents and with siblings, with the lowest mean levels for conflict with peers.

Table 5.2 Descriptive statistics for children's changes in mean levels of conflict from baseline (T1) to posttest (T2)

Children's conflict with:[a]	Incredible Years T1	Incredible Years T2	Control T1	Control T2
Parents (M, SD)	3.90 (1.31)	3.24 (1.18)	3.80 (1.24)	3.46 (1.21)
Siblings (M, SD)	3.85 (1.80)	3.54 (1.71)	3.81 (1.75)	3.68 (1.72)
Peers (M, SD)	2.86 (1.47)	2.47 (1.26)	2.82 (1.36)	2.65 (1.20)

Note. *M* = Mean, *SD* = Standard Deviation; *N* = 854 for Incredible Years intervention condition, *N* = 555 for control condition.

[a] Possible range of mean conflict scores are 1–7, with a higher score indicating a higher level of conflict.

5.4.2 Main analyses

Table 5.3 shows the results from the multivariate analyses. A negative coefficient reflects benefit, as a lower conflict value represents a desired outcome. Incredible Years reduced children's levels of conflict with parents (β = -0.21, 95% CI -0.31 to -0.12, *p* <. 001), albeit with a small effect size. There were only very small, statistically non-significant, reductions in children's levels of conflict with siblings (β = -0.02, 95% CI -0.16 to 0.11) and peers (β = -0.11, 95% CI -0.23 to 0.0001). The intraclass coefficients indicate that there was very little variation between trials for intervention effects on each type of conflict, with most variation between individuals rather than at group level.

Table 5.3 Estimated programme effects on children's levels of interpersonal conflict

Children's conflict with:	Beta value and [95% confidence interval][a]	*p*	ICC[b]
Parents	-0.21 [-0.31, -0.12]	<.001***	0.019
Siblings	-0.02 [-0.16, 0.11]	.749	0.006
Peers	-0.11 [-0.23, 0.0001]	.050	0.035

Note. Using complete case responses, $N = 1, 295$.

*** $p < .001$.

All models controlled for children's baseline levels of conflict with parents, siblings and peers, along with the following variables which were identified in the starting sample as differing significantly between intervention and control conditions: child age; child ECBI score (excluding conflict items); age of parent; educational level of the parent; and single parent status.

[a] The beta value represents group differences expressed in baseline standard deviations. For all outcomes, a negative regression coefficient reflects benefits of the Incredible Years programme.

[b] ICC= Intraclass Correlation Coefficient, values closer to 0 indicate there is relatively little variation between trials for intervention effects on each type of conflict, with most variation between individuals.

5.4.3 Pre-planned post-hoc analyses

A. Sensitivity analysis for the possibility of target children without siblings

It is likely that the study sample included some children without a sibling and, therefore, the intervention cannot be expected to affect level of sibling conflict in these cases. The pooled dataset contains no direct measure of numbers of siblings in the family. Therefore, to be conservative, families where parents answered 'never' to

both sibling conflict items from the ECBI at all timepoints were treated as likely to have no siblings. To be clear, this is not to assume that these are one-child families per se, but, since it was impossible to exclude the possibility that they might be one-child families, rather than a child with no conflict with their sibling, this was a necessary approach. As a sensitivity analysis, these children were removed from the main sample and the analyses were repeated using this smaller sample (N = 877), finding comparable results to the main analyses (Table H.1, Appendix H). This suggests that the lack of intervention effects on children's conflict with their siblings was not due to the inclusion of families who might have only one child. It is also possible that families where the target child did not have a sibling were excluded from the pooled sample, as they might not have answered the sibling conflict items from the ECBI. However, this is unlikely as only five of the excluded families (1.2% of the excluded sample) were missing both sibling conflict items at all timepoints.

B. Moderator analyses

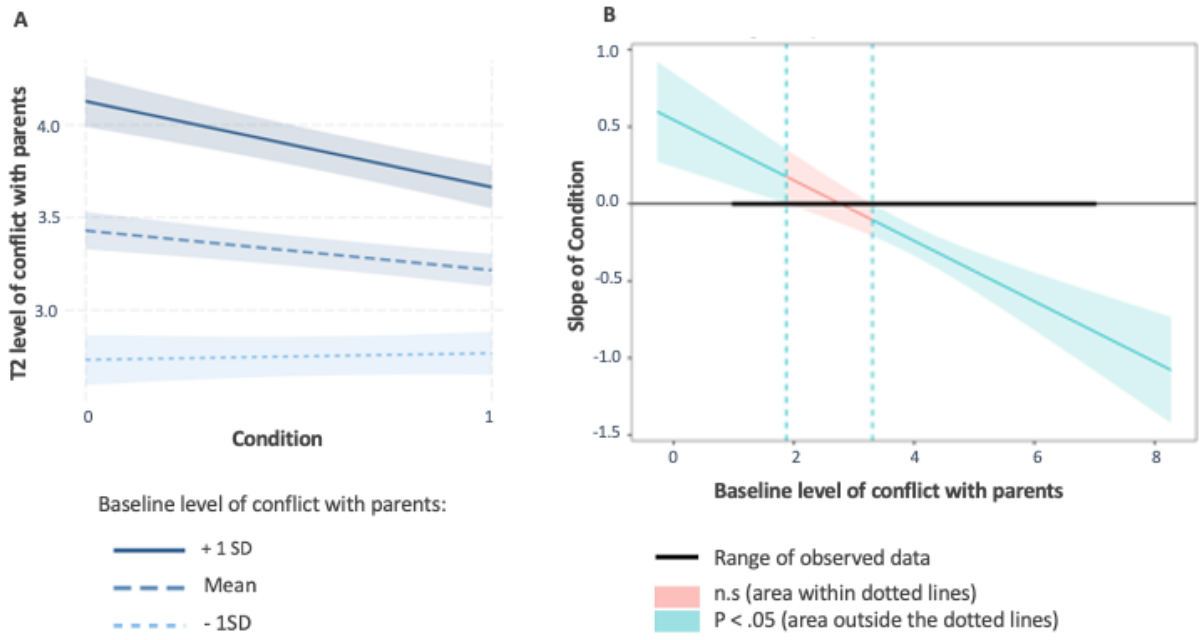
Moderator analyses were conducted to explore whether conflict rates were lower in children with higher baseline levels of conflict. For each multivariate model (conflict with: parents, siblings, and peers) from the main analyses, an interaction term was added between condition (intervention or control) and the baseline level of conflict which corresponded to the model outcome. Moderation analyses were conducted for all relationship types. The interaction term between condition and baseline conflict level was significant for conflict with parents (β = -0.20, 95% CI -0.27 to -0.12, p <.001) and conflict with siblings (β = -0.11, 95% CI -0.19 to -0.04, p = .003), but not significant for conflict with peers (β = 0.01, 95% CI -0.06 to 0.09, p = .717). This suggests that the Incredible Years programme helped to reduced children's conflict with parents and siblings especially in children with higher baseline rates of conflicts with parents and siblings, respectively.

Simple slopes illustrate the effects of the intervention on posttest levels of conflict with parents (Figure 5.1A) and with siblings (Figure 5.2A), according to differing baseline levels of conflict (-1 *SD*, *M*, and +1 *SD*). Simple slopes show that for both types of conflict, higher baseline levels of conflict were associated with greater intervention effects. This relationship was stronger for conflict with parents than with siblings. For conflict with parents, there were significant intervention effects for baseline score at the mean level (β = -0.21, t = -4.38, p <.001) or higher (+1 *SD*: β = -0.46, t = -6.72, p <.001). For conflict with siblings, there were only significant effects of the intervention for those with a baseline score of +1 *SD* (β = -0.22, t = -2.31, p = .02).

To further interpret these interactions, regions of significance were examined using the Johnson-Neyman procedure (Johnson & Neyman, 1936) (Figure 5.1B and Figure 5.2B), to identify the exact values of baseline conflict at which there is a significant association between condition and posttest level of conflict. The regions of significance can be identified as those where the 95% upper and lower confidence intervals do not overlap on the Y-axis.

The intervention condition had a significant effect on children's conflict with parents at posttest when children's average baseline conflict with parents score was either >3.31 (849 children, 65.6% of the sample) or <1.87 (74 families, 5.72%) on the 1–7 Likert scale of the ECBI (Figure 5.1B). This suggests that the significant main effects of Incredible Years on reducing children's conflict with parents was predominantly driven by those with higher levels of conflict with their parents at baseline (i.e., scoring an average >3.31 on the conflict with parents variable at baseline).

Figure 5.1 Illustrations of interactions between baseline level of conflict with parents and condition for level of conflict with parents posttest. A: Simple slopes B: Johnson-Neyman Regions of Significance



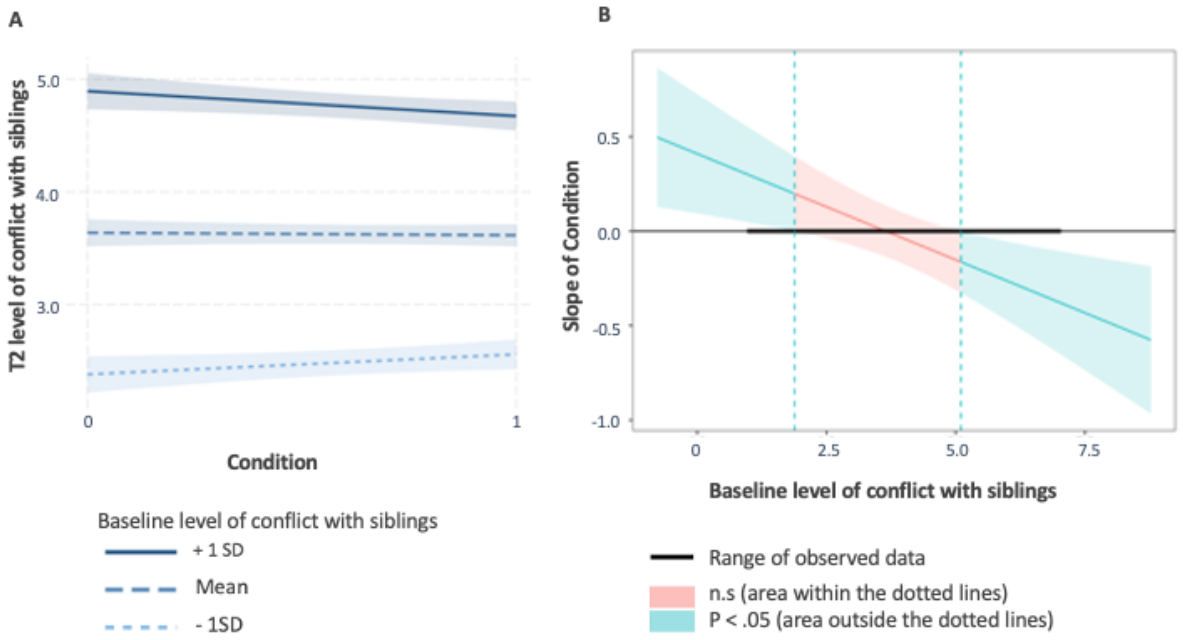
Note: 95% upper and lower confidence intervals are shown

n.s = non-significant

For the simple slopes (5.1A), 0 on the X-axis refers to the control condition, and 1 to the intervention condition. The Y-axis reflects the mean value for posttest (T2) level of conflict with parents. Possible values range from 1-7, reflecting average scores using the 7-point Likert scale of the ECBI; a higher value represents a greater frequency of conflict behaviour.

For the Johnson-Neyman plot (5.1B), the X-axis represents the mean level of baseline conflict with parents. Possible values range from 1–7, reflecting average scores using the 7-point Likert scale of the ECBI; a higher value represents a greater frequency of conflict behaviour. The Y-axis represents the conditional slope of the predictor (condition), and the plot shows where the condition slope differs significantly from 0.

Figure 5.2 Illustrations of interactions between baseline level of conflict with siblings and condition for level of conflict with siblings posttest. A: Simple slopes B: Johnson-Neyman Regions of Significance



There is a smaller region of significance for conflict with siblings (Figure 5.2B). The intervention condition had a significant effect on posttest conflict with siblings when the average baseline level of conflict with siblings was either >5.10 (286 children, 22.1% of the sample) or < 1.88 (221 children, 17.1%). This suggests that Incredible Years predominantly had a significant effect on reducing children's conflict with their siblings when their baseline level of conflict with siblings was very high. However, this pertains to less than a quarter of the sample, hence the non-significant overall main effects of the programme on children's conflict with their siblings.

Johnson–Neyman analyses also indicated significant intervention effects at very low baseline levels of conflict for both outcomes. For conflict with parents, this corresponded to baseline scores below 1.87 (74 families; 5.72% of the sample; Figure 5.1B), and for conflict with siblings this corresponded to scores below 1.88 (221 children; 17.1% of the sample;

Figure 5.2B). Descriptive analyses of these subgroups indicated small increases in average conflict from pre- to posttest (Tables 5.4 and 5.5).

Table 5.4 Descriptive statistics for changes in children's mean levels of conflict from baseline (T1) to post-intervention (T2) in a sample with low levels of baseline conflict with parents

Interpersonal conflict:	**Incredible Years T1** ***(M, SD)***	**Incredible Years T2** ***(M, SD)***	**Control T1** ***(M, SD)***	**Control T2** ***(M, SD)***
Children's conflict:[a]				
with Parents	1.47 (0.28)	1.92 (0.79)	1.54 (0.24)	1.84 (0.86)
with Siblings	2.50 (1.40)	2.66 (1.55)	3.11 (1.64)	3.17 (1.55)
with Peers	1.73 (1.11)	1.72 (0.81)	1.73 (0.760	2.09 (1.06)

Note. M = mean, *SD* = standard deviation.

N = 42 for Incredible Years intervention condition, *N* = 32 for control condition

[a]Possible range of mean conflict scores = 1–7

Table 5.5 Descriptive statistics for changes in children's mean levels of conflict from baseline (T1) to post-intervention (T2) in a sample with low levels of baseline conflict with siblings

Interpersonal conflict:	**Incredible Years T1** ***(M, SD)***	**Incredible Years T2** ***(M, SD)***	**Control T1** ***(M, SD)***	**Control T2** ***(M, SD)***
Children's conflict:[a]				
with Parents	3.67 (1.46)	3.04 (1.16)	3.61 (1.38)	3.34 (1.31)
with Siblings	1.06 (0.16)	1.61 (1.12)	1.12 (0.23)	1.63 (1.00)
with Peers	2.55 (1.60)	2.27 (1.24)	2.32 (1.31)	2.27 (1.16)

Note. *M* = mean, *SD* = standard deviation.

N = 134 for Incredible Years intervention condition, *N* = 87 for control condition

[a]Possible range of mean conflict scores = 1–7

Additional unplanned post-hoc sensitivity analyses exploring age effects and session attendance were also conducted. Excluding very young children (< three years old, *n* = 54; Table 5.6) did not change study findings.

Table 5.6 Estimated effects of Incredible Years on children's levels of conflict, excluding children under the age of 3 (*n* = 54)

Interpersonal conflict:	**Beta value and [95% confidence interval][a]**	***p* value**	**ICC[b]**
Children's conflict:			
with Parents	-0.18 [-0.26, -0.10]	<.001***	0.019
with Siblings	-0.01 [-0.09, 0.07]	.782	0.008
with Peers	-0.08 [-0.17, 0.02]	.104	0.040

Note. Using complete case responses, *n* = 1, 250.

All models controlled for children's baseline levels of conflict with parents, siblings, and peers, and also the following variables which were identified in the starting sample as differing significantly between the intervention and control conditions: child age; child ECBI score (excluding conflict items); age of parent; educational level of the parent; and single parent status.

[a] The beta value represents group differences expressed in baseline standard deviations. For all outcomes, a negative regression coefficient reflects benefits of the Incredible Years programme.

[b] ICC= Intraclass Correlation Coefficient, values closer to 0 indicates that there is relatively little variation between trials in terms of children's levels of conflict, most variation is between individuals.

***$p < .001$.

Excluding parents who did not attend any Incredible Years sessions (*n* = 93; Table 5.7) also did not change study findings.

Table 5.7 Estimated effects of Incredible Years on children's levels of conflict, excluding intervention families who did not attend any sessions (*n* = 93)

Interpersonal conflict:	**Beta value and [95% confidence interval][a]**	***p* value**	**ICC[b]**
Children's conflict:			
with Parents	-0.21[-0.30, -0.13]	<.001***	0.016
with Siblings	-0.00 [-0.08, 0.08]	.976	0.001
with Peers	-0.07 [-0.17, 0.02]	.115	0.027

Note. Using complete case responses, *n* = 1, 206.

All models controlled for children's baseline levels of conflict with parents, siblings, and peers, and also the following variables which were identified in the starting sample as differing significantly between the intervention and control conditions: child age; child ECBI score (excluding conflict items); age of parent; educational level of the parent; and single parent status.

[a] The beta value represents group differences expressed in baseline standard deviations. For all outcomes, a negative regression coefficient reflects benefits of the Incredible Years programme.

[b] ICC= Intraclass Correlation Coefficient, values closer to 0 indicates that there is relatively little variation between trials in terms of children's levels of conflict, most variation is between individuals.

****p* < .001.

5.5 Discussion

This study examined the extent to which the Incredible Years parenting programme was effective in reducing children's levels of interpersonal conflict with their parents, siblings, and peers respectively. In line with study hypotheses, the programme had the largest effect on children's conflict with their parents, which is perhaps unsurprising given the focus of the programme on improving parent-child relationships (e.g., by reducing or eliminating coercive parent-child interactions; Patterson, 1982). It is likely that when a parent changes their behaviour towards their child, the child also changes their behaviour, leading to reductions in children's conflict with their parents.

The finding that the programme does not have overall effects on children's levels of conflict with siblings and peers, is consistent with previous research showing that, whilst the Incredible Years programme is extremely effective at reducing disruptive behaviour, particularly when baseline levels are high, wider benefits are generally limited (Leijten et al., 2020; Overbeek et al., 2021). There are several possible reasons for these findings. First, if changes in children's conflict with other children occur via improvements first in the parent-child relationship, a longer measurement point might be needed for such cascading effects to become apparent. Unfortunately, due to the use of waitlist controls (who received the intervention immediately after the first post-intervention measurement point) for most trials, longer term follow-ups were not possible.

Second, although parenting behaviour plays a key role in the likelihood of children's conflict with others (Labella & Masten, 2018; Tippett & Wolke, 2015), there are additional contributory factors, not necessarily targeted by Incredible Years. For example, the differential treatment of siblings by parents increases sibling conflict (Jenkins et al., 2012). Families with different structures, such as those with step siblings, might also face additional challenges surrounding sibling conflict, which are not specifically addressed in Incredible

Years. Furthermore, following developmental systems theory, in which an individual's development emerges from interactions across different system levels, such as their family and wider community (Bronfenbrenner & Morris, 2006), there are a range of risk factors for children behaving aggressively towards others. These include factors in the family- e.g., poverty, and family violence (Espelage et al., 2014; Farrington et al., 2017); school- e.g., friendships with antisocial peers (Piehler & Dishion, 2007); and wider community- e.g., exposure to neighbourhood violence (Masten, 2021; Schwartz & Proctor, 2000).

In addition, it may be harder for children to change their behaviour towards peers in environments where adults around the child have not taken part in the parenting programme, so have not changed how they interact with the child. Therefore, in this environment there might be a higher likelihood of the child's negative behaviour being reinforced, sustaining their conflict with peers. Baseline levels of conflict with peers were also low in the study sample, both relative to the baseline values of conflict with parents and conflict with siblings, and relative to the ECBI response scale. This is perhaps because of the small number of treatment programmes in the sample. As such, it may be that for many children, their scores could not be reduced any further.

Moderator analyses findings suggest that children with more severe conflict with parents or siblings prior to the programme benefitted more from the intervention in terms of reductions in conflict with parents and siblings, respectively. This mirrors findings from the literature on parenting programmes that address child behavioural problems more broadly (Kjøbli et al., 2023), including Incredible Years trials (Leijten et al., 2020), which show that positive intervention outcomes are more likely when there is more scope for changes to occur. Although the pooled dataset does not contain data on parental programme goals, parents of children with high baseline conflict levels may be more highly motivated to address this problem during the programme, choosing to focus on helping their child navigate

interpersonal relationships (e.g., skills to manage non-compliance and aggression between siblings). Almost all parenting programmes allow for this, by asking parents to choose their own goals for the child.

It may seem somewhat surprising that children's baseline level of conflict with peers did not moderate intervention effectiveness. It is possible, but unlikely, that the distribution of scores for children's conflict with peers at baseline was too narrow to detect baseline moderation (Howe & Leijten, 2023), as a large, pooled dataset from a range of trials was used. Alternatively, unmeasured contextual adversities, such as discrimination towards the child in the school environment, might better account for variations in the effectiveness of the programme in terms of reducing conflict with peers. As Parra-Cardona (2023) notes in their commentary on equity effects in prevention science, such factors are often unmeasured in interventions, yet can influence their effectiveness. Relatedly, the peer conflict measure did not differentiate between children who initiated conflict and those who reacted to it. This conflation may have underestimated programme effects, as the intervention may have had less of an influence on how other children interact with the target child, particularly in the context of discrimination.

Finally, the study sample age range was broad (1–11 years) and it is possible that parents of very young children are less likely to endorse items assessing children's conflict with other children. However, sensitivity analyses excluding children below three years of age (Table 5.6) did not alter the findings.

Moderation analyses also found that, for both conflict with parents and conflict with siblings, Incredible Years led to significant effects for a small number of families when baseline levels of conflict were extremely low. Unexpectedly, this appears to be driven by very small increases in interpersonal conflict levels from pre- to posttest (Tables 5.4 and 5.5). It may be that the programme increased parents' awareness of their child's conflict

behaviours, although this should be interpreted with caution given the small percentage of families involved (5% of intervention condition families for conflict with parents, and 15% of intervention families for conflict with siblings).

This study had several strengths. First, the use of a uniquely large, pooled dataset enabled use of a well-powered sample to estimate programme effects, and to rigorously test baseline moderation effects. Furthermore, the wide range of settings in the study sample enhances the generalisability of findings. Second, assessing children's interpersonal conflict using the ECBI, which had seven possible response options per item, allowed for assessment of subtle changes in children's conflict before and after programme completion. The use of such a sensitive measure also suggests that a lack of programme effects on children's peer problems in previous studies, which used a less sensitive measure (the SDQ), is not related to measurement issues (Overbeek et al., 2021).

At the same time, the study has limitations. First, there were differences in the ECBI items assessing conflict with parents when compared to those assessing conflict with siblings and peers, in terms of the number of items and their content. The ECBI has the same content for assessing conflict with siblings and peers (two items assessing how often the target child physically or verbally fights with their siblings/ friends), but slightly different content for conflict with parents. Therefore, the five items which best captured children's conflict with parents were selected. These assess a range of conflict behaviours (e.g., whether the child acts defiantly when told to do something and argues about rules), with a greater specificity than the sibling and peer conflict items. It is possible that these differences account, at least in part, for the stronger programme effects on children's conflict with their parents, with the sibling and peer conflict items perhaps unable to detect more subtle changes in children's behaviour.

Second, children's conflict behaviours were rated by parents only. Parents may not be best placed to assess conflict behaviours outside of the home (i.e., with peers), thereby

accounting for a lack of intervention effects for peer conflict. Teachers may be better placed to assess this conflict behaviour, as they may have more opportunities to observe children with their peers. Teachers might also be more aware of what constitutes normative, versus conflictual, peer interactions. Unfortunately, there were too few trials with teacher reported data to include these measures in the original pooling study (Leijten, Gardner, Landau, et al., 2018). Relatedly, the pooled dataset also does not contain any objective measures of children's interpersonal behaviours, and it may be that parents' programme engagement influences their ratings of children's interpersonal conflict. While the pooled dataset contains no measure of programme engagement, excluding parents who did not attend any intervention sessions as a proxy for engagement did not change findings (Table 5.7). Reassuringly, a recent meta-analysis of behavioural parent training programmes (Beelmann et al., 2023) also found that effect sizes on child behaviour obtained through independent observations did not significantly differ from those obtained through parent-report.

Finally, the pooled dataset does not contain measures relating to neurodiversity, with some trials explicitly excluding children with autism spectrum disorder. While examining intervention effects for children with diagnoses such as autism spectrum disorder was beyond the scope of this study, it is an important area of future research, as neurodiverse children may be at particular risk for conflict with siblings and peers (Humphrey & Hebron, 2015; Toseeb et al., 2020). Although the Incredible Years programme has been adapted for use with children with autism spectrum disorder (Williams et al., 2020), its effects on interpersonal conflict are yet to be tested.

The most important implication of this study for practice is that Incredible Years reduces not only children's conflict with their parents but can also reduce sibling conflict in families with the most severe sibling conflict at baseline (an average score > 5 on the ECBI, which corresponds to parents rating their child to, on average, often or always engage in

conflict with their sibling). This is particularly important, given that there is a paucity of evidence-based suggestions for how parents can best manage difficulties in sibling relationships (Leijten et al., 2021).

A second important implication of this study for practice is that there were no wider benefits to children's conflict with peers. When parents' key programme goals include helping children to manage peer relationships, it may be that a stronger focus is needed on existing programme elements which target children's social competence and empathy skills. Collaboration between families and teachers might also be needed, to ensure that a child's positive behaviour change at home can be reinforced in the school environment, where most peer interactions take place. This might look like supplementing parenting programmes with child-focused programmes that address children's interpersonal difficulties, such as the Incredible Years school-based 'Dinosaur' programme (Webster-Stratton, 2015). Indeed, research suggests that multicomponent programmes for children with conduct problems, directed at more than one risk domain, show promise for improving children's prosocial skills (Webster-Stratton et al., 2004).

Alongside this, to prevent the school environment sustaining children's conflict with peers, it might be necessary to embed school-based indicated interventions (i.e., the Incredible Years 'Dinosaur' programme) within universal social-emotional learning programmes to improve the overall school climate (e.g., children's perceptions of their peers, enjoyment of school). This approach posits that a positive shift in the school climate may be a prerequisite for targeted interventions to be effective (de Mooij et al., 2024). However, as with all interventions, this will need to be evaluated carefully, as there is potential for harm. For example, targeted interventions may inadvertently exacerbate perceptions of children with disruptive behaviour as being different from their peers, increasing children's relationship difficulties.

5.6 Conclusions

This study's results provide evidence that high-quality behavioural parenting programmes, such as Incredible Years, can reduce children's conflict behaviour within the family, especially when baseline levels of sibling conflict are high. However, programmes do not reduce children's conflict outside of the home, i.e., with peers. Thus, this chapter directly addresses Aim 3 and RQ3 of this thesis.

These findings are based on the first study, to date, which has used individual participant data integrated across multiple trials of the Incredible Years parenting programme, to examine the effects of Incredible Years on children's conflict with their parents, siblings, and peers. This represents an important and unique contribution to the field's understanding of the effects of behavioural parenting programmes on children's interpersonal conflict, because little is known about sibling relationships in the context of parenting programmes aimed at addressing child disruptive behaviour (Weeland et al., 2021). Furthermore, sibling conflict has not been incorporated as a programme outcome in previous research, despite a wealth of evidence highlighting its importance for child development and behaviour. Children's conflict with peers is also seldom assessed as a specific programme outcome. At the same time, this study also highlights areas for future research, such as incorporating teacher ratings of children's conflict with peers, and exploring how parents' programme participation goals might relate to programme effects on children's interpersonal conflict.

Chapter 6: Discussion

In this thesis, I used longitudinal birth cohort data and individual-level pooled data from randomised controlled trials of a behavioural parenting programme, to better understand the role of social relationships in children's emotional and behavioural difficulties. Specifically, I applied developmental and family systems approaches, alongside advanced quantitative analyses to: explore individual differences in resilience processes given a child's level of early maltreatment (Study 1, Chapter 3); and examine the effects of intervening in the parent-child relationship within and beyond the family system (Studies 2 and 3, Chapters 4 and 5). The subsequent sections summarise the main research aims, research questions, and findings from each study (Section 6.1). Sections 6.2–6.6 outline novel contributions of the thesis, general strengths and weaknesses, its implications for research, practice, and policy, and recommendations for future research.

6.1 Summary of thesis

6.1.1 How do children differ in their emotional and behavioural resilience, and level of friendship, given their exposure to child maltreatment?

Chapter 3 addressed Aim 1 of this thesis, to investigate individual differences in children's resilience to maltreatment. The study explored how children varied in their emotional and behavioural resilience (defined as doing better-than-expected given their level of maltreatment exposure) and their level of friendship support across development. Using data from approximately 6,000 children in the ALSPAC cohort, group-based multi-trajectory modelling was used to understand how patterns of emotional resilience, behavioural resilience, and friendship support co-developed across childhood and adolescence.

A five-group model fit the data best, revealing distinct developmental trajectories. While emotional and behavioural resilience trajectories varied across groups, perceived friendship support was generally high across all groups. The largest group of children (46%) maintained the highest levels of emotional and behavioural resilience and the highest levels of friendship support across development. Some children showed resilience in one domain but not another: 29% of children had lower behavioural resilience, but relative emotional resilience and increasing friendship support, while 12% had lower emotional resilience, but relative behavioural resilience, and lower friendship support. Two smaller groups of children followed trajectories characterised by persistently lower levels of resilience in both domains: 8% of children followed trajectories characterised by low emotional resilience and very low behavioural resilience, with increasing friendship support; and 5% of children followed trajectories of very low emotional and behavioural resilience and the lowest levels of friendship support.

6.1.2 How do conduct problems co-occur in siblings, and do behavioural parenting programmes influence the conduct problems of non-targeted siblings?

Grounded in family systems theory, which emphasises understanding child behaviour within the broader family context, Chapter 4 examined effects of the Incredible Years behavioural parenting programme on the conduct problems of sibling dyads, thereby addressing Aim 2 of this thesis: to examine the spillover effects of parenting programmes on sibling behaviour.

The study used individual participant data pooled across three randomised trials of the Incredible Years parenting programme (in England, Wales, and Ireland), which collected conduct problems for the index child and one non-targeted sibling. The sample included 240 families (480 children), comprising an index child (*M* age = 4.73, *SD* = 1.44, range 2–9 years, 62% male) and one non-targeted sibling (*M* age = 5.94 years, *SD* = 3.15, range 6 months –15 years, 49% male). Latent transition analysis identified groups of families at both baseline and

posttest based on families' combinations of index child and non-targeted sibling conduct problems.

Analyses identified two distinct groups (i.e., classes) of families with specific patterns of co-occurring sibling dyad conduct problems. At baseline, most families (80%) belonged to a class characterised by moderate clinical levels of conduct problems in the index child and non-clinical levels for the non-targeted sibling. A smaller group of families (20%) had severe clinical levels for both children at baseline. Class distributions and co-occurring sibling conduct patterns were largely similar at posttest, but with lower levels of conduct problems across classes.

Focusing on how Incredible Years influenced these patterns, most intervention families maintained their initial sibling dyad conduct problems at posttest, but with lower levels across classes. Most intervention families reported improvements predominantly for the index child. However, a minority of families with severe baseline levels of conduct problems in both children moved to a class with non-clinical levels for both children.

6.1.3 What is the influence of a behavioural parenting programme on children's conflict with their siblings and peers?

Using the same dataset as Chapter 4 and also following family systems theory, Chapter 5 investigated whether a behavioural parenting programme influences children's behaviour beyond the parent-child relationship, to also change children's interactions with their siblings and peers. This addressed Aim 3 of the thesis: to consider the role of parent training on children's interpersonal conflict.

The study leveraged individual participant-level data pooled across 12 randomised trials in Europe, comprising a total of 1,409 families. Children's ages ranged from 1-11 years (M = 5.53 years, SD = 1.56), 61% male. Sixty percent of children were from low-income

families, and 30% from an ethnic minority. Multilevel models explored the effects of Incredible Years on children's conflict with parents, siblings, and peers.

Analyses showed that the Incredible Years programme reduced children's conflict with their parents (β = -.21), but there were no statistically significant main effects of the programme on conflict with siblings or peers. However, moderation analyses showed that Incredible Years reduced conflict in sibling relationships for the 22% families with the most severe sibling conflict at baseline (i.e., at baseline, families who rated their child as, on average, engaging in conflict with their sibling 'often' or 'always').

6.2 Originality of the research

This thesis makes original contributions to developmental psychopathology, intervention, and family systems research. First, all studies moved beyond main effects analyses, instead using advanced quantitative analyses to reveal individual differences in patterns of results over time. Second, all studies adopted a systems approach to examine: resilience processes over time, giving unique insights into systems of resilience across development (Chapter 4); and family systems using causal data to provide new findings into effects of parenting programmes within and beyond the family system (Chapters 5 and 6). This section describes these novel contributions in more detail, outlining how they relate to existing research, and why these new findings are of use to the field. Specific contributions to research, practice and policy are outlined in sections 6.4 and 6.5.

6.2.1 Beyond main effects

A core novel contribution of this thesis is its departure from main effects analyses, which typically examines population-level associations (e.g., variable X predicting variable Y). Instead, this research identified individual differences in resilience processes and intervention effects over time, patterns that would otherwise be obscured in main effects analyses. These

findings have crucial implications for adapting existing interventions (such as those supporting children's wellbeing following child maltreatment, or parenting programmes targeting children's behaviour problems) and for designing new ones. This is because each study in this thesis demonstrates that a 'one-size-fits-all' approach to intervening to reduce children's emotional and behavioural problems will not be effective for all children. The following section outlines how each specific study moved beyond studying main effects and the implications of this for interventions.

Specifically, Chapter 3 used a person-centred analysis, group-based trajectory modelling, to plot trajectories of resilience and friendship support across development. This analysis uncovered distinct patterns of these constructs, which were not identified in previous variable-centred studies in this area (Glickman et al., 2021; van Harmelen et al., 2016; Van Harmelen et al., 2017). Notably, the analyses identified trajectories of mixed resilience (where relative emotional resilience co-occurred with low behavioural resilience, and vice versa) alongside high friendship support. The analyses also identified groups characterised by more vulnerable resilience trajectories, yet relatively high friendship support. These are new findings for the resilience literature, which previously conceptualised friendship support as uniformly buffering against the negative effects of child maltreatment on mental health (Van Harmelen et al., 2017). While this chapter was not designed to speak to potential causal relationships between these factors, the novel trajectory groups suggest a more complex dynamic between friendship support and resilience than previously thought. This potentially echoes peer influence theories, where high friendship support can sometimes co-occur with higher levels of mental health problems if an individual's friends also experience mental health problems (Dishion & Tipsord, 2011).

The presence of more vulnerable trajectories alongside high friendship support also indicates that other factors (e.g., warm family relationships, support from school staff), are

likely necessary to support children's resilience- consistent with a multisystemic approach to resilience (Masten et al., 2021). As such, when designing interventions to support children's wellbeing after adversities such as maltreatment, it is crucial to acknowledge that while friendship is an undoubtedly important source of support, its effects may not always be straightforward, nor will it be the only system necessary for children's emotional and behavioural resilience, particularly for individuals following more vulnerable trajectories.

Chapters 4 and 5 examine effects of a parenting programme on change in patterns of co-occurring sibling conduct problems (Chapter 4) and children's conflict with their siblings and peers (Chapter 5). Therefore, they move beyond the primary focus of behavioural parenting programme research on intervention main effects on the index child's conduct problems (Leijten, Gardner, Landau, et al., 2018). In doing so, these studies uniquely contribute to the parenting programme literature, demonstrating previously unexplored wider benefits of such programmes, as well as limitations of these programmes in their current format.

Specifically, Chapter 4 shows that while a minority of families (just 10 families; Table E.1, Appendix E) with severe conduct problems in both siblings pre-intervention benefit greatly from the programme, reporting non-clinical levels of conduct problems in both siblings post-intervention, the majority of non-targeted siblings with severe conduct problems maintain their conduct problems post-intervention. These nuanced findings would have been obscured by variable-centred approaches. For example, two Incredible Years trials (which comprised two of the three trials in Chapter 4) previously reported main effects showing reductions in the non-targeted sibling's conduct problems (e.g. Cohen's $d = 0.68$ for 31 non-targeted siblings in Gardner et al. (2006); and Cohen's $d = 0.69$ for 89 siblings in Hutchings et al. (2007)). However, as Chapter 4 highlights, these findings may have been driven by a minority of non-targeted siblings benefitting greatly, while the majority did not. This is a

crucial distinction for parenting programme researchers and clinicians to be aware of. While trials typically focus on the behaviour of one child, some families will have more than one child with disruptive behaviour. Understanding that programmes, in their current format, may not meet the needs of all children within a family unit is vital knowledge when designing more effective interventions.

Similarly, Chapter 5 demonstrates that a behavioural parenting programme for child disruptive behaviour has wider effects on children's interactions with their siblings- reducing sibling conflict for families with particularly high levels of sibling conflict at baseline (22% of families in this sample). This baseline moderation finding would have been obscured by reporting main effects alone, which showed an overall non-significant effect on sibling conflict. However, there was no effect on children's conflict with peers, regardless of baseline severity of this conflict type. Sibling and peer conflict have not previously been reported as programme outcomes, representing novel findings for the field, highlighting both the wider potential for parenting programmes to improve children's family relationships, as well as potential boundaries of their effectiveness, as there were no effects on peer conflict.

6.2.2 Systems approach

Each study in this thesis adopts systems view, generating novel findings for the field. Chapters 4 and 5, leveraging causal data from pooled randomised controlled trials of the Incredible Years parenting programme, examined programme effects on family systems. This approach is notably underutilised in parenting interventions for child disruptive behaviour (Feinberg et al., 2012; Weeland et al., 2021). To date, research using the Incredible Years pooled dataset has typically focused on the index child-parent subsystem, such as child conduct problems, ADHD, and emotional problems (Leijten et al., 2020); and parenting practices and mental health (Leijten, Gardner, Landau, et al., 2018; Leijten, Gardner, Melendez-Torres, Weeland, et al., 2019). However, parent-child relationships do not exist in a

vacuum, families are complex. For example, many families will have multiple children with behaviour problems, and behaviour problems are not always confined to one setting, such as the home. Therefore, a systems approach advances understanding of how intervening in the parent-index child subsystem affects both the wider family system (e.g., non-targeted sibling behaviour, sibling relationships) and children's behaviour outside of the home (e.g., conflict with peers), thus providing a more holistic view of programme effects on families.

Additionally, taking a systems approach to examine co-occurring sibling conduct problems (Chapter 4), and children's behaviour outside of the home (Chapter 5) may offer preliminary insights into the considerable heterogeneity in programme effects on index child conduct problems (Pelham et al., 2017; Van Aar et al., 2019). While programmes are effective on average in reducing index child conduct problems, they are not equally effective for all families. This heterogeneity is well-established, yet consistent moderators beyond initial severity of child disruptive behaviour are seldom identified, leaving the field with little knowledge of why some families benefit more than others (McMahon et al., 2021). One reason for this may be that the role of factors outside of the parent-index child subsystem are rarely examined, despite evidence of the interlinked nature of family systems, including that relationships in one subsystem (e.g., sibling) can affect individual child behaviour (Pike & Oliver, 2017). Therefore, Chapters 4 and 5, which look beyond the parent-index child subsystem, might tentatively help to explain such heterogeneity. These explanations are only tentative, because identifying factors which might help explain heterogeneity in index child outcomes was not the primary focus of these studies.

For example, in Chapter 4, although the mean levels of index child conduct problems were similar at baseline in both latent classes (i.e., above the clinical threshold), all index children in families where their sibling had non-clinical levels of conduct problems transitioned to a posttest group where mean levels of index child conduct problems were at

non-clinical levels. This contrasts with the group of index children where their sibling also had clinical levels of conduct problems, where just 28% of intervention families moved to a group where the index child now had non-clinical levels of conduct problems. In other words, it seems that index children in families where their sibling also had clinical levels of conduct problems, were less likely to benefit from the programme than index children where their sibling had non-clinical levels. While only speculative, one reason for this pattern might be that families where more than one child has high levels of disruptive behaviour may struggle to consistently implement programme strategies, potentially explaining some of the previously observed heterogeneity in index child conduct problems (Van Aar et al., 2019). Conflict between siblings might also be more likely when both children have high levels of disruptive behaviour, maintaining the index child's disruptive behaviour (Pike & Oliver, 2017).

Similarly, Chapter 5's findings that Incredible Years does not reduce children's conflict with peers may be one reason why some children's disruptive behaviour persists if they still have high levels of conflict with peers outside of the home. This is because negative peer interactions might reinforce their disruptive behaviour, increasing the likelihood that they also behave disruptively at home (Kaufman et al., 2019).

Chapter 3 makes a novel contribution to developmental systems resilience science. By plotting how emotional and behavioural resilience, and friendship support, co-occur across development, this study directly operationalises Ann Masten and colleagues' view that resilience is a dynamic process of positive adaptation following adversity- one that continuously changes over time as a result of an individual's interactions with the systems around them (Masten, 2021, 2024; Ungar & Theron, 2020). While this is an established theoretical perspective in the resilience field, the existing resilience and friendship support literature has largely focused on examining these factors at limited timepoints (Glickman et

al., 2021; van Harmelen et al., 2016; Van Harmelen et al., 2017, 2021). These studies provide valuable ‘snapshots’ into functioning at a particular timepoint, however they do not give a comprehensive understanding of the dynamic unfolding of resilience and its co-occurrence with potential resilience factors, which is central to a developmental systems view of resilience.

Chapter 3 directly addresses this gap. The study's measure of resilience (operationalised as residuals) captures functioning relative to early adversity, thereby modelling the interplay between children’s past experiences and current adaptation. This directly aligns with Masten’s view of resilience as a process of successful adaptation despite significant threats (Masten, 2021). Repeating this measure over time further captures this dynamic process. Additionally, group-based trajectory modelling allowed for the examination of how friendship support (a key resilience factor within Masten’s multilevel systemic framework; Masten et al., 2021) co-occurs with these resilience trajectories across development. This study therefore puts Masten’s developmental systems view of resilience into empirical practice, providing a novel insight into resilience processes across development. This moves beyond simply identifying at a single timepoint whether friendship support protects against poor mental health following adversity, to instead plot across development how friendship support co-occurs with better or worse-than expected-functioning, given an individual’s level of maltreatment during early childhood.

6.3 General strengths and limitations

This section outlines the general strengths and limitations of the overall thesis by evaluating the research methods and approaches used across the three empirical chapters.

6.3.1 Strengths

This thesis has several key strengths, encompassing its methodological rigour and use of advanced quantitative analyses, as well as its innovative use of existing datasets to ask new questions of the data.

6.3.1.1 Methodological rigour and advanced analyses

A notable strength of this thesis is its commitment to open science. Each study's research methods were systematically and transparently documented. For example, each study's research questions, hypotheses, and analysis plan were pre-registered on the Open Science Framework prior to receiving the datasets and conducting analyses (Open Science Framework project links for Chapters 3, 4, and 5, respectively). This rigorous approach reduces the potential for unintentional researcher biases to influence the research process (Baldwin et al., 2022). Furthermore, to both promote transparency and to directly facilitate future work building upon study findings, analysis code for the two published studies is publicly available on their corresponding Open Science Framework project pre-registrations. Analysis code for Chapter 3 will be uploaded once the paper based on this Chapter is published.

A second strength of this thesis is its use of large-scale datasets, providing sufficient sample sizes to employ advanced analytical techniques and generate novel, robust findings. These included person-centred analyses, such as group-based multi-trajectory modelling in Chapter 3 to uncover individual differences in resilience processes, and latent transition analysis in Chapter 4 to identify distinct patterns of intervention responses. Additionally, baseline moderation and the Johnson-Neyman procedure were applied in Chapter 5 to understand the *exact* levels of baseline interpersonal conflict at which Incredible Years had significant effects.

The large sample sizes were critical for the robust application of these methods. For group-based multi-trajectory modelling, while no single 'magic number' for sample size exists, the complexity of modelling joint trajectories of multiple variables necessitates larger samples to accurately identify shared patterns across outcomes. Indeed, simulation studies of single-trajectory group-based trajectory modelling suggests samples of at least 500 participants for robust findings (Loughran & Nagin, 2006). Given the added complexity of plotting multiple trajectories, even larger samples are needed- a criterion easily met by ALSPAC, as Chapter 3 has a sample size exceeding 6, 000 participants. Similarly for latent transition analysis, while there is no consensus on a minimal sample size, individual Incredible Years trials with data from two siblings (typically $N < 100$ families) are likely too small to reliably recover true latent classes (i.e., achieving adequate between-class separation and within-class homogeneity) and accurately measure transitions (Nylund-Gibson et al., 2023). The use of pooled data in Chapter 4 thus increases confidence in the correct estimation of latent transition model parameters.

Finally, when conducting baseline moderation analyses there is potential for underpowered tests when the distribution of the baseline moderator is sparse in the tails (i.e., too few participants at very high or low risk for a variable such as conduct problems), which can obscure moderation (Howe & Leijten, 2023). However, Chapter 5's use of the Incredible Years pooled dataset, comprising 12 diverse trials (ranging from outpatient psychiatric clinics to community prevention settings), mitigated this risk, thereby strengthening the conclusions drawn from the baseline interpersonal conflict moderation analyses.

This thesis also integrates diverse secondary data types, thereby establishing a comprehensive framework for examining the influence of social relationships on children's emotional and behavioural problems. Such a comprehensive approach would be considerably more challenging to achieve with just one dataset. Specifically, longitudinal data from

ALSPAC enabled the investigation of resilience processes across development, which the absence of long-term data in the Incredible Years trials precludes. Furthermore, because data in the Incredible Years dataset was from randomised controlled trials, this meant that causal questions could be asked regarding how intervening in the parent-child relationship influences child outcomes. Randomisation effectively controls for confounding, a challenge far more difficult to mitigate in observational data. By combining these distinct data types, the thesis capitalises on their complementary strengths: the rich developmental insights from longitudinal cohorts and the robust causal inference afforded by randomised controlled trials.

6.3.1.2 Innovative use of existing data

A further strength of this thesis is its re-purposing of existing intervention data to explore previously unexamined effects of the programme on the family system and beyond. Examining family systems in child behaviour intervention is an area rarely explored (Weeland et al., 2021), and prior to this thesis, has not been used in combination with individual participant data from multiple randomised trials, making this approach particularly innovative.

A final strength of this thesis is its increased precision in construct measurement. In Chapter 3, rather than defining resilience based on only on an individual's current functioning (e.g., a binary outcome such as absence of psychopathology; Klika & Herrenkohl, 2013), a residuals approach was used. This method accounts for exposure to maltreatment by operationalising resilience as whether an individual is functioning better or worse than expected given their level of exposure to maltreatment. This allows for a more precise understanding of the full range of children's functioning following maltreatment. For example, an individual with moderate symptoms despite significant adversity would be classified as demonstrating resilience, a crucial nuance for understanding factors associated with such resilience, which would be missed if only current functioning (i.e., raw mental

health scores) is considered. Similarly, the Incredible Years conflict study examined whether the programme influenced specific interaction patterns (e.g., sibling and peer conflict), offering a more precise understanding of the exact aspects of children's behaviour influenced (or not) by these programmes, compared to examining only effects on general disruptive behaviour.

6.3.2 Limitations

This research also has limitations, primarily stemming from its reliance on secondary data. Specifically, using secondary data limits each study in relation to the measures available, the populations studied, and proportions of missing data.

6.3.2.1 Available measures

Using secondary data throughout this thesis enabled a scale and diversity of data which would not be feasible to obtain throughout primary data collection within the scope of a PhD. However, relying solely on secondary data inherently confines study analyses to the measures available within a dataset.

First, there are limitations concerning the quality of available measures. For example, the Incredible Years dataset's sibling relationships measures consist of just two parent-report items on physical/verbal fights between siblings. This meant that Chapter 5 could only address programme effects on conflictual aspects of sibling relationships. Ideally, the dataset would have also included measures of sibling warmth, such as whether the index child likes to be with their sibling, misses them when they are away, and has fun with their sibling (Pike & Oliver, 2017). This is crucial, because sibling relationships are characterised by frequent shifts between warmth and conflict (Kramer, 2010). It is the balance of these positive versus negative interactions which is important for children's wellbeing, with relationships characterised predominantly by negative interactions posing a risk for mental health problems

(Kramer, 2010). Therefore, measuring sibling warmth would have allowed for a more comprehensive understanding of whether, beyond reducing severe sibling conflict, Incredible Years also fostered positive interactions. For example, it is plausible that while fighting decreased following the intervention, this might simply be due to siblings interacting less frequently, rather than an increase in positive exchanges. However, it is important to note that a lack of comprehensive sibling measures is not unique to Incredible Years, rather it reflects a broader challenge in the field, as there is a paucity of valid and reliable tools to assess sibling relationship quality (Holmes et al., 2024).

Relatedly, the Incredible Years dataset only includes parent-report measures of the sibling relationship. However, a comprehensive understanding of intervention effects on the sibling relationship would likely benefit from also including child-report data, particularly as children as young as four can provide useful information on their sibling relationship (Pike et al., 2005). As noted previously, there are few established sibling relationship measures (Holmes et al., 2024), especially child-report measures which are brief enough to feasibly include as additional intervention outcomes. One potential approach could be asking the child to speak about their sibling for five minutes (what kind of person they are, and how they get along). There is preliminary evidence that this adaptation of the Five-Minute Speech Sample (Magaiia et al., 1986), which is commonly used to assess parental warmth/negativity towards their child, may be a valid and reliable measure of sibling relationships in children aged 7–11 years (Yelland & Daley, 2009). Alternatively, sibling interactions could be assessed by adapting dyadic interaction paradigms originally designed to assess parent-child relationships. For example, the Etch-a-Sketch Online task (Oliver & Pike, 2021), which is an eight-minute cooperative drawing task between a parent and child, could be adapted for completion by two siblings (Oliver & Pike, 2021).

Second, while ALSPAC's five-item friendship support measure is more detailed than other comparable cohort studies (e.g., the Millennium Cohort Study's single binary outcome), it does not assess all facets of friendship (e.g., reciprocity). Furthermore, while it has adequate test-rest reliability and external validity (Van Harmelen et al., 2021), its construct validity is untested.

Furthermore, the scope of enquiry in this thesis was limited by measures that were not collected at all in each dataset. For example, while the Incredible Years dataset offered a unique opportunity to examine outcomes for a non-targeted sibling using data from a large individual-participant data meta-analysis, there was no information on parenting practices specifically directed towards the non-targeted sibling. Because parental differential treatment of siblings is associated with increased likelihood of conduct problems in the disfavoured child (Eradus et al., 2024), it would have been informative to have data on parenting towards both siblings. This would have allowed me to generate a differential treatment variable and investigate if it varied per transition group (e.g., did families where both children benefitted greatly from the programme have lower levels of differential treatment than families where just the index child benefitted?). Similarly, the absence of data on parenting goals in the Incredible Years dataset limited the ability to explore how these goals might relate to sibling dyad benefit in Chapter 4, or whether families with reduced sibling conflict in Chapter 5 prioritised this as a programme goal.

Additionally, the Incredible Years pooled dataset lacks multi-rater measures of non-targeted sibling behaviour, as well as children's interpersonal conflict, relying solely on parent-report. However, data from an independent observer would have been particularly beneficial for assessing sibling behaviour (where parent ratings can be susceptible to contrast effects, Kuntsi et al., 2000). Teacher-report data would also have been valuable for assessing children's conflict with peers, as this conflict type typically occurs outside the home.

In Chapter 3, data in ALSPAC on cohort members' friends' mental health would have been valuable to assess with greater certainty whether peer contagion might be one explanation for the observed trajectory patterns. For example, did individuals in the mixed and low resilience trajectory groups have friends with higher levels of mental health problems?

Finally, while Chapter 5 focused on sibling and peer conflict, some sibling and peer relationships will involve more severe violence, specifically victimisation. While Chapter 5 suggests that Incredible Years can effectively reduce severe sibling conflict, it cannot be assumed that it would successfully address sibling victimisation. This is because sibling victimisation encompasses behaviours not included in the Incredible Years conflict measures. For example, whether the behaviour exists in the context of a power imbalance, and types of bullying such as relational (e.g., exclusion) and damage to property. Specifically, sibling victimisation is defined as "any unwanted aggressive behavior(s) by a sibling that involves an observed or perceived power imbalance and is repeated multiple times or is highly likely to be repeated. Bullying may inflict harm or distress on the targeted sibling, including physical, psychological, or social harm. It includes two modes of bullying (direct and indirect) as well as four types (physical, verbal, relational, and damage to property)" (Wolke et al., 2015, p. 918). There are no evidence-based interventions designed to reduce sibling victimisation, despite accumulating evidence that it is both a frequent and harmful experience, associated with a range of negative mental health outcomes (Bowes et al., 2014; Dantchev et al., 2018; Sellars, Oliver, et al., 2024). Therefore, it would have been particularly useful if Incredible Years contained items to assess sibling victimisation, to see if this programme reduced sibling victimisation. However, this lack of sibling victimisation measures reflects a wider data gap, as few datasets contain measures assessing sibling victimisation, particularly during childhood. For example, ALSPAC and the Millennium Cohort Study are notable for including

items assessing sibling victimisation, however, the measures begin at age 12 and 11 years respectively (Bowes et al., 2014; Sellars, Oliver, et al., 2024), preventing the study of sibling victimisation earlier in childhood.

6.3.2.2 Generalisability

The generalisability of findings in this thesis are constrained by the characteristics of the populations studied, as well as the potential influence of missing data.

First, it is not clear whether findings generalise to neurodiverse populations, who are at increased risk of experiencing friendship difficulties (Fox et al., 2024) and negative sibling relationships (Toseeb et al., 2020). Crucially, the Incredible Years pooled dataset does not contain measures of neurodiversity, meaning it is not clear whether findings around observed effects on sibling relationships (Chapter 5) generalise to neurodivergent children. Additionally, the friendship trajectory groupings identified in Chapter 3 (using ALSPAC data- i.e., from a general population sample) may also manifest differently within neurodivergent populations, further highlighting a potential limitation in scope. However, it would also be incorrect to assume that parenting programmes would not help neurodivergent children's relationships, or that friendships are not important for their wellbeing (Fox & Asbury, 2024). Instead, neurodivergent children might benefit from higher intervention doses or adaptations to the delivery process, rather than having fundamentally distinct mechanisms of change. For example, the Incredible Years parenting programme was adapted for parents of children with autism spectrum disorder (Williams et al., 2020). These adaptations included videos of parenting vignettes with children with autism spectrum disorder, as well as a greater focus on emotion coaching, self-regulation skills, and discussion of stress experienced by families (Williams et al., 2020).

Second, generalisability of results may be limited due to individuals excluded from each study because they did not meet the study's inclusion criteria surrounding data

availability- i.e., missing too much data. Although full information maximum likelihood was used to handle attrition and incomplete measures within the included samples, it cannot account for individuals excluded from studies due to extensive missing data. For example, in the ALSPAC study, individuals were excluded if they were entirely missing maltreatment data and/ or did not have data for at least two of the five timepoints for all three measures used in the trajectory analyses. Crucially, as detailed in Chapter 3's results section, those excluded from the sample differed from the included participants on key characteristics related to an increased risk of later mental health problems (e.g., higher levels of parental mental health problems). Consequently, findings from this study may not be truly representative of the wider ALSPAC study, or the broader UK population.

Finally, the generalisability of findings from Chapter 4 may be limited by both the size and the relative homogeneity of the sample. This is because the sample was restricted to the three trials within the wider Incredible Years pooled dataset that included data on a non-targeted sibling. This constitutes a relatively modest sample (240 families) for person-centred analyses. Indeed, a larger sample may have uncovered additional latent classes and transition patterns. Furthermore, it is not a particularly diverse sample, comprising only indicated prevention trials in community settings. This homogeneity potentially limits the generalisability of findings from Chapter 4. Nonetheless, it is important to also acknowledge that this still represents the largest sample to date for studying intervention effects on a non-targeted sibling.

6.4 Research implications

6.4.1 Individual differences in resilience to maltreatment

Findings from the ALSPAC study tentatively challenge suggestions that children who have experienced maltreatment will be particularly vulnerable to mental health problems and

friendship difficulties (Goemans et al., 2023; McCrory et al., 2022). Instead, post-hoc analyses demonstrated that, of the children who experienced maltreatment in the ALSPAC sample, approximately half had consistently high levels of emotional and behavioural resilience and friendship support (i.e., belonged to the highest resilience and friendship support trajectory group; Table B.2, Appendix B). This aligns with heartening findings from the wider resilience literature, which conceptualises resilience not as a rare phenomenon, but rather as 'ordinary magic'- the most common response to adversity, resulting from everyday processes such as friendship support (Masten, 2014).

However, several important caveats mean that this conclusion is only tentative. First, as detailed in the Discussion section of Chapter 3, the study's measures of maltreatment and friendship have limitations. Furthermore, it is important to reiterate that this is correlational research, preventing any inference of a causal relationship between resilience and friendship support. Finally, although a substantial proportion of children demonstrated emotional and behavioural resilience, this finding should not be taken to mean that children who have experienced maltreatment should not receive support where necessary.

6.4.2 Wider effects of parenting programmes for child behaviour problems

Findings from Chapters 4 and 5 have direct implications for how researchers conceptualise behavioural parenting programme effects, and how these are operationalised in trials. First, Chapter 4's findings underscore the necessity of incorporating a family systems approach in parenting programme research, expanding focus to include examination of programme effects on more than one child per family. Given that conduct problems are both heritable and environmentally influenced (Kretschmer et al., 2022), some families will have multiple children exhibiting such difficulties. Indeed, Chapter 4 demonstrates that 20% of families in indicated prevention trials also had a non-targeted sibling with severe clinical levels of

conduct problems, despite being recruited based on the index child's behaviour. This percentage may be even higher in treatment samples. Currently, however, a mismatch exists between this understanding of conduct problem prevalence within families and the typical focus of parenting programme trials on outcomes for just one child. For example, only three of the 15 trials in the Incredible Years dataset included data on a non-targeted sibling.

This mismatch holds critical implications for researchers, particularly given Chapter 4's finding that among families with high levels of conduct problems in both siblings at baseline, nearly three-quarters of non-targeted siblings still had severe clinical levels of conduct problems at follow-up. Therefore, when a non-targeted sibling also has severe levels of conduct problems, it is by no means guaranteed that they will benefit from the programme. Without taking a broader approach to programme effects, a misalignment persists between conclusions that parenting programmes are an effective strategy to reduce child conduct problems and the reality that this efficacy might be limited to one child per family. This means that, in their current format, programmes may leave families with substantial unmet needs when multiple children in the family have disruptive behaviour. Chapter 4 therefore represents a first step in examining parenting programmes through a family systems lens, demonstrating the insights gained from considering programme effects on the wider family system.

Second, children's disruptive behaviour outside of the home is seldom reported as a parenting programme outcome (Chapter 5). Indeed, there were too few Incredible Years trials with teacher-reported disruptive behaviour to include this measure in the pooled dataset (Leijten, Gardner, Landau, et al., 2018). This reflects a broader paucity of data in the field: a meta-analysis of parenting programmes for disruptive behaviour found only 37 studies with teacher-report data, compared to over 200 studies with parent-report data (Beelmann et al., 2023). Yet, children's disruptive behaviour is not always confined to one setting, and indeed

behaviour problems in multiple settings are a necessary criterion for a conduct disorder diagnosis (American Psychiatric Association, 2013).

As Chapter 5 highlights, even when children's behaviour outside of the home is measured, it is not assessed comprehensively. For example, among the 36 items included in the parent-report Eyberg Child Behavior Inventory (Robinson et al., 1980), the primary measure of child conduct problems in the Incredible Years pooled dataset, only two items assessed behaviour outside the home (conflict with peers). Findings from Chapter 5, using these items, demonstrated that Incredible Years had no effects on children's conflict with peers. This highlights the importance for researchers of considering the wider context of children's conduct problems. Although observational research demonstrates that children's behaviour can carry relationship dynamics from one system to another (e.g., parent-child negative interactions are associated with subsequent increases in peer problems, and vice versa; Kaufman et al., 2019), Chapter 5's findings demonstrate that it cannot be assumed that intervening in the family system will necessarily change children's interactions in a different system.

6.5 Practice and policy implications

6.5.1 Multisystemic interventions

Findings from Chapter 3 and Chapter 5 directly reinforce the importance of acknowledging, in line with a socioecological approach (Bronfenbrenner, 1979), that supportive relationships in multiple systems (e.g., school and home) are necessary for children's emotional and behavioural wellbeing. Therefore, when children's emotional and/or behavioural problems are a concern, support in just one system of their life might not be enough to reduce their difficulties. Specifically, findings from Chapter 3 suggest that friendship alone may not ameliorate some children's risk for emotional and behavioural problems following

maltreatment. Findings from Chapter 5 show that intervening in the parent-child relationship as part of a parenting programme for child disruptive behaviour has no spillover effects to children's conflict with peers.

Findings from these Chapters therefore raise an important question for practice and policy: should interventions to reduce children's behavioural difficulties continue to focus on a single setting (e.g., home-based parenting programmes (Leijten, Gardner, Landau, et al., 2018) and school-based social skills training (Webster-Stratton & Reid, 2004)), or adopt a broader socioecological approach?

For example, based on findings from Chapter 5, which indicate that a parenting programme for child disruptive behaviour has no effects on children's behaviour outside the home, a broader intervention approach might involve a multisystemic targeted intervention. Such an intervention would be designed to support children with disruptive behaviour across different aspects of their lives, facilitating positive change in children's relationships and behaviour across contexts. A crucial first step towards designing this kind of intervention could be a components analysis aimed at identifying key components from existing evidence-based interventions to reduce child disruptive behaviour, in both home and school settings. These identified components could then be combined to form the basis of a multisystemic intervention. While key components of parenting programmes for reducing child disruptive behaviour have been identified (positive reinforcement, praise, and logical consequences; Leijten, Gardner, Melendez-Torres, Van Aar, et al., 2019), the core elements of school-based interventions are less clearly defined (French, 2019). Therefore, a components analysis could be an important area for future research.

Once potential components are identified, research evaluating the synergistic effects of combining cross-system elements will be essential to ensure such a multisystemic intervention does not have iatrogenic effects. This caution is underscored by historical

examples of harm from multicomponent interventions to prevent behavioural problems, such as the Cambridge-Somerville Youth Study in the 1940s (Zane et al., 2016), and the Adolescent Transitions Program in the 1990s (Dishion et al., 1999).

6.5.2 Adapting existing behavioural parenting programmes

Chapter 4 has implications for practice and policy concerning both the effectiveness and accessibility of parenting programmes for families where multiple children have high levels of disruptive behaviour.

First, in relation to programme effectiveness, the Chapter demonstrates that when two children per family have severe clinical levels of conduct problems, it is not guaranteed that the programme benefits will extend beyond the index child. Parenting strategies for families with siblings is not a formal part of the Incredible Years programme, beyond a section in the 'Praise' module, which encourages parents to praise other members of the family (Webster-Stratton, 2015). Therefore, it may be important for programme developers to consider adapting the programme to include guidance on parenting strategies for families with siblings. This might include guidance on managing sibling conflict, as well as guidance when more than one child has disruptive behaviour. Such adaptations could include advice for families on how to adapt strategies to children of different ages within the same family, for example using time-out for younger children versus logical consequences for older children to reduce disruptive behaviour. At the same time, programmes will also need to consider the risk of perceived differential treatment when families are working with two (or more) children in different ways, as this may inadvertently exacerbate sibling conflict and/or individual child disruptive behaviour. For example, it might be necessary for parents to support the child who is receiving less parental attention, even if this is due to that child being less disruptive. Therefore, programmes should also include strategies to minimise differential

treatment, and cooperative family activities to reduce sibling rivalry and enhance parent-sibling communication.

Second, a lack of programme effects on non-targeted siblings should also be of concern to practitioners, as the disruptive behaviour of non-targeted siblings may reduce the sustainability of any improvement in the index child-parent relationship. Progress for the index child might be harder to maintain when there is another child in the family with high levels of disruptive behaviour, due to increased parental stress, as well as the potential for sibling conflict.

It is also important for practice and policy to consider that structural barriers for parenting programme attendance, such as childcare and transport costs (Berry et al., 2022), may be exacerbated when families have multiple children with disruptive behaviour. If these families face increased difficulty in attending parenting programmes, this has clear policy and practice implications for equitable access. Insights from Incredible Years facilitators suggest that providing 'wraparound' care, such as offering free transport to sessions and childcare for children while parents attend the programme, is a key facilitator of programme attendance (Furlong & McGilloway, 2015). This approach could be particularly helpful for supporting families where multiple children have disruptive behaviour to access programmes. More broadly, parents' perceptions of facilitators to accessing psychological treatments for their child's mental health difficulties highlight the importance of providing easily accessible services, such as drop-in services in local community settings like schools and primary care facilities (Reardon et al., 2017). Embedding support within existing services that parents use may be particularly useful for families where multiple children have disruptive behaviour.

However, in the UK context, government funding for parenting programmes integrated into the local community, such as in Sure Start services, was cut in 2010. Consequently, most Sure Start centres have closed, hindering families' access to these

programmes, despite their effectiveness in improving child disruptive behaviour (Carneiro et al., 2025; Sammons et al., 2015). The introduction of the Family Hubs and Start for Life programmes in 2022, which also seek to join up family support services in the community, may offer a new opportunity for ensuring equitable access to parenting support. While policymakers establish these new centres, it is important they ensure services are accessible to families struggling with multiple children's disruptive behaviour, particularly given that some hubs are not planned to be actual physical locations (Carneiro et al., 2025).

6.5.3 Supporting families to manage sibling conflict

Chapter 5's findings have key implications for how to support families in managing sibling relationships. While behavioural parenting programmes to reduce child conduct problems were not designed specifically to address sibling relationships, Chapter 5 suggests they may be a feasible option for reducing severe sibling conflict. This is a valuable finding for practitioners, indicating that when there are high levels of sibling conflict within the context of children's wider disruptive behaviour, general behavioural parenting programmes may effectively reduce sibling conflict, potentially precluding the need for additional programmes specifically targeting sibling relationships. This may be particularly important, given that parenting programmes for child disruptive behaviour, such as Incredible Years, may be more accessible to families compared to more focused sibling interventions, of which there are limited options (Leijten, Melendez-Torres, et al., 2021).

Moreover, there are very few studies evaluating parenting programmes for sibling relationships. For example, a recent meta-analysis on this topic identified just eight randomised controlled trials, with too few effect sizes to determine which programme approach (behaviour management versus mediation) was associated with the largest effect sizes, and which specific aspects of sibling relationships were affected by the programmes (Leijten, Melendez-Torres, et al., 2021). Consequently, in the absence of a consensus on the

optimum evidence-based strategy to improve sibling relationships, general parenting programmes might offer a practical option for families where sibling conflict is a concern. It is possible that, in the future, components from sibling-focused programmes could be embedded in general parenting programmes to enhance their effectiveness when sibling conflict is a concern. However, the current evidence base is not strong enough to conclude which specific components of sibling-focused programmes contribute most to their effects.

6.6 Recommendations for future research

6.6.1 Data collection

Using a systems approach to understand the influence of social relationships on children's emotional and behavioural difficulties should continue to be a goal of research. Findings from this thesis address some gaps in the field's understanding of parenting programme effects beyond just the parent-index child subsystem (Weeland et al., 2021), as well as gaps in understanding of how systems of resilience unfold across development. However, the most pressing barrier for studies wishing to take a systems approach when analysing a secondary dataset is the lack of necessary data. For example, while ALSPAC was unique in including repeated measures of friendship support across development, it did not include comparable measures of sibling support, precluding understanding of how other salient relationships in children's lives unfold across development. Similarly, while the Incredible Years dataset was novel in its inclusion of non-targeted sibling data, there was no information on parenting towards the non-targeted sibling, preventing understanding of potential mechanisms contributing to change (or lack thereof) in the non-targeted sibling's behaviour.

To facilitate a more robust examination of family and developmental systems in large-scale datasets, increased funding for the collection of additional, relevant data will be essential. In parenting intervention studies, this thesis demonstrates that particularly crucial

areas of future data collection include collecting information on parenting programme goals relating to managing sibling and peer relationships, the behaviour problems of non-targeted siblings, parenting practices specifically directed towards non-targeted siblings, and routine collection of multi-rater assessments of child behaviour. Longitudinal studies would benefit from repeated measures of sibling interactions and parental differential treatment towards siblings.

Additionally, to enable a systems approach to both observational and intervention studies, datasets would ideally integrate data collected both at home (e.g., parent-report) and at school (e.g., teacher-report). This might necessitate extra funding so that, for example, parenting programmes also routinely include questions completed by teachers about children's friendships and behaviour at school. Pragmatically, however, achieving this level of integration might be challenging. For example, while schools-based research is set up to collect child and teacher data, ensuring parental engagement to collect family-based data might be harder. Conversely, family-based research collects parent data, but children will be dispersed across different schools, so coordinating the collection of data from teachers presents a challenge. An alternative approach might be to capitalise on the increased usage of data-linkage in longitudinal cohort studies, which involves integrating data across different spheres of children's lives (for example medical and social care records; Harron et al., 2020). While this thesis did not use ALSPAC's linked education and primary care data (Cornish et al., 2021), this could be an informative area of future research for assessing children's functioning in different systems.

6.6.2 Infrastructure to facilitate the study of spillover effects

The field also requires enhanced infrastructure to facilitate the study of spillover effects, particularly when employing person-centred approaches to examine individual differences in intervention effects. Individual trials are often underpowered for such an approach. However,

individual participant data meta-analyses are more likely to provide sufficient power for such analyses. Although the Incredible Years data individual participant data meta-analyses was the first study to harmonise parenting programme trial data, it has since been built on, with a recent study harmonising individual participant data from 14 randomised controlled trials of social learning-based parenting programmes, with data from over 3, 000 families (Laas Sigurðardóttir et al., 2024). Therefore, increased data collection in relevant areas, in combination with better infrastructure to facilitate advanced quantitative analyses, will enable the field to ask new questions of parenting programmes regarding their systemic effects.

6.6.3 Interdisciplinary teams

Finally, findings from this thesis warrant a call not just for better data and data structures to facilitate a systems approach to research, but also for researchers to work in interdisciplinary teams to enhance the acceptability, feasibility, and scalability of systems-based research. No single researcher or discipline possesses all the expertise necessary to conduct this work. Therefore, thorough implementation of a systems approach in future research, whether longitudinal or intervention, will require diverse expertise. This will include theorists, practitioners, qualitative researchers to help understand barriers and facilitators to participation, as well as researchers skilled in advanced quantitative longitudinal systems analyses. Crucially, it also requires coproduction with community members and relevant stakeholders to ensure research is acceptable and feasible.

The Born in Bradford study, a multi-ethnic birth cohort study set up in 2007 (Wright et al., 2013), is a compelling example of how a multidisciplinary approach can facilitate the collection of rich longitudinal data. For example, its research priorities are determined in collaboration with communities and key education, health, and local authority stakeholders. This co-production model has helped to enable ongoing data collection across various

systems of children's lives, such as linked health and education data (Cartwright et al., 2023; McEachan et al., 2024).

6.7 Conclusions

Social relationships are key determinants of child development, associated with both concurrent and future wellbeing and psychopathology. Indeed, a central tenet of developmental psychopathology is that children's emotional and behavioural difficulties arise, in part, through continuous, bidirectional, interactions between a child and the different systems in which they are embedded, such as their family and school. In this thesis, I utilised the complementary strengths of longitudinal birth cohort data and individual-level pooled data from randomised controlled trials of a behavioural parenting programme, to better understand the role of social relationships in children's emotional and behavioural difficulties. Specifically, I applied developmental and family systems approaches, alongside advanced quantitative analyses to explore individual differences in resilience processes given a child's level of early maltreatment, and examine the effects of intervening in the parent-child relationship within and beyond the family system.

Across all studies, findings underscore the necessity of looking beyond just one system of functioning (e.g., the parent-child subsystem, or friendships) to achieve a more complete understanding of the role of social relationships in children's emotional and behavioural difficulties. Findings also highlight the utility of person-centred analytic approaches to reveal individual differences in outcomes. Although children's emotional and behavioural development is the result of interacting systems at multiple ecological levels, current datasets and research teams are not always optimally set up to investigate this complexity. I hope that this thesis inspires future researchers to collect comprehensive data on the systems in which a child is embedded when compiling new datasets, collaborate on harmonising individual datasets into pooled datasets, and work in multidisciplinary teams to

thoroughly implement a systems approach to research. These advances will enable the field to ask new questions about the influence of social relationships in children's emotional and behavioural difficulties across multiple areas of children's lives. Such evidence may be key to developing multisystem targeted interventions to support children's interactions at both home and school, and ultimately reduce their risk of emotional and behavioural difficulties.

References

Ainsworth, M. D. (1989). Attachments beyond infancy. *American Psychologist*, *4*(44), 709–716. https://doi.org/https://doi.org/10.1037/0003-066X.44.4.709

Allen, C., & Mehler, D. M. A. (2019). Open science challenges, benefits and tips in early career and beyond. *PLoS Biology*, *17*(5), e3000246. https://doi.org/10.1371/journal.pbio.3000246

American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). https://doi.org/10.1176/appi.books.9780890425596

Ards, S. D., Myers, S. L., Ray, P., Kim, H. E., Monroe, K., & Arteaga, I. (2012). Racialized perceptions and child neglect. *Children and Youth Services Review*, *34*(8), 1480–1491. https://doi.org/10.1016/j.childyouth.2012.03.018

Armitage, J. M., Kwong, A. S. F., Tseliou, F., Sellers, R., Blakey, R., Anthony, R., Rice, F., Thapar, A., & Collishaw, S. (2023). Cross-cohort change in parent-reported emotional problem trajectories across childhood and adolescence in the UK. *The Lancet Psychiatry*, *10*(7), 509–517. https://doi.org/10.1016/S2215-0366(23)00175-X

Armitage, J. M., Newlove-Delgado, T., Ford, T., McManus, S., & Collishaw, S. (2024). Characteristics of children with a psychiatric disorder in 1999, 2004 and 2017: An analysis of the national child mental health surveys of England. *Journal of Child Psychology and Psychiatry and Allied Disciplines*. https://doi.org/10.1111/jcpp.14040

Axberg, U., & Broberg, A. G. (2012). Evaluation of “The Incredible Years” in Sweden: The transferability of an American parent-training program to Sweden. *Scandinavian Journal of Psychology*, *53*(3), 224–232. https://doi.org/10.1111/j.1467-9450.2012.00955.x

Backhaus, S., Leijten, P., Jochim, J., Melendez-Torres, G. J., & Gardner, F. (2023). Effects over time of parenting interventions to reduce physical and emotional violence against

children: A systematic review and meta-analysis. *EClinicalMedicine*, *60*. https://doi.org/10.1016/j.eclinm.2023.102003

Backhaus, S., Leijten, P., Meinck, F., & Gardner, F. (2023). Different instruments, same content? A systematic comparison of child maltreatment and harsh parenting instruments. *Trauma, Violence, and Abuse*, *24*(5), 3546–3563. https://doi.org/10.1177/15248380221134290

Baldwin, J. R., Coleman, O., Francis, E. R., & Danese, A. (2024). Prospective and retrospective measures of child maltreatment and their association with psychopathology: A systematic review and meta-analysis. *JAMA Psychiatry*, *81*(8), 769–781. https://doi.org/10.1001/jamapsychiatry.2024.0818

Baldwin, J. R., Pingault, J. B., Schoeler, T., Sallis, H. M., & Munafò, M. R. (2022). Protecting against researcher bias in secondary data analysis: Challenges and potential solutions. *European Journal of Epidemiology*, *37*(1), 1–10. https://doi.org/10.1007/s10654-021-00839-0

Baldwin, J. R., Reuben, A., Newbury, J. B., & Danese, A. (2019). Agreement between prospective and retrospective measures of childhood maltreatment: A systematic review and meta-analysis. *JAMA Psychiatry*, *76*(6), 584–593. https://doi.org/10.1001/jamapsychiatry.2019.0097

Baldwin, J. R., Wang, B., Karwatowska, L., Schoeler, T., Tsaligopoulou, A., Munafò, M. R., & Pingault, J. B. (2023). Childhood maltreatment and mental health problems: A systematic review and meta-analysis of quasi-experimental studies. *American Journal of Psychiatry*, *180*(2), 117–126. https://doi.org/10.1176/appi.ajp.20220174

Bandura, A., & Walters, R. H. (1977). *Social learning theory* (Vol. 1). Prentice Hall.

Bateson, G., Jackson, D. D., Haley, J., & Weakland, J. (1956). Toward a theory of schizophrenia. *Behavioral Science*, *1*(4), 251–264. https://doi.org/10.1002/bs.3830010402

Bauer, A., Hammerton, G., Fraser, A., Fairchild, G., & Halligan, S. L. (2021). Associations between developmental timing of child abuse and conduct problem trajectories in a UK birth cohort. *BMC Psychiatry*, *21*(1). https://doi.org/10.1186/s12888-021-03083-8

Beelmann, A., Arnold, L. S., & Hercher, J. (2023). Parent training programs for preventing and treating antisocial behavior in children and adolescents: A comprehensive meta-analysis of international studies. *Aggression and Violent Behavior*, *68*, 101798. https://doi.org/10.1016/j.avb.2022.101798

Bernstein, D. P., Stein, J. A., Newcomb, M. D., Walker, E., Pogge, D., Ahluvalia, T., Stokes, J., Handelsman, L., Medrano, M., Desmond, D., & Zule, W. (2003). Development and validation of a brief screening version of the Childhood Trauma Questionnaire. *Child Abuse and Neglect*, *27*(2), 169–190. https://doi.org/10.1016/S0145-2134(02)00541-0

Berry, V., Melendez-Torres, G. J., Axford, N., Axberg, U., de Castro, B. O., Gardner, F., Gaspar, M. F., Handegård, B. H., Hutchings, J., Menting, A., McGilloway, S., Scott, S., & Leijten, P. (2022). Does social and economic disadvantage predict lower engagement with parenting interventions? An integrative analysis using individual participant data. *Prevention Science*, *24*(8), 1447–1458. https://doi.org/10.1007/s11121-022-01404-1

Bertalanffy, L. von. (1968). *General System Theory: Foundations, Development, Applications*. Braziller.

Bertie, L. A., Nauta, M. H., Kooiman, B., Chen, W., & Hudson, J. L. (2024). Editorial Perspective: Extending IPDMA methodology to drive treatment personalisation in child mental health. *Journal of Child Psychology and Psychiatry and Allied Disciplines*, *65*(11), 1546–1550. https://doi.org/10.1111/jcpp.14025

Bevilacqua, L., Hale, D., Barker, E. D., & Viner, R. (2018). Conduct problems trajectories and psychosocial outcomes: A systematic review and meta-analysis. *European Child and Adolescent Psychiatry*, *27*(10), 1239–1260. https://doi.org/10.1007/s00787-017-1053-4

Bigler, M. E., Schuurmans, I. K., Zhu, Y., Siddique, N., Hoffman, N., Koen, N., Zar, H. J., Stein, D. J., Cecil, C. A. M., & Dunn, E. C. (2025). Are different types of childhood adversities correlated within and across time? A comparison of data on adversity co-occurrence from three longitudinal birth cohort studies. *Child Abuse and Neglect*, 107315. https://doi.org/10.1016/j.chiabu.2025.107315

Birtchnell, J., Evans, C., & Kennard, J. (1988). The total score of the Crown-Crisp Experiential Index: A useful and valid measure of psychoneurotic pathology. *British Journal of Medical Psychology*, *61*(3), 255–266. https://doi.org/10.1111/j.2044-8341.1988.tb02787.x

Bolger, K. E., Patterson, C. J., & Kupersmidt, J. B. (1998a). Peer relationships and self-esteem among children who have been maltreated. *Child Development*, *69*(4), 1171–1197. https://doi.org/10.1111/j.1467-8624.1998.tb06166.x

Bolger, K. E., Patterson, C. J., & Kupersmidt, J. B. (1998b). Peer relationships and self-esteem among children who have been maltreated. *Child Development*, *69*(4), 1171–1197. https://doi.org/10.1111/j.1467-8624.1998.tb06166.x

Bonanno, G. A. (2021). The resilience paradox. *European Journal of Psychotraumatology*, *12*(1), 1942642. https://doi.org/10.1080/20008198.2021.1942642

Bornstein, M. H. (2019). *Handbook of parenting: Children and parenting* (3rd ed.). Routledge/Taylor & Francis Group. https://doi.org/10.4324/9780429440847

Bornstein, M. H., Hahn, C. S., & Haynes, O. M. (2010). Social competence, externalizing, and internalizing behavioral adjustment from early childhood through early adolescence:

Developmental cascades. *Development and Psychopathology*, *22*(4), 717–735. https://doi.org/10.1017/S0954579410000416

Bowes, L., Maughan, B., Caspi, A., Moffitt, T. E., & Arseneault, L. (2010). Families promote emotional and behavioural resilience to bullying: Evidence of an environmental effect. *Journal of Child Psychology and Psychiatry and Allied Disciplines*, *51*(7), 809–817. https://doi.org/10.1111/j.1469-7610.2010.02216.x

Bowes, L., Wolke, D., Joinson, C., Lereya, S. T., & Lewis, G. (2014). Sibling bullying and risk of depression, anxiety, and self-harm: A prospective cohort study. *Pediatrics*, *134*(4), e1032–e1039. https://doi.org/10.1542/peds.2014-0832

Bowlby, J. (1973). *Attachment and loss: Separation, anxiety and anger*. Basic Books.

Boyd, A., Golding, J., Macleod, J., Lawlor, D. A., Fraser, A., Henderson, J., Molloy, L., Ness, A., Ring, S., & Smith, G. D. (2013). Cohort profile: The 'Children of the 90s'-The index offspring of the Avon Longitudinal Study of Parents and Children. *International Journal of Epidemiology*, *42*(1), 111–127. https://doi.org/10.1093/ije/dys064

Brady, G. H., & Stoneman, Z. (1988). Sibling Conflict. *Journal of Children in Contemporary Society*, *19*(3–4), 39–53. https://doi.org/10.1300/j274v19n03_03

Brestan, E. V., Eyberg, S. M., Boggs, S. R., & Algina, J. (1997). Parent-child interaction therapy: Parents' perceptions of untreated siblings. *Child and Family Behavior Therapy*, *19*(3), 13–28. https://doi.org/10.1300/J019v19n03_02

Bronfenbrenner, U. (1979). *The ecology of human development*. Harvard University Press.

Bronfenbrenner, U., & Morris, P. A. (2006). The bioecological model of human development. In R. M. Lerner (Ed.), *Handbook of child psychology: Theoretical models of human development* (6th ed., Vol. 1, pp. 793–828). Wiley. https://doi.org/10.1002/9780470147658.chpsy0114

Brown, S. M., Rienks, S., McCrae, J. S., & Watamura, S. E. (2019). The co-occurrence of adverse childhood experiences among children investigated for child maltreatment: A latent class analysis. *Child Abuse and Neglect*, *87*, 18–27. https://doi.org/10.1016/j.chiabu.2017.11.010

Bryan, C. J., Tipton, E., & Yeager, D. S. (2021). Behavioural science is unlikely to change the world without a heterogeneity revolution. *Nature Human Behaviour*, *5*(8), 980–989. https://doi.org/10.1038/s41562-021-01143-3

Buist, K. L., Deković, M., & Prinzie, P. (2013). Sibling relationship quality and psychopathology of children and adolescents: A meta-analysis. *Clinical Psychology Review*, *33*(1), 97–106. https://doi.org/10.1016/j.cpr.2012.10.007

Bukowski, W. M., & Adams, R. (2005). Peer relationships and psychopathology: Markers, moderators, mediators, mechanisms, and meanings. *Journal of Clinical Child and Adolescent Psychology*, *34*(1), 3–10. https://doi.org/10.1207/s15374424jccp3401_1

Bullock, B. M., & Dishion, T. J. (2002). Sibling collusion and problem behavior in early adolescence: Toward a process model for family mutuality. *Journal of Abnormal Child Psychology*, *30*(2), 143–153. https://doi.org/10.1023/A:1014753232153

Burghart, M., & Backhaus, S. (2024). The long-term consequences of family violence victimization: An umbrella review of longitudinal meta-analyses on child maltreatment and intimate partner violence. *Journal of Family Violence*, 1–11. https://doi.org/10.1007/s10896-024-00768-y

Burns, G. L., & Patterson, D. R. (2001). Normative data on the Eyberg Child Behavior Inventory and Sutter-Eyberg Student Behavior Inventory: Parent and teacher rating scales of disruptive behavior problems in children and adolescents. *Child and Family Behavior Therapy*, *23*(1), 15–28. https://doi.org/10.1300/J019v23n01_02

Burt, S. A., Hyde, L. W., Frick, P. J., Jaffee, S. R., Shaw, D. S., & Tremblay, R. (2018). Commentary: Childhood conduct problems are a public health crisis and require resources: A commentary on Rivenbark et al. (). *Journal of Child Psychology and Psychiatry and Allied Disciplines*, *59*(6), 711–713. https://doi.org/10.1111/jcpp.12930

Cahill, S., Hager, R., & Chandola, T. (2022). The validity of the residuals approach to measuring resilience to adverse childhood experiences. *Child and Adolescent Psychiatry and Mental Health*, *16*(1), 18. https://doi.org/10.1186/s13034-022-00449-y

Cahill, S., Hager, R., & Shryane, N. (2023). Patterns of resilient functioning in early life: Identifying distinct groups and associated factors. *Development and Psychopathology*, *4*(36), 1789–1809. https://doi.org/10.1017/S0954579423001165

Capaldi, D. M. (1992). Co-occurrence of conduct problems and depressive symptoms in early adolescent boys: II. A 2-year follow-up at Grade 8. *Development and Psychopathology*, *4*(1), 125–144. https://doi.org/10.1017/S0954579400005605

Capaldi, D. M., Dishion, T. J., Stoolmiller, M., & Yoerger, K. (2001). Aggression toward female partners by at-risk young men: The contribution of male adolescent friendships. *Developmental Psychology*, *37*(1), 61–73. https://doi.org/10.1037/0012-1649.37.1.61

Carneiro, P., Cattan, S., Conti, G., Crawford, C., Farquharson, C., & Ridpath, N. (2025). *The short-and medium-term effects of Sure Start on children's outcomes*. https://ifs.org.uk/publications/short-and-medium-term-effects-sure-start-childrens-outcomes

Cartwright, C., Rahman, A., Islam, S., Lockyer, B., Roper, E., Worcester, M., Zarate, M., McEachan, R., Amini, N., Hammard, R., Horner, P., & Iqbal, H. (2023). People powered research: What do communities identify as important for happy and healthy children and young people? A multi-disciplinary community research priority setting exercise in the

City of Bradford, United Kingdom (UK). *International Journal for Equity in Health*, *22*(1). https://doi.org/10.1186/s12939-023-01881-y

Caspi, A., & Moffitt, T. E. (2018). All for one and one for all: Mental disorders in one dimension. *American Journal of Psychiatry*, *175*(9), 831–844. https://doi.org/10.1176/appi.ajp.2018.17121383

Cassidy, J. (1994). Emotion regulation: Influences of attachment relationships. *Monographs of the Society for Research in Child Development*, *59*(2), 228–249. https://doi.org/10.1111/j.1540-5834.1994.tb01287.x

Chow, A. R. W., Baldwin, J. R., & Bowes, L. (2024). Do meaningful dimensions of childhood adversity exist? Data-driven evidence from two prospective cohort studies. *Journal of Child Psychology and Psychiatry and Allied Disciplines*. https://doi.org/10.1111/jcpp.14098

Cicchetti, D. (2013). Annual research review: Resilient functioning in maltreated children - Past, present, and future perspectives. *Journal of Child Psychology and Psychiatry and Allied Disciplines*, *54*(4), 402–422. https://doi.org/10.1111/j.1469-7610.2012.02608.x

Collins, W., & Laursen, B. (2000). Adolescent relationships: The art of fugue. In C. Hendrick & S. S. Hendrick (Eds.), *Close relationships: A sourcebook* (pp. 58–69). SAGE Publications.

Collishaw, S. (2015). Annual research review: Secular trends in child and adolescent mental health. *Journal of Child Psychology and Psychiatry and Allied Disciplines*, *56*(3), 370–393. https://doi.org/10.1111/jcpp.12372

Collishaw, S., Pickles, A., Messer, J., Rutter, M., Shearer, C., & Maughan, B. (2007). Resilience to adult psychopathology following childhood maltreatment: Evidence from a community sample. *Child Abuse and Neglect*, *31*(3), 211–229. https://doi.org/10.1016/j.chiabu.2007.02.004

Connor, K. M., & Davidson, J. R. (2003). Development of a new resilience scale: The Connor-Davidson resilience scale (CD-RISC). *Depression and Anxiety*, *18*(2), 76-82. https://doi.org/10.1002/da.10113

Copeland, W. E., Alaie, I., Jonsson, U., & Shanahan, L. (2021). Associations of childhood and adolescent depression with adult psychiatric and functional outcomes. *Journal of the American Academy of Child & Adolescent Psychiatry*, *60*(5), 604–611. https://doi.org/10.1016/j.jaac.2020.07.895

Copeland, W. E., Shanahan, L., Costello, E. J., & Angold, A. (2009). Childhood and adolescent psychiatric disorders as predictors of young adult disorders. *Archives of General Psychiatry*, *66*(7), 764–772. https://doi.org/10.1001/archgenpsychiatry.2009.85

Copeland, W. E., Shanahan, L., Costello, E. J., Angold, A., & Psych, M. R. C. (2011). Cumulative prevalence of psychiatric disorders by young adulthood: A prospective cohort analysis from the Great Smoky Mountains Study. *Journal of the American Academy of Child & Adolescent Psychiatry*, *50*(3), 252–261. https://doi.org/10.1016/j.jaac.2010.12.014

Cornish, R. P., MacLeod, J., Boyd, A., & Tilling, K. (2021). Factors associated with participation over time in the Avon Longitudinal Study of Parents and Children: A study using linked education and primary care data. *International Journal of Epidemiology*, *50*(1), 293–302. https://doi.org/10.1093/ije/dyaa192

Costello, E. J., & Maughan, B. (2015). Annual research review: Optimal outcomes of child and adolescent mental illness. *Journal of Child Psychology and Psychiatry and Allied Disciplines*, *56*(3), 324–341. https://doi.org/10.1111/jcpp.12371

Cox, J. L., Holden, J. M., & Sagovsky, R. (1987). Detection of postnatal depression: Development of the 10-item Edinburgh Postnatal Depression scale. *British Journal of Psychiatry*, *150*(6), 782–786. https://doi.org/10.1192/bjp.150.6.782

Criss, M. M., Pettit, G. S., Bates, J. E., Dodge, K. A., & Lapp, A. L. (2002). Family adversity, positive peer relationships, and children's externalizing behavior: A longitudinal perspective on risk and resilience. *Child Development*, *73*(4), 1220–1237. https://doi.org/10.1111/1467-8624.00468

Curran, P. J., & Hussong, A. M. (2009). Integrative data analysis: The simultaneous analysis of multiple data sets. *Psychological Methods*, *14*(2), 81–100. https://doi.org/10.1037/a0015914

Cyr, C., Euser, E. M., Bakermans-Kranenburg, M. J., & Van Ijzendoorn, M. H. (2010). Attachment security and disorganization in maltreating and high-risk families: A series of meta-analyses. *Development and Psychopathology*, *22*(1), 87–108. https://doi.org/10.1017/S0954579409990289

Daniel, E., Plamondon, A., & Jenkins, J. M. (2018). An examination of the sibling training hypothesis for disruptive behavior in early childhood. *Child Development*, *89*(1), 235–247. https://doi.org/10.1111/cdev.12754

Dănilă, I., Balazsi, R., Tăut, D., Băban, A., Foran, H. M., Heinrich, N., Lachman, J. M., & Hutchings, J. (2024). Linking child adjustment difficulties with mother's maladaptive parental behavior: The mediating roles of parental cognitions and parenting stress. *Family Process, 63*(4), 2016–2036. https://doi.org/10.1111/famp.13011

Dantchev, S., Zammit, S., & Wolke, D. (2018). Sibling bullying in middle childhood and psychotic disorder at 18 years: A prospective cohort study. *Psychological Medicine*, *48*(14), 2321–2328. https://doi.org/10.1017/S0033291717003841

De Los Reyes, A., Augenstein, T. M., Wang, M., Thomas, S. A., Drabick, D. A. G., Burgers, D. E., & Rabinowitz, J. (2015). The validity of the multi-informant approach to assessing child and adolescent mental health. *Psychological Bulletin*, *141*(4), 858–900. https://doi.org/10.1037/a0038498

de Mooij, B., Delsing, M., Fekkes, M., Vliek, L., Scholte, R. H. J., & Overbeek, G. (2024). Social-emotional learning intervention effects: The role of universal versus indicated implementation settings. *Applied Developmental Science*, 1–14. https://doi.org/10.1080/10888691.2024.2317716

Defoe, I. N., Keijsers, L., Hawk, S. T., Branje, S., Dubas, J. S., Buist, K., Frijns, T., A. G. Van Aken, M., Koot, H. M., Van Lier, P. A. C., & Meeus, W. (2013). Siblings versus parents and friends: Longitudinal linkages to adolescent externalizing problems. *Journal of Child Psychology and Psychiatry and Allied Disciplines*, *54*(8), 881–889. https://doi.org/10.1111/jcpp.12049

Degli Esposti, M., Pinto Pereira, S. M., Humphreys, D. K., Sale, R. D., & Bowes, L. (2020). Child maltreatment and the risk of antisocial behaviour: A population-based cohort study spanning 50 years. *Child Abuse and Neglect*, *99*, 104281. https://doi.org/10.1016/j.chiabu.2019.104281

Devries, K., Knight, L., Petzold, M., Merrill, K. G., Maxwell, L., Williams, A., Cappa, C., Chan, K. L., Garcia-Moreno, C., Hollis, N. T., Kress, H., Peterman, A., Walsh, S. D., Kishor, S., Guedes, A., Bott, S., Butron Riveros, B. C., Watts, C., & Abrahams, N. (2018). Who perpetrates violence against children? A systematic analysis of age-specific and sex-specific data. *BMJ Paediatrics Open*, *2*(1), e000180. https://doi.org/10.1136/bmjpo-2017-000180

Dirks, M. A., De Los Reyes, A., Briggs-Gowan, M., Cella, D., & Wakschlag, L. S. (2012). Embracing not erasing contextual variability in children's behavior - Theory and utility in the selection and use of methods and informants in developmental psychopathology. *Journal of Child Psychology and Psychiatry and Allied Disciplines*, *53*(5), 558–574. https://doi.org/10.1111/j.1469-7610.2012.02537.x

Dishion, T. J. (2016). An evolutionary framework for understanding coercion and aggression. In T. J. Dishion & J. J. Snyder (Eds.), *The Oxford handbook of coercive relationship dynamics* (pp. 53–69). Oxford University Press. https://doi.org/10.1093/oxfordhb/9780199324552.013.3

Dishion, T. J., Forgatch, M., Chamberlain, P., & Pelham, W. E. (2016). The Oregon model of behavior family therapy: From intervention design to promoting large-scale system change. *Behavior Therapy*, *47*(6), 812–837. https://doi.org/10.1016/j.beth.2016.02.002

Dishion, T. J., Mccord, J., & Poulin, F. (1999). When interventions harm: Peer groups and problem behavior. *American Psychologist*, *54*(9), 755–764. https://doi.org/10.1037//0003-066x.54.9.755

Dishion, T. J., Spracklen, K. M., Andrews, D. W., & Patterson, G. R. (1996). Deviancy training in male adolescent friendships. *Behavior Therapy*, *27*, 373–390. https://doi.org/10.1016/S0005-7894(96)80023-2

Dishion, T. J., & Tipsord, J. M. (2011). Peer contagion in child and adolescent social and emotional development. *Annual Review of Psychology*, *62*, 189–214. https://doi.org/10.1146/annurev.psych.093008.100412

Dodge, K. A., Pettit, G. S., & Bates, J. E. (1994). Effects of physical maltreatment on the development of peer relations. *Development and Psychopathology*, *6*(1), 43–55. https://doi.org/10.1017/S0954579400005873

Doyle, O., Hegarty, M., & Owens, C. (2018). Population-based system of parenting support to reduce the prevalence of child social, emotional, and behavioural problems: difference-In-differences study. *Prevention Science*, *19*(6), 772–781. https://doi.org/10.1007/s11121-018-0907-4

Dumville, J. C., Torgerson, D. J., & Hewitt, C. E. (2006). Reporting attrition in randomised controlled trials. *BMJ*, *332*(7547), 969–971. https://doi.org/10.1136/bmj.332.7547.969

Dunn, E. C., Ernst, S. C., Nishimi, K., & Choi, K. R. (2024). The prevalence, predictors, and health consequences of disagreement in reports of child maltreatment exposure. *Child Psychiatry and Human Development*, 1–11. https://doi.org/10.1007/s10578-024-01721-2

Dunn, E. C., Nishimi, K., Neumann, A., Renaud, A., Cecil, C. A. M., Susser, E. S., & Tiemeier, H. (2020). Time-dependent effects of exposure to physical and sexual violence on psychopathology symptoms in late childhood: In search of sensitive periods in development. *Journal of the American Academy of Child and Adolescent Psychiatry*, *59*(2), 283-295.e4. https://doi.org/10.1016/j.jaac.2019.02.022

Dunn, J., Deater-Deckard, K., Pickering, K., & Golding, J. (1999). Siblings, parents, and partners: Family relationships within a longitudinal community study. *The Journal of Child Psychology and Psychiatry and Allied Disciplines*, *40*(7), 1025–1037. https://doi.org/10.1111/1469-7610.00521

Eames, C., Daley, D., Hutchings, J., Whitaker, C. J., Bywater, T., Jones, K., & Hughes, J. C. (2010). The impact of group leaders' behaviour on parents acquisition of key parenting skills during parent training. *Behaviour Research and Therapy*, *48*(12), 1221–1226. https://doi.org/10.1016/j.brat.2010.07.011

Eisenberg, N., Cumberland, A., Spinrad, T. L., Fabes, R. A., Shepard, S. A., Reiser, M., Murphy, B. C., Losoya, S. H., & Guthrie, I. K. (2001). The relations of regulation and emotionality to children's externalizing and internalizing problem behavior. *Child Development*, *72*(4), 1112–1134. https://doi.org/10.1111/1467-8624.00337

Elliott, J., & Shepherd, P. (2006). Cohort profile: 1970 British Birth Cohort (BCS70). *International Journal of Epidemiology*, *35*(4), 836–843. https://doi.org/10.1093/ije/dyl174

Enders, C. K. (2023). Missing data: An update on the state of the art. *Psychological Methods*, *28*(1), 1–28. https://doi.org/10.1037/met0000563

Eradus, M., Leijten, P., Melendez-Torres, G. J., Foo, X. Q., & Oliver, B. R. (2024). Parental differential warmth, hostility, and sibling differences in internalizing and externalizing behavior problems: A meta-analysis. *Journal of Family Psychology*, *38*(3), 387–399. https://doi.org/https://doi.org/10.1037/fam0001194

Espelage, D. L., Low, S., Rao, M. A., Hong, J. S., & Little, T. D. (2014). Family violence, bullying, fighting, and substance use among adolescents: A longitudinal mediational model. *Journal of Research on Adolescence*, *24*(2), 337–349. https://doi.org/10.1111/jora.12060

Farooq, B., Russell, A. E., Howe, L. D., Herbert, A., Smith, A. D. A. C., Fisher, H. L., Baldwin, J. R., Arseneault, L., Danese, A., & Mars, B. (2024). The relationship between type, timing and duration of exposure to adverse childhood experiences and adolescent self-harm and depression: Findings from three UK prospective population-based cohorts. *Journal of Child Psychology and Psychiatry and Allied Disciplines*, *65*(10), 1369–1387. https://doi.org/10.1111/jcpp.13986

Farrington, D. P., Gaffney, H., & Ttofi, M. M. (2017). Systematic reviews of explanatory risk factors for violence, offending, and delinquency. *Aggression and Violent Behavior*, *33*, 24–36. https://doi.org/10.1016/j.avb.2016.11.004

Fearon, R. P., Bakermans-Kranenburg, M. J., van IJzendoorn, M. H., Lapsley, A. M., & Roisman, G. I. (2010). The significance of insecure attachment and disorganization in the development of children's externalizing behavior: A meta-analytic study. *Child Development*, *81*(2), 435–456. https://doi.org/10.1111/j.1467-8624.2009.01405.x

Feinberg, M. E., Solmeyer, A. R., & McHale, S. M. (2012). The third rail of family systems: Sibling relationships, mental and behavioral health, and preventive intervention in childhood and adolescence. *Clinical Child and Family Psychology Review*, *15*(1), 43–57. https://doi.org/10.1007/s10567-011-0104-5

Ferguson, C. J. (2010). Genetic contributions to antisocial personality and behavior: A meta-analytic review from an evolutionary perspective. *Journal of Social Psychology*, *150*(2), 160–180. https://doi.org/10.1080/00224540903366503

Field, A. (2012). *Discovering statistics using R*. SAGE Publications.

Fitzpatrick, S., & Bussey, K. (2014). The role of perceived friendship self-efficacy as a protective factor against the negative effects of social victimization. *Social Development*, *23*(1), 41–60. https://doi.org/10.1111/sode.12032

Forgatch, M. S., & Patterson, G. R. (2010). Parent Management Training—Oregon Model: An intervention for antisocial behavior in children and adolescents. In J. R. Weisz & A. E. Kazdin (Eds.), *Evidence-based psychotherapies for children and adolescents* (2nd ed., pp. 159–177). The Guilford Press.

Fox, L., & Asbury, K. (2024). "I need them for my autism, but I don't know why": Exploring the friendship experiences of autistic children in UK primary schools. *Autism and Developmental Language Impairments*, *9*. https://doi.org/10.1177/23969415241275934

Fox, L., Williams, R., & Asbury, K. (2024). Experiences of friendships among autistic children in UK schools: A qualitative meta-synthesis. *Neurodiversity*, *2*. https://doi.org/10.1177/27546330241272250

Fraser, A., Macdonald-wallis, C., Tilling, K., Boyd, A., Golding, J., Davey smith, G., Henderson, J., Macleod, J., Molloy, L., Ness, A., Ring, S., Nelson, S. M., & Lawlor, D. A. (2013). Cohort profile: The Avon Longitudinal Study of Parents and Children: ALSPAC mothers cohort. *International Journal of Epidemiology*, *42*(1), 97–110. https://doi.org/10.1093/ije/dys066

French, D. D. (2019). Essential components of school-based intervention for students with emotional and behavioral disorders: An integration of research and practice. *Preventing School Failure*, *63*(4), 369–381. https://doi.org/10.1080/1045988X.2019.1619510

Frick, P. J., & Viding, E. (2009). Antisocial behavior from a developmental psychopathology perspective. *Development and Psychopathology*, *21*(4), 1111–1131. https://doi.org/10.1017/S0954579409990071

Fritz, J., de Graaff, A. M., Caisley, H., van Harmelen, A. L., & Wilkinson, P. O. (2018). A systematic review of amenable resilience factors that moderate and/or mediate the relationship between childhood adversity and mental health in young people. *Frontiers in Psychiatry*, *9*, 341825. https://doi.org/10.3389/fpsyt.2018.00230

Fritz, J., Fried, E. I., Goodyer, I. M., Wilkinson, P. O., & van Harmelen, A. L. (2018). A network model of resilience factors for adolescents with and without exposure to childhood adversity. *Scientific Reports*, *8*(1), 15774. https://doi.org/10.1038/s41598-018-34130-2

Furlong, M., & McGilloway, S. (2015). Barriers and facilitators to implementing evidence-based parenting programs in disadvantaged settings: A qualitative study. *Journal of Child and Family Studies*, *24*(6), 1809–1818. https://doi.org/10.1007/s10826-014-9984-6

Furlong, M., McGilloway, S., Bywater, T., Hutchings, J., Smith, S. M., & Donnelly, M. (2012). Behavioural and cognitive-behavioural group-based parenting programmes for early-onset conduct problems in children aged 3 to 12 years. *Campbell Systematic Reviews*, *8*(1), 1–239. https://doi.org/10.4073/csr.2012.12

Gardner, F. (1987). Positive interaction between mothers and conduct-problem children: Is there training for harmony as well as fighting? *Journal of Abnormal Child Psychology*, *15*(2), 283–293. https://doi.org/10.1007/bf00916355

Gardner, F., Burton, J., & Klimes, I. (2006). Randomised controlled trial of a parenting intervention in the voluntary sector for reducing child conduct problems: Outcomes and

mechanisms of change. *Journal of Child Psychology and Psychiatry and Allied Disciplines*, *47*(11), 1123–1132. https://doi.org/10.1111/j.1469-7610.2006.01668.x

Gardner, F., & Leijten, P. (2017). Incredible Years parenting interventions: Current effectiveness research and future directions. *Current Opinion in Psychology*, *15*, 99–104. https://doi.org/10.1016/j.copsyc.2017.02.023

Gardner, F., Leijten, P., Harris, V., Mann, J., Hutchings, J., Beecham, J., Bonin, E. M., Berry, V., McGilloway, S., Gaspar, M., Seabra-Santos, M. J., Orobio de Castro, B., Menting, A., Williams, M., Axberg, U., Morch, W. T., Scott, S., & Landau, S. (2019). Equity effects of parenting interventions for child conduct problems: a pan-European individual participant data meta-analysis. *The Lancet Psychiatry*, *6*(6), 518–527. https://doi.org/10.1016/S2215-0366(19)30162-2

Gardner, F., Leijten, P., Mann, J., Landau, S., Harris, V., Beecham, J., Bonin, E.-M., Hutchings, J., & Scott, S. (2017). Could scale-up of parenting programmes improve child disruptive behaviour and reduce social inequalities? Using individual participant data meta-analysis to establish for whom programmes are effective and cost-effective. *Public Health Research*, *5*(10), 1–144. https://doi.org/10.3310/phr05100

Gass, K., Jenkins, J., & Dunn, J. (2007). Are sibling relationships protective? A longitudinal study. *Journal of Child Psychology and Psychiatry and Allied Disciplines*, *48*(2), 167–175. https://doi.org/10.1111/j.1469-7610.2006.01699.x

Gershoff, E. T., Goodman, G. S., Miller-Perrin, C. L., Holden, G. W., Jackson, Y., & Kazdin, A. E. (2018). The strength of the causal evidence against physical punishment of children and its implications for parents, psychologists, and policymakers. *American Psychologist*, *73*(5), 626–638. https://doi.org/10.1037/amp0000327

Gilbert, R., Widom, C. S., Browne, K., Fergusson, D., & Webb, E. (2009). Burden and consequences of child maltreatment in high-income countries. *The Lancet*, *373*, 68–81. https://doi.org/10.1016/S0140

Giletta, M., Choukas-Bradley, S., Maes, M., Linthicum, K. P., Card, N. A., & Prinstein, M. J. (2021). A meta-analysis of longitudinal peer influence effects in childhood and adolescence. *Psychological Bulletin*, *147*(7), 719–747. https://doi.org/10.1037/bul0000329

Glickman, E. A., Choi, K. W., Lussier, A. A., Smith, B. J., & Dunn, E. C. (2021). Childhood emotional neglect and adolescent depression: Assessing the protective role of peer social support in a longitudinal birth cohort. *Frontiers in Psychiatry*, *12*, 681176. https://doi.org/10.3389/fpsyt.2021.681176

Goemans, A., Viding, E., & McCrory, E. (2023). Child maltreatment, peer victimization, and mental health: Neurocognitive perspectives on the cycle of victimization. *Trauma, Violence, and Abuse*, *24*(2), 530–548. https://doi.org/10.1177/15248380211036393

Goodman, R. (1997). The Strengths and Difficulties Questionnaire: A research note. *Journal of Child Psychology and Psychiatry and Allied Disciplines*, *38*(5), 581–586. https://doi.org/10.1111/j.1469-7610.1997.tb01545.x

Goodyer, I., Wright, C., & Altham, P. (1990). Recent achievements and adversities in anxious and depressed school age children. *Journal of Child Psychology and Psychiatry*, *31*(7), 1063–1077. https://doi.org/10.1111/j.1469-7610.1990.tb00846.x

Groh, A. M., Roisman, G. I., van Ijzendoorn, M. H., Bakermans-Kranenburg, M. J., & Fearon, R. P. (2012). The significance of insecure and disorganized attachment for children's internalizing symptoms: A meta-analytic study. *Child Development*, *83*(2), 591–610. https://doi.org/10.1111/j.1467-8624.2011.01711.x

Gunnar, M. R. (2017). Social buffering of stress in development: A career perspective. *Perspectives on Psychological Science*, *12*(3), 355–373. https://doi.org/10.1177/1745691616680612

Ha, T., Van Ryzin, M. J., & Elam, K. K. (2023). Socialization processes within adolescents' relationships with parents and peers predicting couples' intimate partner violence in adulthood: A social learning perspective. *Development and Psychopathology*, *35*(1), 204–217. https://doi.org/10.1017/S0954579421000602

Handley, E. D., Duprey, E. B., Russotti, J., Levin, R. Y., & Warmingham, J. M. (2024). Person-centered methods to advance developmental psychopathology. *Development and Psychopathology*, *36*(5), 2285–2293. https://doi.org/10.1017/S0954579424000282

Handley, E. D., Russotti, J., Rogosch, F. A., & Cicchetti, D. (2019). Developmental cascades from child maltreatment to negative friend and romantic interactions in emerging adulthood. *Development and Psychopathology*, *31*(5), 1649–1659. https://doi.org/10.1017/S095457941900124X

Harron, K., Doidge, J. C., & Goldstein, H. (2020). Assessing data linkage quality in cohort studies. *Annals of Human Biology*, *47*(2), 218–226. https://doi.org/10.1080/03014460.2020.1742379

Hartup, W. W. (2022). Friendships and their developmental significance. In *Childhood social development* (pp. 175–205). Psychology Press. https://doi.org/10.4324/9781315785042

Hartup, W. W., & Stevens, N. (1997). Friendships and adaptation in the life course. *Psychological Bulletin*, *121*(3), 355–370. https://psycnet.apa.org/doi/10.1037/0033-2909.121.3.355

Herbert, K., Xi, Q., Feder, G., Gilbert, R., Powell, C., Howarth, E., & Morris, S. (2023). Child maltreatment and parental domestic violence and abuse, co-occurrence and the effect on lifetime outcomes in the Avon Longitudinal Study of Parents and Children

(ALSPAC). *SSM - Population Health*, *24*, 101555. https://doi.org/10.1016/j.ssmph.2023.101555

Hollis, S., & Campbell, F. (1999). What is meant by intention to treat analysis? Survey of published randomised controlled trials. *BMJ*, *319*(7211), 670–674. https://doi.org/10.1136/bmj.319.7211.670

Holmes, M. R., Bender, A. E., O'Donnell, K. A., Miller, E. K., & Conard, I. T. (2024). Illuminating the landscape of sibling relationship quality: An evidence and gap map. *Child Development*, *95*(4), 1425–1440. https://doi.org/10.1111/cdev.14065

Holst, C. G., Oncioiu, S. I., Creswell, C., & Bowes, L. (2023). What happens to children's mental health and peer relationships during periods of restricted and unrestricted social interactions? Results from the Co-SPACE study in primary school-aged children. *JAACAP Open*, *1*(12), 128–140. https://doi.org/10.1016/j.jaacop.2023.05.003

Howe, G., & Leijten, P. (2023). When is it time to revise or adapt our prevention programs? Introduction to special issue on using baseline target moderation to assess variation in prevention impact. *Prevention Science*, *24*, 199–203. https://doi.org/10.1007/s11121-022-01456-3

Humphrey, N., & Hebron, J. (2015). Bullying of children and adolescents with autism spectrum conditions: A "state of the field" review. *International Journal of Inclusive Education*, *19*(8), 845–862. https://doi.org/10.1080/13603116.2014.981602

Hurlburt, M. S., Nguyen, K., Reid, J., Webster-Stratton, C., & Zhang, J. (2013). Efficacy of the Incredible Years group parent program with families in Head Start who self-reported a history of child maltreatment. *Child Abuse and Neglect*, *37*(8), 531–543. https://doi.org/10.1016/j.chiabu.2012.10.008

Hutchings, J., Gardner, F., Bywater, T., Daley, D., Whitaker, C., Jones, K., Eames, C., & Edwards, R. T. (2007). Parenting intervention in Sure Start services for children at risk

of developing conduct disorder: Pragmatic randomised controlled trial. *British Medical Journal*, *334*(7595), 678–682. https://doi.org/10.1136/bmj.39126.620799.55

Hutchings, J., Griffith, N., Bywater, T., & Williams, M. E. (2017). Evaluating the Incredible Years Toddler Parenting Programme with parents of toddlers in disadvantaged (Flying Start) areas of Wales. *Child: Care, Health and Development*, *43*(1), 104–113. https://doi.org/10.1111/cch.12415

Ioannidis, K., Askelund, A. D., Kievit, R. A., & Van Harmelen, A. L. (2020). The complex neurobiology of resilient functioning after childhood maltreatment. *BMC Medicine*, *18*(1), 1–16. https://doi.org/10.1186/s12916-020-1490-7

Jaffee, S. R. (2017). Child maltreatment and risk for psychopathology in childhood and adulthood. *The Annual Review of Clinical Psychology*, *21*(13), 525–551. https://doi.org/10.1146/annurev-clinpsy-032816

Jaffee, S. R., Caspi, A., Moffitt, T. E., Polo-Tomás, M., & Taylor, A. (2007). Individual, family, and neighborhood factors distinguish resilient from non-resilient maltreated children: A cumulative stressors model. *Child Abuse and Neglect*, *31*(3), 231–253. https://doi.org/10.1016/j.chiabu.2006.03.011

Jenkins, J., Rasbash, J., Leckie, G., Gass, K., & Dunn, J. (2012). The role of maternal factors in sibling relationship quality: A multilevel study of multiple dyads per family. *Journal of Child Psychology and Psychiatry and Allied Disciplines*, *53*(6), 622–629. https://doi.org/10.1111/j.1469-7610.2011.02484.x

Jones, B. L., & Nagin, D. S. (2013). A note on a Stata plugin for estimating group-based trajectory models. *Sociological Methods and Research*, *42*(4), 608–613. https://doi.org/10.1177/0049124113503141

Jones, D. S., & Podolsky, S. H. (2015). The history and fate of the gold standard. *The Lancet*, *385*(9977), 1502–1503. https://doi.org/10.1016/S0140-6736(15)60742-5

Kaehler, L. A., Jacobs, M., & Jones, D. J. (2016). Distilling common history and practice elements to inform dissemination: Hanf-Model BPT Programs as an example. *Clinical Child and Family Psychology Review*, *19*(3), 236–258. https://doi.org/10.1007/s10567-016-0210-5

Kalisch, R., Baker, D. G., Basten, U., Boks, M. P., Bonanno, G. A., Brummelman, E., Chmitorz, A., Fernàndez, G., Fiebach, C. J., Galatzer-Levy, I., Geuze, E., Groppa, S., Helmreich, I., Hendler, T., Hermans, E. J., Jovanovic, T., Kubiak, T., Lieb, K., Lutz, B., … Kleim, B. (2017). The resilience framework as a strategy to combat stress-related disorders. *Nature Human Behaviour*, *1*(11), 784–790. https://doi.org/10.1038/s41562-017-0200-8

Kaufman, T. M. L., Kretschmer, T., Huitsing, G., & Veenstra, R. (2019). Caught in a vicious cycle? Explaining bidirectional spillover between parent-child relationships and peer victimization. *Development and Psychopathology*, *32*(1), 11–20. https://doi.org/10.1017/S0954579418001360

Kazdin, A. E. (2010). Problem-solving skills training and parent management training for oppositional defiant disorder and conduct disorder. In J. R. Weisz & A. E. Kazdin (Eds.), *Evidence-based psychotherapies for children and adolescents* (2nd ed., pp. 211–226). The Guildford Press.

Keijsers, L., Boele, S., & Bülow, A. (2022). Measuring parent–adolescent interactions in natural habitats. The potential, status, and challenges of ecological momentary assessment. *Current Opinion in Psychology*, *44*, 264–269. https://doi.org/10.1016/j.copsyc.2021.10.002

Khambati, N., Mahedy, L., Heron, J., & Emond, A. (2018). Educational and emotional health outcomes in adolescence following maltreatment in early childhood: A population-based

study of protective factors. *Child Abuse and Neglect*, *81*, 343–353. https://doi.org/10.1016/j.chiabu.2018.05.008

Kjøbli, J., Melendez-Torres, G. J., Gardner, F., Backhaus, S., Linnerud, S., & Leijten, P. (2023). Research review: Effects of parenting programs for children's conduct problems on children's emotional problems – a network meta-analysis. *Journal of Child Psychology and Psychiatry and Allied Disciplines*, *64*(3), 348–356. https://doi.org/10.1111/jcpp.13697

Klijn, S. L., Weijenberg, M. P., Lemmens, P., Van Den Brandt, P. A., & Lima Passos, V. (2017). Introducing the fit-criteria assessment plot- A visualisation tool to assist class enumeration in group-based trajectory modelling. *Statistical Methods in Medical Research*, *26*(5), 2424–2436. https://doi.org/10.1177/0962280215598665

Klika, B. B., & Herrenkohl, T. I. (2013). A review of developmental research on resilience in maltreated children. *Trauma, Violence, and Abuse*, *14*(3), 222–234. https://doi.org/10.1177/1524838013487808

Knowles, G., Stanyon, D., Yamasaki, S., Miyashita, M., Gayer-Anderson, C., Endo, K., Usami, S., Niimura, J., Nakajima, N., Baba, K., Richards, T., Kitisu, J., Hashi, A., Clement-Gbede, K. S., Tettey, N., Davis, S., Lowis, K., Buckley, V., Moreno-Agostino, D., … Nishida, A. (2025). Trajectories of depressive symptoms among young people in London, UK, and Tokyo, Japan: A longitudinal cross-cohort study. *The Lancet Child & Adolescent Health*, *9*(4), 224–233. https://doi.org/10.1016/S2352-4642(25)00059-8

Koss, M. P., & Gidycz, C. A. (1985). Sexual experiences survey: Reliability and validity. *Journal or Consulting and Clinical Psychology*, *53*(3), 422–423. https://psycnet.apa.org/doi/10.1037/0022-006X.53.3.422

Kramer, L. (2004). Experimental interventions in sibling relationships. In *Continuity and change in family relations* (pp. 359–394). Routledge. https://doi.org/10.4324/9781410609878

Kramer, L. (2010). The essential ingredients of successful sibling relationships: An emerging framework for advancing theory and practice. *Child Development Perspectives*, *4*(2), 80–86. https://doi.org/10.1111/j.1750-8606.2010.00122.x

Kretschmer, T., Hickman, M., Doerner, R., Emond, A., Lewis, G., Macleod, J., Maughan, B., Munafò, M. R., & Heron, J. (2014). Outcomes of childhood conduct problem trajectories in early adulthood: Findings from the ALSPAC study. *European Child and Adolescent Psychiatry*, *23*(7), 539–549. https://doi.org/10.1007/s00787-013-0488-5

Kretschmer, T., Vrijen, C., Nolte, I. M., Wertz, J., & Hartman, C. A. (2022). Gene–environment interplay in externalizing behavior from childhood through adulthood. *Journal of Child Psychology and Psychiatry and Allied Disciplines*, *63*(10), 1206–1213. https://doi.org/10.1111/jcpp.13652

Kuntsi, J., Gayán, J., & Stevenson, J. (2000). Parents' and teachers' ratings of problem behaviours in children: genetic and contrast effects. *Twin Research*, *3*(4), 251–258. https://doi.org/10.1375/twin.3.4.251

Laas Sigurðardóttir, L. B., Melendez-Torres, G. J., Backhaus, S., Gardner, F., Scott, S., & Leijten, P. (2024). Individual participant data meta-analysis: Individual differences in mediators of parenting program effects on disruptive behavior. *Journal of the American Academy of Child & Adolescent Psychiatry*, *64*(5), 564–576. https://doi.org/10.1016/j.jaac.2024.10.003

Labella, M. H., & Masten, A. S. (2018). Family influences on the development of aggression and violence. *Current Opinion in Psychology*, *19*, 11–16. https://doi.org/10.1016/j.copsyc.2017.03.028

Lansford, J. E., Criss, M. M., Laird, R. D., Shaw, D. S., Pettit, G. S., Bates, J. E., & Dodge, K. A. (2011). Reciprocal relations between parents' physical discipline and children's externalizing behavior during middle childhood and adolescence. *Development and Psychopathology*, *23*(1), 225–238. https://doi.org/10.1017/S0954579410000751

Lansford, J. E., Criss, M. M., Pettit, G. S., Dodge, K. A., & Bates, J. E. (2003). Friendship quality, peer group affiliation, and peer antisocial behavior as moderators of the link between negative parenting and adolescent externalizing behavior. *Journal of Research on Adolescence*, *13*(2), 161–184. https://doi.org/https://doi.org/10.1111/1532-7795.1302002

Lansford, J. E., Rothenberg, W. A., Jensen, T. M., Lippold, M. A., Bacchini, D., Bornstein, M. H., Chang, L., Deater-Deckard, K., Di Giunta, L., Dodge, K. A., Malone, P. S., Oburu, P., Pastorelli, C., Skinner, A. T., Sorbring, E., Steinberg, L., Tapanya, S., Uribe Tirado, L. M., Alampay, L. P., & Al-Hassan, S. M. (2018). Bidirectional relations between parenting and behavior problems from age 8 to 13 in nine countries. *Journal of Research on Adolescence*, *28*(3), 571–590. https://doi.org/10.1111/jora.12381

Larsson, B., Fossum, S., Clifford, G., Drugli, M. B., Handegård, B. H., & Mørch, W. T. (2009). Treatment of oppositional defiant and conduct problems in young Norwegian children: Results of a randomized controlled trial. *European Child and Adolescent Psychiatry*, *18*(1), 42–52. https://doi.org/10.1007/s00787-008-0702-z

Lawlor, D. A., Lewcock, M., Rena-Jones, L., Rollings, C., Yip, V., Smith, D., Pearson, R. M., Johnson, L., Millard, L. A. C., Patel, N., Skinner, A., & Tilling, K. (2019). The second generation of the Avon Longitudinal Study of Parents and Children (ALSPAC-G2): A cohort profile. *Wellcome Open Research*, *4*, 36. https://doi.org/10.12688/wellcomeopenres.15087.1

Leijten, P., Gardner, F., Landau, S., Harris, V., Mann, J., Hutchings, J., Beecham, J., Bonin, E. M., & Scott, S. (2018). Research review: Harnessing the power of individual participant data in a meta-analysis of the benefits and harms of the Incredible Years parenting program. *Journal of Child Psychology and Psychiatry and Allied Disciplines*, *59*(2), 99–109. https://doi.org/10.1111/jcpp.12781

Leijten, P., Gardner, F., Melendez-Torres, G. J., Knerr, W., & Overbeek, G. (2018). Parenting behaviors that shape child compliance: A multilevel meta-analysis. *PLoS ONE*, *13*(10), e0204929. https://doi.org/10.1371/journal.pone.0204929

Leijten, P., Gardner, F., Melendez-Torres, G. J., Van Aar, J., Hutchings, J., Schulz, S., Knerr, W., & Overbeek, G. (2019). Meta-analyses: Key parenting program components for disruptive child behavior. *JAACAP*, *58*(2), 180–190. https://doi.org/10.1016/j.jaac.2018.07.900

Leijten, P., Gardner, F., Melendez-Torres, G. J., Weeland, J., Hutchings, J., Landau, S., McGilloway, S., Overbeek, G., Van Aar, J., Menting, A., Orobio De Castro, B., Berry, V., Gaspar, M. F., Axberg, U., Morch, W. T., & Scott, S. (2019). Co-occurring change in children's conduct problems and maternal depression: Latent class individual participant data meta-analysis of the Incredible Years parenting program. *Development and Psychopathology*, *31*(5), 1851–1862. https://doi.org/10.1017/S0954579419001068

Leijten, P., Melendez-Torres, G. J., Gardner, F., van Aar, J., Schulz, S., & Overbeek, G. (2018). Are relationship enhancement and behavior management "The Golden Couple" for disruptive child behavior? Two meta-analyses. *Child Development*, *89*(6), 1970–1982. https://doi.org/10.1111/cdev.13051

Leijten, P., Melendez-Torres, G. J., & Oliver, B. R. (2021). Parenting programs to improve sibling interactions: A meta-analysis. *Journal of Family Psychology*, *35*, 703–708. https://doi.org/10.1037/fam0000833

Leijten, P., Raaijmakers, M. A. J., Orobio de Castro, B., van den Ban, E., & Matthys, W. (2017). Effectiveness of the Incredible Years parenting program for families with socioeconomically disadvantaged and ethnic minority backgrounds. *Journal of Clinical Child and Adolescent Psychology*, *46*(1), 59–73. https://doi.org/10.1080/15374416.2015.1038823

Leijten, P., Rienks, K., Groenman, A. P., Anand, M., Kömürcü Akik, B., David, O., Kızıltepe, R., Thongseiratch, T., & Catarina Canário, A. (2024). Online parenting support: Meta-analyses of non-inferiority and additional value to in-person support. *Children and Youth Services Review*, *159*, 107497. https://doi.org/10.1016/j.childyouth.2024.107497

Leijten, P., Scott, S., Landau, S., Harris, V., Mann, J., Hutchings, J., Beecham, J., & Gardner, F. (2020). Individual participant data meta-analysis: Impact of conduct problem severity, comorbid attention-deficit/ hyperactivity disorder and emotional problems, and maternal depression on parenting program effects. *Journal of the American Academy of Child & Adolescent Psychiatry*, *59*(8), 933–943. https://doi.org/10.1016/j.jaac.2020.01.023

Leijten, P., Wijngaards-de Meij, L., Menting, A., Orobio de Castro, B., Overbeek, G., & Matthys, W. (2021). Parenting group composition does not impact program effects on children's conduct problems. *Journal of Family Psychology*, *35*(5), 709. https://doi.org/https://doi.org/10.1037/fam0000820

Lerner, R. M. (2006). Developmental science, developmental systems, and contemporary theories of human development. In R. M. Lerner & W. Damon (Eds.), *Handbook of child psychology: Theoretical models of human development* (pp. 1–17). John Wiley.

Loughran, T., & Nagin, D. S. (2006). Finite sample effects in group-based trajectory models. *Sociological Methods and Research*, *35*(2), 250–278. https://doi.org/10.1177/0049124106292292

Luthar, S. S., & Cicchetti, D. (2000). The construct of resilience: Implications for interventions and social policies. *Development and Psychopathology*, *12*(4), 857–885. https://doi.org/https://psycnet.apa.org/doi/10.1017/S0954579400004156

Magaiia, A. B., Goldstein, M. J., Karno, M., Miklowitz, D. J., Jenkins, J., & Rec, I. R. H. F. (1986). A brief method for assessing expressed emotion in relatives of psychiatric patients. *Psychiatry Research*, *17*(3), 203–205.

Masten, A. S. (2005). Peer relationships and psychopathology in developmental perspective: Reflections on progress and promise. *Journal of Clinical Child and Adolescent Psychology*, *34*(1), 87–92. https://doi.org/10.1207/s15374424jccp3401_8

Masten, A. S. (2006). Developmental psychopathology: Pathways to the future. *International Journal of Behavioral Development*, *30*(1), 47–54. https://doi.org/10.1177/0165025406059974

Masten, A. S. (2014). *Ordinary magic: Resilience in development*. Guilford Press.

Masten, A. S. (2015). Pathways to integrated resilience science. *Psychological Inquiry*, *26*(2), 187–196. https://doi.org/10.1080/1047840X.2015.1012041

Masten, A. S. (2021). Resilience in developmental systems: Principles, pathways, and protective processes in research and practice. In M. Ungar (Ed.), *Multisystemic resilience: Adaptation and transformation in contexts of change* (pp. 113–134). Oxford University Press. https://doi.org/10.1093/oso/9780190095888.003.0007

Masten, A. S. (2024). Emergence and evolution of developmental resilience science over half a century. *Development and Psychopathology*, *36*(5), 2542–2550. https://doi.org/10.1017/S0954579424000154

Masten, A. S., & Cicchetti, D. (2010). Developmental cascades. *Development and Psychopathology*, *22*(3), 491–495. https://doi.org/10.1017/S0954579410000222

Masten, A. S., Lucke, C. M., Nelson, K. M., & Stallworthy, I. C. (2021). Resilience in development and psychopathology: Multisystem perspectives. *Annual Review of Clinical Psychology*, *1*(17), 521–549. https://doi.org/10.1146/annurev-clinpsy-081219

McCrory, E., Foulkes, L., & Viding, E. (2022). Social thinning and stress generation after childhood maltreatment: A neurocognitive social transactional model of psychiatric vulnerability. *The Lancet Psychiatry*, *9*(10), 828–837. https://doi.org/10.1016/S2215-0366(22)00202-4

Mcdonald, T. P., Poertner, J., & Pierpont, J. (1999). Predicting caregiver stress: An ecological perspective. *American Journal of Orthopsychiatry*, *69*(1), 100–109. https://doi.org/10.1037/h0080385

McEachan, R. R. C., Santorelli, G., Watmuff, A., Mason, D., Barber, S. E., Bingham, D. D., Bird, P. K., Lennon, L., Lewer, D., Mon-Williams, M., Shire, K. A., Waiblinger, D., West, J., Yang, T. C., Lawlor, D. A., Pickett, K. E., & Wright, J. (2024). Cohort Profile Update: Born in Bradford. *International Journal of Epidemiology*, *53*(2), dyae037. https://doi.org/10.1093/ije/dyae037

McGilloway, S., Mhaille, G. N., Bywater, T., Furlong, M., Leckey, Y., Kelly, P., Comiskey, C., & Donnelly, M. (2012). A parenting intervention for childhood behavioral problems: A randomized controlled trial in disadvantaged community-based settings. *Journal of Consulting and Clinical Psychology*, *80*(1), 116–127. https://doi.org/10.1037/a0026304

McGilloway, S., NiMhaille, G., Bywater, T., Leckey, Y., Kelly, P., Furlong, M., Comiskey, C., O'Neill, D., & Donnelly, M. (2014). Reducing child conduct disordered behaviour and improving parent mental health in disadvantaged families: A 12-month follow-up and cost analysis of a parenting intervention. *European Child and Adolescent Psychiatry*, *23*(9), 783–794. https://doi.org/10.1007/s00787-013-0499-2

McHale, S. M., Sun, X., Updegraff, K. A., & Whiteman, S. D. (2024). Patterns and correlates of changes in sibling intimacy and conflict from middle childhood through young adulthood. *Developmental Psychology*. https://doi.org/10.1037/dev0001750

McHale, S. M., Whiteman, S. D., Kim, J. Y., & Crouter, A. C. (2007). Characteristics and Correlates of Sibling Relationships in Two-Parent African American Families. *Journal of Family Psychology*, *21*(2), 227–235. https://doi.org/10.1037/0893-3200.21.2.227

McMahon, R. J., Goulter, N., & Frick, P. J. (2021). Moderators of psychosocial intervention response for children and adolescents with conduct problems. *Journal of Clinical Child and Adolescent Psychology*, *50*(4), 525–533. https://doi.org/10.1080/15374416.2021.1894566

McMillan, C., Jones, K. A., Jacobsen, W. C., Ramirez, N. G., & Feinberg, M. E. (2025). Friends forever? Correlates of high school friendship (in)stability from adolescence to young adulthood. *Social Networks*, *82*, 27–38. https://doi.org/10.1016/j.socnet.2025.02.002

Menting, A. T. A., de Castro, B. O., Wijngaards-de Meij, L. D. N. V., & Matthys, W. (2014). A trial of parent training for mothers being released from incarceration and their children. *Journal of Clinical Child and Adolescent Psychology*, *43*(3), 381–396. https://doi.org/10.1080/15374416.2013.817310

Menting, A. T. A., Orobio de Castro, B., & Matthys, W. (2013). Effectiveness of the Incredible Years parent training to modify disruptive and prosocial child behavior: A meta-analytic review. *Clinical Psychology Review*, *33*(8), 901–913. https://doi.org/10.1016/j.cpr.2013.07.006

Minuchin, P. (1985). Families and individual development: provocations from the field of family therapy. *Child Development*, *56*(2), 289–302. https://psycnet.apa.org/doi/10.2307/1129720

Morpeth, L., Blower, S., Tobin, K., Taylor, R. S., Bywater, T., Edwards, R. T., Axford, N., Lehtonen, M., Jones, C., & Berry, V. (2017). The effectiveness of the Incredible Years pre-school parenting programme in the United Kingdom: a pragmatic randomised controlled trial. *Child Care in Practice*, *23*(2), 141–161. https://doi.org/10.1080/13575279.2016.1264366

Munafò, M. R., Nosek, B. A., Bishop, D. V. M., Button, K. S., Chambers, C. D., Percie Du Sert, N., Simonsohn, U., Wagenmakers, E. J., Ware, J. J., & Ioannidis, J. P. A. (2017). A manifesto for reproducible science. *Nature Human Behaviour*, *1*(1), 0021. https://doi.org/10.1038/s41562-016-0021

Muthén, L. K., & Muthén, B. O. (2018). *Mplus Version 8.0.* Muthén & Muthén.

Nagin, D. S. (2005). *Group-based modeling of development*. Harvard University Press.

Nagin, D. S., Jones, B. L., & Elmer, J. (2024). Recent advances in group-based trajectory modeling for clinical research. *Annual Review of Clinical Psychology*, *20*, 285–305. https://doi.org/10.1146/annurev-clinpsy-081122

Nagin, D. S., Jones, B. L., Passos, V. L., & Tremblay, R. E. (2018). Group-based multi-trajectory modeling. *Statistical Methods in Medical Research*, *27*(7), 2015–2023. https://doi.org/10.1177/0962280216673085

Nagin, D. S., & Odgers, C. L. (2010). Group-based trajectory modeling in clinical research. *Annual Review of Clinical Psychology*, *6*, 109–138. https://doi.org/10.1146/annurev.clinpsy.121208.131413

Newlove-Delgado, T., Marcheselli, F., Williams, T., Mandalia, D., Davis, J., McManus, S., Savic, M., Treloar, W., & Ford, T. (2022). *Mental Health of Children and Young People in England, 2022-wave 3 follow up to the 2017 survey*. https://digital.nhs.uk/data-and-information/publications/statistical/mental-health-of-children-and-young-people-in-england/2022-follow-up-to-the-2017-survey

Ng-Knight, T., Shelton, K. H., Riglin, L., Frederickson, N., McManus, I. C., & Rice, F. (2019). 'Best friends forever'? Friendship stability across school transition and associations with mental health and educational attainment. *British Journal of Educational Psychology*, *89*(4), 585–599. https://doi.org/10.1111/bjep.12246

Nivard, M. G., Lubke, G. H., Dolan, C. V., Evans, D. M., St Pourcain, B., Munafò, M. R., & Middeldorp, C. M. (2017). Joint developmental trajectories of internalizing and externalizing disorders between childhood and adolescence. *Development and Psychopathology*, *29*(3), 919–928. https://doi.org/10.1017/S0954579416000572

Northstone, K., Lewcock, M., Groom, A., Boyd, A., Macleod, J., Timpson, N., & Wells, N. (2019). The Avon Longitudinal Study of Parents and Children (ALSPAC): An update on the enrolled sample of index children in 2019. *Wellcome Open Research*, *4*. https://doi.org/10.12688/wellcomeopenres.15132.1

Nosek, B. A., Ebersole, C. R., DeHaven, A. C., & Mellor, D. T. (2018). The preregistration revolution. *Proceedings of the National Academy of Sciences*, *115*(11), 2600–2606. https://doi.org/10.1073/pnas.1708274114

Nylund, K. L., Asparouhov, T., & Muthén, B. O. (2007). Deciding on the number of classes in latent class analysis and growth mixture modeling: A Monte Carlo simulation study. *Structural Equation Modeling*, *14*(4), 535–569. https://doi.org/10.1080/10705510701575396

Nylund-Gibson, K. L., Garber, A., Carter, D., Chan, M., Arch, D., Simon, O., Whaling, K., Tartt, E., & Lawrie, S. (2023). Ten frequently asked questions about latent transition analysis. *Psychological Methods*, *28*(2), 284–300. https://doi.org/10.1037/met0000486.supp

Oliver, B. R., & Pike, A. (2018). Mother-child positivity and negativity: Family-wide and child-specific main effects and interactions predict child adjustment. *Developmental Psychology*, *54*(4), 744–756. https://doi.org/10.1037/dev0000467

Oliver, B. R., & Pike, A. (2021). Introducing a novel online observation of parenting behavior: reliability and validation. *Parenting*, *21*(2), 168–183. https://doi.org/10.1080/15295192.2019.1694838

Overbeek, G., Van Aar, J., Orobio De Castro, B., Matthys, W., Weeland, J., Chhangur, R. R., & Leijten, P. (2021). Longer-term outcomes of the Incredible Years parenting intervention. *Prevention Science*, *22*, 419–431. https://doi.org/10.1007/s11121-020

Padaigaitė-Gulbinienė, E., Hammerton, G., Powell, V., Rice, F., & Collishaw, S. (2024). Modifiable protective factors for mental health resilience in the offspring of depressed parents: A high-risk longitudinal cohort spanning adolescence and adulthood. *JCPP Advances*, *3*(4), e12240. https://doi.org/10.1002/jcv2.12240

Parker, J. G., Rubin, K. H., Erath, S. A., Wojslawowicz, J. C., & Buskirk, A. A. (2015). Peer relationships, child development, and adjustment: A developmental psychopathology perspective. In D. Cicchetti & Donald J. Cohen (Eds.), *Developmental psychopathology: Volume One: Theory and method* (Vol. 1, pp. 419–493). John Wiley & Sons.

Parra-Cardona, R. (2023). Baseline target moderation and baseline target moderation mediation approaches: Reflections on cultural adaptation and social justice. *Prevention Science*, *24*(2), 304–308. https://doi.org/10.1007/s11121-022-01457-2

Patalay, P., & Gage, S. H. (2019). Changes in millennial adolescent mental health and health-related behaviours over 10 years: A population cohort comparison study. *International Journal of Epidemiology*, *48*(5), 1650–1664. https://doi.org/10.1093/ije/dyz006

Patterson, G. R. (1982). *Coercive family process*. Castalia.

Patterson, G. R. (1984). Siblings: Fellow travelers in coercive family processes. In *Advances in the study of aggression* (Vol. 1, pp. 174–214). Academic Press.

Patterson, G. R., Degarmo, D., & Forgatch, M. S. (2004). Systematic changes in families following prevention trials. *Journal of Abnormal Child Psychology*, *32*(6), 621–633. https://doi.org/10.1023/b:jacp.0000047211.11826.54

Patterson, G. R., Dishion, T. J., & Bank, L. (1984). Family interaction: A process model of deviancy training. *Aggressive Behavior*, *10*(3), 253–267. https://doi.org/10.1002/1098-2337(1984)10:3<253::AID-AB2480100309>3.0.CO;2-2

Patterson, G. R., Dishion, T. J., & Yoerger, K. (2000). Adolescent growth in new forms of problem behavior: Macro-and micro-peer dynamics. *Prevention Science*, *1*(1), 3–13. https://doi.org/https://doi.org/10.1023/A:1010019915400

Patterson, G. R., Reid, J. B., & Dishion, T. J. (1992). *Antisocial boys* (Vol. 4). Castalia.

Pelham, W. E., Dishion, T. J., Tein, J. Y., Shaw, D. S., & Wilson, M. N. (2017). What doesn't work for whom? Exploring heterogeneity in responsiveness to the Family Check-Up in early childhood using a mixture model approach. *Prevention Science*, *18*(8), 911–922. https://doi.org/10.1007/s11121-017-0805-1

Perez-Brena, N. J., Duncan, J. C., Bámaca, M. Y., & Perez, R. (2022). Progress and gaps: A systematic review of the family demographics and family subsystems represented in top family science journals 2008–2018. *Journal of Family Theory and Review*, *14*(1), 59–78. https://doi.org/10.1111/jftr.12446

Perley-Robertson, B., Babchishin, K. M., & Helmus, L. M. (2024). The effect of missing item data on the relative predictive accuracy of correctional risk assessment tools. *Assessment*, *31*(8), 1643-1657. https://doi.org/10.1177/10731911231225191

Pickering, J. A., & Sanders, M. R. (2017). Integrating parents' views on sibling relationships to tailor an evidence-based parenting intervention for sibling conflict. *Family Process*, *56*(1), 105–125. https://doi.org/10.1111/famp.12173

Piehler, T. F., & Dishion, T. J. (2007). Interpersonal dynamics within adolescent friendships: Dyadic mutuality, deviant talk, and patterns of antisocial behavior. *Child Development*, *78*(5), 1611–1624. https://doi.org/10.1111/j.1467-8624.2007.01086.x

Pike, A., Coldwell, J., & Dunn, J. F. (2005). Sibling relationships in early/middle childhood: Links with individual adjustment. *Journal of Family Psychology*, *19*(4), 523–532. https://doi.org/10.1037/0893-3200.19.4.523

Pike, A., & Oliver, B. R. (2017). Child behavior and sibling relationship quality: A cross-lagged analysis. *Journal of Family Psychology*, *31*(2), 250–255. https://doi.org/10.1037/fam0000248

Pinquart, M. (2017a). Associations of parenting dimensions and styles with externalizing problems of children and adolescents: An updated meta-analysis. *Developmental Psychology*, *53*(5), 873–932. https://doi.org/10.1037/dev0000295.supp

Pinquart, M. (2017b). Associations of parenting dimensions and styles with internalizing symptoms in children and adolescents: A meta-analysis. *Marriage and Family Review*, *53*(7), 613–640. https://doi.org/10.1080/01494929.2016.1247761

Plomin, R., & Daniels, D. (2011). Why are children in the same family so different from one another? *International Journal of Epidemiology*, *40*(3), 563–582. https://doi.org/10.1093/ije/dyq148

Polanczyk, G. V., Salum, G. A., Sugaya, L. S., Caye, A., & Rohde, L. A. (2015). Annual research review: A meta-analysis of the worldwide prevalence of mental disorders in children and adolescents. *Journal of Child Psychology and Psychiatry and Allied Disciplines*, *56*(3), 345–365. https://doi.org/10.1111/jcpp.12381

Poulin, F., & Chan, A. (2010). Friendship stability and change in childhood and adolescence. *Developmental Review*, *30*(3), 257–272. https://doi.org/10.1016/j.dr.2009.01.001

Poulin, F., Dishion, T. J., & Haas, E. (1999). The peer influence paradox: Friendship quality and deviancy training within male adolescent friendships. *Merrill-Palmer Quarterly*, *45*(1), 42–61. https://doi.org/https://doi.org/10.1353/mpq.1999.0006

Poulton, R., Moffitt, T. E., & Silva, P. A. (2015). The Dunedin Multidisciplinary Health and Development Study: Overview of the first 40 years, with an eye to the future. *Social Psychiatry and Psychiatric Epidemiology*, *50*(5), 679–693. https://doi.org/10.1007/s00127-015-1048-8

Power, C., & Elliott, J. (2006). Cohort profile: 1958 British birth cohort (National Child Development Study). *International Journal of Epidemiology*, *35*(1), 34–41. https://doi.org/10.1093/ije/dyi183

Radford, L., Corral, S., Bradley, C., & Fisher, H. L. (2013). The prevalence and impact of child maltreatment and other types of victimization in the UK: Findings from a population survey of caregivers, children and young people and young adults. *Child Abuse and Neglect*, *37*(10), 801–813. https://doi.org/10.1016/j.chiabu.2013.02.004

Rajyaguru, P., Kwong, A. S. F., Braithwaite, E., & Pearson, R. M. (2021). Maternal and paternal depression and child mental health trajectories: Evidence from the Avon Longitudinal Study of Parents and Children. *BJPsych Open*, *7*(5), e166. https://doi.org/10.1192/bjo.2021.959

Reardon, T., Harvey, K., Baranowska, M., O'Brien, D., Smith, L., & Creswell, C. (2017). What do parents perceive are the barriers and facilitators to accessing psychological treatment for mental health problems in children and adolescents? A systematic review of qualitative and quantitative studies. *European Child and Adolescent Psychiatry*, *26*(6), 623–647. https://doi.org/10.1007/s00787-016-0930-6

Reblin, M., & Uchino, B. N. (2008). Social and emotional support and its implication for health. *Current Opinion in Psychiatry*, *21*(2), 201–205. https://doi.org/10.1097/YCO.0b013e3282f3ad89

Reitman, D., & McMahon, R. J. (2012). Constance "Connie" Hanf (1917-2002): The mentor and the model. *Cognitive and Behavioral Practice*, *20*(1), 106–116. https://doi.org/10.1016/j.cbpra.2012.02.005

Riley, R. D., Lambert, P. C., & Abo-Zaid, G. (2010). Meta-analysis of individual participant data: Rationale, conduct, and reporting. *BMJ*, *340*(7745), 521–525. https://doi.org/10.1136/bmj.c221

Rivenbark, J. G., Odgers, C. L., Caspi, A., Harrington, H. L., Hogan, S., Houts, R. M., Poulton, R., & Moffitt, T. E. (2018). The high societal costs of childhood conduct problems: evidence from administrative records up to age 38 in a longitudinal birth cohort. *Journal of Child Psychology and Psychiatry and Allied Disciplines*, *59*(6), 703–710. https://doi.org/10.1111/jcpp.12850

Robinson, E. A., Eyberg, S. M., & Ross, A. W. (1980). The standardization of an inventory of child conduct problem behaviors. *Journal of Clinical Child Psychology*, *9*(1), 22–28. https://doi.org/10.1080/15374418009532938

Rogosch, F. A., & Cicchetti, D. (1994). Illustrating the interface of family and peer relations through the study of child maltreatment. *Social Development*, *3*(3), 291–308. https://doi.org/10.1111/j.1467-9507.1994.tb00046.x

Rohde, P., Lewinsohn, P. M., Klein, D. N., Seeley, J. R., & Gau, J. M. (2013). Key characteristics of major depressive disorder occurring in childhood, adolescence, emerging adulthood, and adulthood. *Clinical Psychological Science*, *1*(1), 41–53. https://doi.org/10.1177/2167702612457599

Rose, A. J. (2002). Co-rumination in the friendships of girls and boys. *Child Development*, *73*(6), 1830–1843. https://doi.org/10.1111/1467-8624.00509

Rose, A. J. (2021). The costs and benefits of co-rumination. *Child Development Perspectives*, *15*(3), 176–181. https://doi.org/10.1111/cdep.12419

Rose, A. J., Carlson, W., & Waller, E. M. (2007). Prospective associations of co-rumination with friendship and emotional adjustment: Considering the socioemotional trade-offs of co-rumination. *Developmental Psychology*, *43*(4), 1019–1031. https://doi.org/10.1037/0012-1649.43.4.1019

Russell, M. A., & Gajos, J. M. (2020). Annual research review: Ecological momentary assessment studies in child psychology and psychiatry. *Journal of Child Psychology and Psychiatry*, *61*(3), 376–394. https://doi.org/10.1111/jcpp

Sadler, K., Vizard, T., Ford, T., Goodman, A., Goodman, R., & McManus, S. (2018). *Mental Health of Children and Young People in England, 2017: Trends and characteristics*. https://digital.nhs.uk/data-and-information/publications/statistical/mental-health-of-children-and-young-people-in-england/2017/2017

Sameroff, A. (1975). Transactional models in early social relations. *Human Development*, *18*(1), 65–79. https://doi.org/10.1159/000271476

Sammons, P., Hall, J., Smees, R., Goff, J., Sylva, K., Smith, T., Evangelou, M., Eisenstadt, N., & Smith, G. (2015). *The impact of children's centres: studying the effects of children's centres in promoting better outcomes for young children and their families Evaluation of Children's Centres in England (ECCE, Strand 4)*. https://ora.ox.ac.uk/objects/uuid:cb5dbff9-619b-44d6-b84e-842b2c6665f1/files/me8135b41046a28982d228b20dddc211f

Sanders, M. R. (2012). Development, evaluation, and multinational dissemination of the Triple P-Positive Parenting Program. *Annual Review of Clinical Psychology*, *8*, 345–379. https://doi.org/10.1146/annurev-clinpsy-032511-143104

Sanders, R. (2004). *Sibling relationships: Theory and issues for practice.* Palgrave Macmillan.

Sandler, I. N., Schoenfelder, E. N., Wolchik, S. A., & MacKinnon, D. P. (2011). Long-term impact of prevention programs to promote effective parenting: Lasting effects but uncertain processes. *Annual Review of Psychology*, *62*, 299–329. https://doi.org/10.1146/annurev.psych.121208.131619

Schwartz, D., & Proctor, L. J. (2000). Community violence exposure and children's social adjustment in the school peer group: The mediating roles of emotion regulation and social cognition. *Journal of Consulting and Clinical Psychology*, *68*(4), 670–683. https://doi.org/10.1037/0022-006X.68.4.670

Schwartz-Mette, R. A., Shankman, J., Dueweke, A. R., Borowski, S., & Rose, A. J. (2020). Relations of friendship experiences with depressive symptoms and loneliness in childhood and adolescence: A meta-analytic review. *Psychological Bulletin*, *8*(146), 664–700. https://doi.org/https://doi.org/10.1037/bul0000239

Scott, S. (2005). Do parenting programmes for severe child antisocial behaviour work over the longer term, and for whom? One year follow-up of a multi-centre controlled trial. *Behavioural and Cognitive Psychotherapy*, *33*(4), 403–421. https://doi.org/10.1017/S135246580500233X

Scott, S., & Dadds, M. R. (2009). Practitioner review: When parent training doesn't work: Theory-driven clinical strategies. *Journal of Child Psychology and Psychiatry and Allied Disciplines*, *50*(12), 1441–1450. https://doi.org/10.1111/j.1469-7610.2009.02161.x

Scott, S., O'Connor, T. G., Futh, A., Matias, C., Price, J., & Doolan, M. (2010). Impact of a parenting program in a high-risk, multi-ethnic community: The PALS trial. *Journal of Child Psychology and Psychiatry and Allied Disciplines*, *51*(12), 1331–1341. https://doi.org/10.1111/j.1469-7610.2010.02302.x

Scott, S., Spender, Q., Doolan, M., Jacobs, B., Aspland, H., & Webster-Stratton, C. (2001). Multicentre controlled trial of parenting groups for childhood antisocial behaviour in clinical practice. *BMJ*, *323*(7306), 194–194. https://doi.org/10.1136/bmj.323.7306.194

Scott, S., Sylva, K., Beckett, C., Doolan, M., Kallitsoglou, A., Beecham, J., & Ford, T. (2013). *Which type of parenting programme best improves child behaviour and reading? The Helping Children Achieve trial. Follow-up of the helping children achieve trial*. https://www.nuffieldfoundation.org/sites/default/files/files/HCA_follow_up_report_13_05_14.pdf

Scott, S., Sylva, K., Doolan, M., Price, J., Jacobs, B., Crook, C., & Landau, S. (2010). Randomised controlled trial of parent groups for child antisocial behaviour targeting multiple risk factors: The SPOKES project. *Journal of Child Psychology and Psychiatry and Allied Disciplines*, *51*(1), 48–57. https://doi.org/10.1111/j.1469-7610.2009.02127.x

Seabra-Santos, M. J., Gaspar, M. F., Azevedo, A. F., Homem, T. C., Guerra, J., Martins, V., Leitão, S., Pimentel, M., Almeida, M., & Moura-Ramos, M. (2016). Incredible Years parent training: What changes, for whom, how, for how long? *Journal of Applied Developmental Psychology*, *44*, 93–104. https://doi.org/10.1016/j.appdev.2016.04.004

Sellars, E., Bowes, L., Oliver, B. R., Gardner, F., Axberg, U., Berry, V., Seabra-Santos, M. J., Hutchings, J., McGilloway, S., Menting, A. T. A., Overbeek, G., Scott, S., & Leijten, P. (2024). Effects of the Incredible Years parenting program on children's interpersonal conflict: An integrative data analysis. *Journal of Family Psychology*, *38*(6), 847–857. https://doi.org/10.1037/fam0001236

Sellars, E., Oliver, B. R., & Bowes, L. (2024). Children's resilience to sibling victimization: The role of family, peer, school, and neighborhood factors. *Development and Psychopathology*, *36*(4), 1973–1987. https://doi.org/10.1017/S0954579423001323

Shanahan, L., McHale, S. M., Crouter, A. C., & Osgood, D. W. (2008). Linkages between parents' differential treatment, youth depressive symptoms, and sibling relationships. *Journal of Marriage and Family*, *70*(2), 480–494. https://doi.org/10.1111/j.1741-3737.2008.00495.x

Shanahan, L., Steinhoff, A., Ribeaud, D., & Eisner, M. (2024). The role of early adolescence in subsequent risk and resilience. *The Journal of Early Adolescence*, *44*(9), 1097–1123. https://doi.org/10.1177/02724316241271381

Sidebotham, P., & Heron, J. (2006). Child maltreatment in the "children of the nineties": A cohort study of risk factors. *Child Abuse and Neglect*, *30*(5), 497–522. https://doi.org/10.1016/j.chiabu.2005.11.005

Simmons, J. P., Nelson, L. D., & Simonsohn, U. (2011). False-positive psychology: Undisclosed flexibility in data collection and analysis allows presenting anything as significant. *Psychological Science*, *22*(11), 1359–1366. https://doi.org/10.1177/0956797611417632

Smorti, M., Inguaggiato, E., Vezzosi, L., & Milone, A. (2021). Parenting and sibling relationships in family with disruptive behavior disorders. Are non-clinical siblings more vulnerable for emotional and behavioral problems? *Brain Sciences*, *11*(10), 1308. https://doi.org/10.3390/brainsci11101308

Snyder, J., Schrepferman, L., Oeser, J., Patterson, G., Stoolmiller, M., Johnson, K., & Snyder, A. (2005). Deviancy training and association with deviant peers in young children: Occurrence and contribution to early-onset conduct problems. *Development and Psychopathology*, *17*(2), 397–413. https://doi.org/10.1017/S0954579405050194

Speyer, L. G., Hang, Y., Hall, H. A., & Murray, A. L. (2022). The role of harsh parenting practices in early- to middle-childhood socioemotional development: An examination in the Millennium Cohort Study. *Child Development*, *93*(5), 1304–1317. https://doi.org/10.1111/cdev.13761

Sroufe, L. A. (1979). The coherence of individual development early care, attachment, and subsequent developmental issues. *American Psychologist*, *34*(10), 834–841. https://doi.org/10.1037/0003-066X.34.10.834

Sroufe, L. A., Egeland, B., Carlson, E., & Collins, W. A. (2005). *The development of the person: The Minnesota study of risk and adaptation from birth to adulthood*. Guilford.

Stevens, E. A., & Prinstein, M. J. (2005). Peer contagion of depressogenic attributional styles among adolescents: A longitudinal study. *Journal of Abnormal Child Psychology*, *33*(1), 25–37. https://doi.org/10.1007/s10802-005-0931-2

Stocker, C. M., Burwell, R. A., & Briggs, M. L. (2002). Sibling conflict in middle childhood predicts children's adjustment in early adolescence. *Journal of Family Psychology*, *16*(1), 50–57. https://doi.org/10.1037/0893-3200.16.1.50

Stormshak, E. A., Bullock, B. M., & Falkenstein, C. A. (2009). Harnessing the power of sibling relationships as a tool for optimizing social-emotional development. *New Directions for Child and Adolescent Development*, *2009*(126), 61–77. https://doi.org/10.1002/CAD.257

Teti, D. M., & Fosco, G. M. (2021). New conceptualizations and directions in the study of family context. *Journal of Family Psychology*, *35*(2), 123–127. https://doi.org/10.1037/fam0000816

Thompson, A. J., Tully, E. C., & Henrich, C. C. (2025). Bidirectional associations between responsive parenting and children's internalizing problems and moderation by negative

emotionality. *Journal of Family Psychology*, *39*(3), 298–307. https://doi.org/10.1037/fam0001291

Tippett, N., & Wolke, D. (2015). Aggression between siblings: Associations with the home environment and peer bullying. *Aggressive Behavior*, *41*(1), 14–24. https://doi.org/10.1002/ab.21557

Toseeb, U., McChesney, G., Oldfield, J., & Wolke, D. (2020). Sibling bullying in middle childhood is associated with psychosocial difficulties in early adolescence: The case of individuals with autism spectrum disorder. *Journal of Autism and Developmental Disorders*, *50*(5), 1457–1469. https://doi.org/10.1007/s10803-019-04116-8

Tucker, C. J., Finkelhor, D., Turner, H., & Shattuck, A. (2013). Association of sibling aggression with child and adolescent mental health. *Pediatrics*, *132*(1), 79–84. https://doi.org/10.1542/peds.2012-3801

Tucker, C. J., & Kazura, K. (2013). Parental responses to school-aged children's sibling conflict. *Journal of Child and Family Studies*, *22*(5), 737–745. https://doi.org/10.1007/s10826-013-9741-2

Ungar, M., & Theron, L. (2020). Resilience and mental health: how multisystemic processes contribute to positive outcomes. *The Lancet Psychiatry*, *7*(5), 441–448. https://doi.org/10.1016/S2215-0366(19)30434-1

van Aar, J., Leijten, P., Orobio de Castro, B., & Overbeek, G. (2017). Sustained, fade-out or sleeper effects? A systematic review and meta-analysis of parenting interventions for disruptive child behavior. *Clinical Psychology Review*, *51*, 153–163. https://doi.org/10.1016/j.cpr.2016.11.006

Van Aar, J., Leijten, P., Orobio De Castro, B., Weeland, J., Matthys, W., Chhangur, R., & Overbeek, G. (2019). Families who benefit and families who do not: Integrating person- and variable-centered analyses of parenting intervention responses. *Journal of the*

American Academy of Child & Adolescent Psychiatry, *58*(10), 993–1003. https://doi.org/10.1016/j.jaac.2019.02.004

Van Harmelen, A. L., Blakemore, S. J., Goodyer, I. M., & Kievit, R. A. (2021). The interplay between adolescent friendship quality and resilient functioning following childhood and adolescent adversity. *Adversity and Resilience Science*, *21*(1), 37–50. https://doi.org/https://doi.org/10.1007/s42844-020-00043-4

van Harmelen, A. L., de Jong, P. J., Glashouwer, K. A., Spinhoven, P., Penninx, B. W. J. H., & Elzinga, B. M. (2010). Child abuse and negative explicit and automatic self-associations: The cognitive scars of emotional maltreatment. *Behaviour Research and Therapy*, *48*(6), 486–494. https://doi.org/10.1016/j.brat.2010.02.003

van Harmelen, A. L., Gibson, J. L., St Clair, M. C., Owens, M., Brodbeck, J., Dunn, V., Lewis, G., Croudace, T., Jones, P. B., Kievit, R. A., & Goodyer, I. M. (2016). Friendships and family support reduce subsequent depressive symptoms in at-risk adolescents. *PLoS ONE*, *11*(5), e0153715. https://doi.org/10.1371/journal.pone.0153715

Van Harmelen, A. L., Kievit, R. A., Ioannidis, K., Neufeld, S., Jones, P. B., Bullmore, E., Dolan, R., Fonagy, P., & Goodyer, I. (2017). Adolescent friendships predict later resilient functioning across psychosocial domains in a healthy community cohort. *Psychological Medicine*, *47*(13), 2312–2322. https://doi.org/10.1017/S0033291717000836

Vanderbilt-Adriance, E., & Shaw, D. S. (2008). Conceptualizing and re-evaluating resilience across levels of risk, time, and domains of competence. *Clinical Child and Family Psychology Review*, *11*, 30–58. https://doi.org/10.1007/s10567-008-0031-2

Viding, E., McCrory, E., Baskin-Sommers, A., De Brito, S., & Frick, P. (2024). An 'embedded brain' approach to understanding antisocial behaviour. *Trends in Cognitive Sciences*, *28*(2), 159–171. https://doi.org/10.1016/j.tics.2023.08.013

von Hippel, P. T., & Schuetze, B. A. (2025). How not to fool ourselves about heterogeneity of treatment effects. *Advances in Methods and Practices in Psychological Science*, *8*(2), 1–30. https://doi.org/10.1177/25152459241304347

Waller, R. E., Verona, E., Lynam, D. R., & Miller, J. D. (2025). Who, how, and when? New perspectives on longstanding issues in the study of externalizing psychopathology. *Personality Disorders: Theory, Research, and Treatment*, *16*(1), 1–7. https://doi.org/10.1037/per0000715

Webster-Stratton, C. (2015). The Incredible Years® series: A developmental approach. In M. J. Van Ryzin, K. L. Kumpfer, G. M. Fosco, & M. T. Greenberg (Eds.), *Family-based prevention programs for children and adolescents: Theory, research, and large-scale dissemination* (pp. 42–67). Psychology Press.

Webster-Stratton, C., & Reid, J. M. (2004). Strengthening social and emotional competence in young children-the foundation for early school readiness and success. *Infants and Young Children*, *17*(2), 96–113. http://dx.doi.org/10.1097/00001163-200404000-00002

Webster-Stratton, C., Reid, M. J., & Hammond, M. (2004). Treating children with early-onset conduct problems: Intervention outcomes for parent, child, and teacher training. *Journal of Clinical Child and Adolescent Psychology*, *33*(1), 105–124. https://doi.org/10.1207/S15374424JCCP3301_11

Weeland, J., Chhangur, R. R., Van Der Giessen, D., Matthys, W., Orobio De Castro, B., & Overbeek, G. (2017). Intervention effectiveness of the Incredible Years: New insights into sociodemographic and intervention-based moderators. *Behaviour Therapy*, *48*(1), 1–18. https://doi.org/10.1016/j.beth.2016.08.002

Weeland, J., Helmerhorst, K. O. W., & Lucassen, N. (2021). Understanding differential effectiveness of behavioral parent training from a family systems perspective: Families

are greater than “Some of Their Parts.” *Journal of Family Theory and Review*, *13*(1), 34–57. https://doi.org/10.1111/jftr.12408

Weisz, J. R., & Kazdin, A. E. (2017). *Evidence-based psychotherapies for children and adolescents*. Guildford Press.

Whiteman, S. D., McHale, S. M., & Soli, A. (2011). Theoretical perspectives on sibling relationships. *Journal of Family Theory & Review*, *3*(2), 124–139. https://doi.org/10.1111/j.1756-2589.2011.00087.x

Williams, M. E., Hastings, R. P., & Hutchings, J. (2020). The Incredible Years Autism Spectrum and Language Delays parent program: A pragmatic, feasibility randomized controlled trial. *Autism Research*, *13*(6), 1011–1022. https://doi.org/10.1002/aur.2265

Wiltz, N. A., & Patterson, G. R. (1974). An evaluation of parent training procedures designed to alter inappropriate aggressive behavior of boys. *Behavior Therapy*, *5*, 215–221. https://psycnet.apa.org/doi/10.1016/S0005-7894(74)80137-1

Wolke, D., Tippett, N., & Dantchev, S. (2015). Bullying in the family: Sibling bullying. *Lancet Psychiatry*, *2*(10), 917–946. https://doi.org/10.1016/s2215-0366(15)00262-x

Wolke, D., Waylen, A., Samara, M., Steer, C., Goodman, R., Ford, T., & Lamberts, K. (2009). Selective drop-out in longitudinal studies and non-biased prediction of behaviour disorders. *British Journal of Psychiatry*, *195*(3), 249–256. https://doi.org/10.1192/bjp.bp.108.053751

Woodward, L. J., & Fergusson, D. M. (1999). Childhood Peer Relationship Problems and Psychosocial Adjustment in Late Adolescence. *Journal of Abnormal Child Psychology*, *27*, 87–104. https://doi.org/10.1023/a:1022618608802

World Health Organization (WHO), V. and I. P. T. & G. F. for H. R. (1999). *Report of the consultation on child abuse prevention*. https://iris.who.int/handle/10665/65900

Wright, J., Small, N., Raynor, P., Tuffnell, D., Bhopal, R., Cameron, N., Fairley, L., A Lawlor, D., Parslow, R., Petherick, E. S., Pickett, K. E., Waiblinger, D., & West, J. (2013). Cohort profile: The Born in Bradford multi-ethnic family cohort study. *International Journal of Epidemiology*, *42*(4), 978–991. https://doi.org/10.1093/ije/dys112

Yang, Y., Fang, F., Arnberg, F. K., Kuja-Halkola, R., D'Onofrio, B. M., Larsson, H., Brikell, I., Chang, Z., Andreassen, O. A., Lichtenstein, P., Valdimarsdóttir, U. A., & Lu, D. (2024). Sex differences in clinically diagnosed psychiatric disorders over the lifespan: A nationwide register-based study in Sweden. *The Lancet Regional Health - Europe*, *47*. https://doi.org/10.1016/j.lanepe.2024.101105

Yeh, H.-C., & Lempers, J. D. (2004). Perceived sibling relationships and adolescent development. *Journal of Youth and Adolescence*, *33*(2), 133–147. https://doi.org/10.1023/B:JOYO.0000013425.86424.0f

Yelland, I., & Daley, D. (2009). Expressed emotion in children: Associations with sibling relationships. *Child: Care, Health and Development*, *35*(4), 568–577. https://doi.org/10.1111/j.1365-2214.2009.00958.x

Zane, S. N., Welsh, B. C., & Zimmerman, G. M. (2016). Examining the iatrogenic effects of the Cambridge-Somerville Youth Study: Existing explanations and new appraisals. *British Journal of Criminology*, *56*(1), 141–160. https://doi.org/10.1093/bjc/azv033

Zemp, M., Friedrich, A. S., Schirl, J., Dantchev, S., Voracek, M., & Tran, U. S. (2021). A systematic review and meta-analysis of the associations between interparental and sibling relationships: Positive or negative? *PLoS ONE*, *16*(9). https://doi.org/10.1371/journal.pone.0257874

Zemp, M., Nussbeck, F. W., Cummings, E. M., & Bodenmann, G. (2017). The spillover of child-related stress into parents' relationship mediated by couple communication. *Family Relations*, *66*(2), 317–330. https://doi.org/10.1111/fare.12244

Appendix A Sample and study variables (Chapter 3)

Table A.1 Comparing baseline variables in the analytic and excluded sample

Variable	Analytic sample (*N* = 6, 518), % or *M, SD*	Excluded sample (*N* = 7, 429), % or *M, SD*	*p* value
Child factors			
Gender (male)	49.19	53.74	<.001
Ethnicity (White)	96.39	93.30	<.001
Family factors			
Maternal age at delivery (years)	29.22 (4.49)	26.91 (5.11)	<.001
Maternal education (< O-levels)	17.99	34.01	<.001
Paternal education (< O-levels)	22.36	32.93	<.001
Household social class (low)	15.18	25.71	<.001
Maternal homeownership status (mortgaged/owned)	84.23	62.85	<.001
Maternal depression	6.34 (4.58)	7.53 (5.07)	<.001
Paternal depression	4.01 (3.77)	4.48 (4.11)	<.001
Maternal anxiety	4.67 (3.41)	5.19 (3.66)	<.001

Note. Maternal and paternal education- O-levels ("Ordinary level" exams obtained by UK students at age 16).

Maternal and paternal depression assessed using the Edinburgh Postnatal Depression Scale.

Maternal anxiety assessed using the anxiety items from the Crown-Crisp Experiential Index.

Appendix A (Chapter 3)

Table A.2 Distribution of maltreatment cumulative scores

Maltreatment score	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**>8[a]**
n	5732	422	164	84	46	32	21	5	7	5
%	87.90	6.47	2.52	1.29	0.71	0.49	0.32	0.08	0.11	0.08

Note. Range is 0-12, higher score indicates higher instances of reported maltreatment

N = 6, 518

[a] Cell categories were collapsed for scores of 9–12, due to the low cell counts, in line with ALSPAC's publication guidelines.

Appendix A (Chapter 3)

Table A.3 Association between degree of maltreatment exposure and emotional and behavioural problems

Variable	Standardised Beta value	95% confidence interval	*p* value
Emotional problems			
T1	0.12	0.10, 0.15	<.001
T2	0.11	0.09, 0.14	<.001
T3	0.10	0.08, 0.13	<.001
T4	0.12	0.09, 0.15	<.001
T5	0.14	0.11, 0.17	<.001
Behavioural problems			
T1	0.09	0.07, 0.11	<.001
T2	0.11	0.08, 0.13	<.001
T3	0.10	0.08, 0.13	<.001
T4	0.11	0.08, 0.14	<.001
T5	0.10	0.07, 0.13	<.001

Note. For both emotional and behavioural problems, a positive regression coefficient indicates that greater exposure to maltreatment (i.e., a higher cumulative score) is associated with increased emotional/ behavioural problems

Appendix A (Chapter 3)

Table A.4 Trajectory variable descriptive statistics

Variable	*N*	*M, SD*	Range
Emotional resilience[a]			
T1	5976	0, 1	-5.15, 2.28
T2	5984	0, 1	-4.96, 1.88
T3	5747	0, 1	-5.05, 2.03
T4	5557	0, 1	-5.11, 2.19
T5	4617	0, 1	-4.69, 2.41
Behavioural resilience[a]			
T1	5961	0, 1	-4.42, 2.40
T2	5972	0, 1	-4.85, 2.53
T3	5741	0, 1	-5.21, 2.09
T4	5548	0, 1	-4.77, 2.02
T5	4617	0, 1	-4.83, 2.32
Friendship support			
T1	5726	11.58 (2.38)	0, 15
T2	6118	12.58 (1.85)	2, 15
T3	5767	12.35 (1.90)	0, 15
T4	5271	12.97 (1.69)	1.67, 15
T5	3423	12.00 (2.46)	0, 15

Note. M = mean, *SD* = standard deviation.

Emotional and behavioural resilience measures are comprised of residuals scores; a positive value indicates better than expected functioning, and a negative value indicates worse than expected functioning.

Friendship assessed using the Cambridge Hormones and Moods Project Friendship questionnaire, maximum score = 15.

[a] $M = 0$ and $SD = 1$ for all resilience variables because values were scaled in the regressions to generate residuals scores.

Appendix B Post-hoc subgroup analyses (Chapter 3)

Table B.1 Maltreatment descriptive statistics per trajectory group- whole sample

Variable	#1 Lowest resilience and FS (4.7%)	#2 Lower resilience, increasing FS (7.6%)	#3 Lower emotional resilience and FS (12.1%)	#4 Lower behavioural resilience, increasing FS (29.0%)	#5 Highest resilience and FS (46.7%)
Maltreatment cumulative score, *M (SD)*	0.44 (1.16)	0.30 (0.84)	0.26 (0.86)	0.22 (0.77)	0.23 (0.88)
% Maltreated	21.24	16.30	13.10	11.44	10.56
% Physical maltreatment	1.96	1.61	1.15	1.38	0.92
% Emotional maltreatment	13.73	11.27	9.80	7.63	6.68
% Co-occurring	5.56	3.42	2.16	2.44	2.96

Note. M = Mean, *SD* = Standard deviation, FS = Friendship support.

N = 6, 518

Maltreatment cumulative score, possible range = 1–12.

Appendix B (Chapter 3)

Table B.2 Maltreatment descriptive statistics per trajectory group- subsample maltreated children

Variable	#1 Lowest resilience and FS (*n* = 65)	#2 Lower resilience, increasing FS (*n* = 81)	#3 Lower emotional resilience and FS (*n* = 103)	#4 Lower behavioural resilience, increasing FS (*n* = 216)	#5 Highest resilience and FS (*n* = 321)
Maltreatment factors					
Maltreatment cumulative score, *M (SD)*	2.06 (1.73)	1.85 (1.23)	2.02 (1.45)	1.92 (1.40)	2.19 (1.76)
% Physical maltreatment	9.23	9.88	8.74	12.04	8.72
% Emotional maltreatment	64.62	69.14	74.76	66.67	63.24
% Co-occurring	26.15	20.99	16.50	21.30	28.04
Child factors					
Gender (% male)	52.31	65.43	30.10	56.48	46.42
Ethnicity (% White)	96.77	92.41	96.04	95.59	92.83
Birthweight in grams (*M, SD)*	3369.69 (491.70)	3318.29 (442.41)	3471.57 (518.18)	3402.68 (534.39)	3447.47 (503.93)
Family factors					

Variable	#1 Lowest resilience and FS (*n* = 65)	#2 Lower resilience, increasing FS (*n* = 81)	#3 Lower emotional resilience and FS (*n* = 103)	#4 Lower behavioural resilience, increasing FS (*n* = 216)	#5 Highest resilience and FS (*n* = 321)
Maternal age at delivery (years) *(M, SD)*	28.85 (4.82)	29.78 (4.59)	29.75 (4.27)	29.74 (4.79)	30.19 (4.42)
Maternal education (% < O-levels)	33.87	21.79	17.53	15.87	12.29
Paternal education (% < O-levels)	32.73	41.18	27.17	23.16	21.05
Household social class (% low)	19.64	13.64	18.60	18.72	15.27
Maternal homeownership status (% mortgaged/ owned)	68.25	73.75	73.74	77.10	82.37
Maternal depression (*M, SD*)	9.98 (5.12)	10.42 (5.04)	9.02 (5.03)	8.54 (5.06)	7.65 (4.75)
Paternal depression (*M, SD*)	6.49 (4.93)	4.82 (4.57)	4.92 (3.86)	4.48 (3.65)	4.74 (3.92)
Maternal anxiety *(M, SD)*	7.73 (3.64)	7.77 (3.76)	6.40 (3.48)	6.09 (3.74)	5.65 (3.66)
Maternal smoking	30.77	42.50	15.69	25.35	17.55

Variable	#1 Lowest resilience and FS (*n* = 65)	#2 Lower resilience, increasing FS (*n* = 81)	#3 Lower emotional resilience and FS (*n* = 103)	#4 Lower behavioural resilience, increasing FS (*n* = 216)	#5 Highest resilience and FS (*n* = 321)
(% yes)					
Maternal alcohol consumption (% yes)	59.38	76.25	64.36	61.79	62.26

Note. M = Mean, *SD* = Standard deviation, FS = Friendship support.

N = 786

Maltreatment cumulative score, possible range = 1–12.

Maternal and paternal education- O-levels ("Ordinary level" exams obtained by UK students at age 16).

Maternal and paternal depression assessed using the Edinburgh Postnatal Depression Scale.

Maternal anxiety assessed using the anxiety items from the Crown-Crisp Experiential Index.

Appendix C Study sample (Chapter 4)

Table C.1 Comparing child and family characteristics at baseline for those included and excluded from the analytic sample

Variable	Included (*N* = 240)	Excluded (*N* = 138)	*p* value
Child			
Index child gender (% boys)	62.08	64.49	.722
Index child age; *M (SD)*	4.73 (1.44)	4.50 (1.54)	.134
Sibling gender (% boys)	48.84	42.86	.637
Sibling age; *M (SD)*	5.94 (3.15)	4.24 (2.97)	.003**
Index child is the eldest in dyad (%)	40.65	54.29	.184
Index child ECBI conduct problems; *M (SD)*	153.27 (30.25)	154.37 (33.43)	.745
Sibling ECBI conduct problems; *M (SD)*	120.33 (37.46)	/[a]	/[a]
Index child SDQ ADHD symptoms; *M (SD)*	6.19 (2.49)	6.50 (2.35)	.251
Index child SDQ emotional problems; *M (SD)*	3.61 (2.62)	3.81 (2.47)	.499
Family			
Mother main caregiver (%)	97.91	96.38	.576
Age main carer; *M (SD)*	32.50 (6.81)	28.79 (7.05)	<.001***
Depressive symptoms; *M (SD)*	15.93 (11.11)	17.25 (11.38)	.277
Teen parent (%)	12.50	29.63	<.001***
Single parent (%)	37.50	50.00	.024*
Low level of education (%)	51.07	51.52	.999
Low income (%)	63.03	64.49	.862
No employed parent in the household (%)	51.56	51.76	.999
% Ethnic minority	2.56	3.79	.734

Note. *N* = number of participants, *M* = mean, *SD* = standard deviation.

ECBI = Eyberg Child Behavior Inventory, possible range of scores 36–252.

SDQ = Strengths and Difficulties Questionnaire, possible range of scores 0–10.

Low education level refers to the percentage of main caregivers with primary or lower secondary educational status.

[a] / = cannot compute values as data is entirely missing for these variables (i.e., sibling ECBI is missing in the excluded sample)

***$p < .001$; ** $p < .01$; * $p < .05$.

Appendix C Study sample (Chapter 4)

Table C.2 Overview of child and family characteristics at baseline

Variable	*n*	Intervention (*N* = 165)	Control (*N* = 75)	*p* value
Child				
Index child gender (% boys)	240	58.79	69.33	.156
Index child age; *M (SD)*	240	4.75 (1.41)	4.70 (1.51)	.790
Sibling gender (% boys)	213	44.44	57.97	.089
Sibling age; *M (SD)*	214	6.11 (3.20)	5.57 (3.03)	.242
Index child is eldest in dyad (%)	214	40.00	42.03	.894
Index child ECBI conduct problems; *M (SD)*	240	152.96 (30.24)	153.96 (30.45)	. 812
Sibling ECBI conduct problems; *M (SD)*	218	122.75 (37.66)	115.00 (36.74)	. 158
Index child SDQ ADHD symptoms; *M (SD)*	228	6.03 (2.51)	6.51 (2.42)	.179
Index child SDQ emotional problems; *M (SD)*	234	3.58 (2.66)	3.66 (2.54)	.820
Family				
Mother main caregiver (%)	239	98.18	97.30	.999
Age main carer; *M (SD)*	240	32.62 (6.91)	32.24 (6.63)	.693
Depressive symptoms; *M (SD)*	237	15.93 (11.18)	15.93 (11.04)	.999
Teen parent (%)	240	12.12	13.33	.958
Single parent (%)	240	38.79	34.67	.640
Low level of education (%)	233	51.85	49.30	.828
Low income (%)	238	60.74	68.00	.350

Variable	*n*	Intervention (*N* = 165)	Control (*N* = 75)	*p* value
No employed parent in the household (%)	133	52.87	48.78	.808
% Ethnic minority	234	3.12	1.35	.724

Note. n = number of participants, *M* = mean, *SD* = standard deviation.

ECBI = Eyberg Child Behavior Inventory, possible range of scores 36–252.

SDQ = Strengths and Difficulties Questionnaire, possible range of scores 0–10.

Low education level refers to the percentage of main caregivers with primary or lower secondary educational status.

Appendix D Sensitivity analysis (Chapter 4)

Table D.1 Estimated main effects of Incredible Years on index child and sibling conduct problems, excluding siblings under the age of 2 (*n* = 18) and over the age of 12 (*n* = 6)

Conduct problems:	**Beta value and [95% confidence interval]**	***p* value**
Index child ECBI score	-0.56 [-0.87, -0.26]	<.001***
Sibling ECBI score	-0.07 [-0.36, 0.22]	.627

Note. $N = 190$.

The beta value represents group differences expressed in baseline standard deviations. A negative regression coefficient reflects benefits of the Incredible Years programme.

Each model controlled for children's baseline levels of conduct problems.

Appendix E Sibling and family characteristics (Chapter 4)

Table E.1 Sibling dyad characteristics according to transition class

Variable	Group 1: Control T1 class #1 to T2 class #1	Group 2: Control T1 class #1 to T2 class #2	Group 3: Control T1 class #2 to T2 class #2	Group 4: IY T1 class #1 to T2 class #1	Group 5: IY T1 class #2 to T2 class #1	Group 6: IY T1 class #2 to T2 class #2
Index child age; *M (SD)*	4.61 (1.53)	/	5.24 (1.42)	4.81 (1.43)	4.80 (1.42)	4.37 (1.22)
Sibling age; *M (SD)*	5.35 (2.96)	/	6.87 (3.41)	6.27 (3.24)	6.48 (3.46)	4.97 (2.69)
Age gap between siblings; *M (SD)*	2.84 (1.82)		3.10 (2.74)	3.00 (2.05)	3.13 (1.40)	2.07 (1.32)
Index child is eldest in dyad (%)	43.10	/	40.00	38.98	37.50	47.37
Index child gender (% male)	69.35	/	66.77	58.53	62.50	59.09
Sibling gender (% male)	56.90	/	60.00	42.37	62.50	50.00
Sibling dyad same gender (%)	46.55	/	60.00	47.46	50.00	50.00
Index child ADHD symptoms; *M (SD)*	6.31 (2.42)	/	7.39 (2.36)	6.01 (2.55)	6.12 (2.53)	6.14 (2.42)

Variable	Group 1: Control T1 class #1 to T2 class #1	Group 2: Control T1 class #1 to T2 class #2	Group 3: Control T1 class #2 to T2 class #2	Group 4: IY T1 class #1 to T2 class #1	Group 5: IY T1 class #2 to T2 class #1	Group 6: IY T1 class #2 to T2 class #2
Index child emotional problems; *M (SD)*	3.46 (2.53)	/	4.32 (2.36)	3.33 (2.56)	4.12 (3.18)	4.84 (2.76)

Note. No descriptives computed for group 2 due to the very low number of families in this transition pattern.

M = mean, *SD* = standard deviation.

SDQ = Strengths and Difficulties Questionnaire, possible range of scores 0–10.

Group 1: Control (60 families)- Moves from class at baseline where the index child has moderate clinical levels of conduct problems and sibling non-clinical levels, to a posttest class where both children have non-clinical levels of conduct problems.

Group 2: Control (2 families)- Moves from class at baseline where the index child has moderate clinical levels of conduct problems and sibling non-clinical levels, to a posttest class where the index child has moderate clinical levels of conduct problems and sibling severe clinical levels.

Group 3: Control (13 families)- Moves from a class at baseline where both siblings have severe clinical levels of conduct problems, to a posttest class where the index child has moderate clinical levels of conduct problems and sibling severe clinical levels.

Group 4: Intervention (130 families)- Moves from class at baseline where the index child has moderate clinical levels of conduct problems and sibling non-clinical levels, to a posttest class where both children have non-clinical levels of conduct problems.

Group 5: Intervention (10 families)- Moves from class at baseline where both siblings have severe clinical levels of conduct problems, to a posttest class where both children have non-clinical levels of conduct problems.

Group 6: Intervention (25 families)- Moves from class at baseline where both siblings have severe clinical levels of conduct problems, to a posttest class where the index child has moderate clinical levels of conduct problems and sibling severe clinical levels.

Appendix E (Chapter 4)

Table E.2 Family characteristics according to transition class

Variable	Group 1: Control T1 class #1 to T2 class #1	Group 2: Control T1 class #1 to T2 class #2	Group 3: Control T1 class #2 to T2 class #2	Group 4: IY T1 class #1 to T2 class #1	Group 5: IY T1 class #2 to T2 class #1	Group 6: IY T1 class #2 to T2 class #2
Absolute number of IY sessions attended	/	/	/	7.90 (4.59)	10.12 (3.98)	6.86 (4.87)
Mother main caregiver (%)	100.00	/	100.00	100.00	100.00	100.00
Age of main carer; *M (SD)*	32.03 (6.60)	/	33.67 (7.10)	32.80 (6.92)	34.88 (9.14)	30.68 (5.83)
Depressive symptoms; *M (SD)*	14.05 (9.74)	/	24.92 (13.41)	14.37 (10.56)	23.25 (14.31)	22.70 (10.52)
Teen parent (%)	1.64	/	8.33	1.48	0.00	4.55
Single parent (%)	33.87	/	41.67	37.78	37.50	45.45
Low level of education (%)	44.83	/	66.67	48.48	62.50	68.18
Low income (%)	64.52	/	83.33	58.65	62.50	72.73

Variable	Group 1: Control T1 class #1 to T2 class #1	Group 2: Control T1 class #1 to T2 class #2	Group 3: Control T1 class #2 to T2 class #2	Group 4: IY T1 class #1 to T2 class #1	Group 5: IY T1 class #2 to T2 class #1	Group 6: IY T1 class #2 to T2 class #2
No employed parent in the household (%)	44.12	/	71.43	50.00	40.00	87.50
% Ethnic minority	1.64	/	0.00	3.85	0.00	0.00

Note. No descriptives computed for group 2 due to the very low number of families in this transition pattern.

M = mean, *SD* = standard deviation.

SDQ = Strengths and Difficulties Questionnaire, possible range of scores 0–10.

Depressive symptoms measured using the Beck Depression Inventory, possible range of scores 0–63.

Low education level refers to the percentage of main caregivers with primary or lower secondary educational status.

Group 1: Control (60 families)- Moves from class at baseline where the index child has moderate clinical levels of conduct problems and sibling non-clinical levels, to a posttest class where both children have non-clinical levels of conduct problems.

Group 2: Control (2 families)- Moves from class at baseline where the index child has moderate clinical levels of conduct problems and sibling non-clinical levels, to a posttest class where the index child has moderate clinical levels of conduct problems and sibling severe clinical levels.

Group 3: Control (13 families)- Moves from a class at baseline where both siblings have severe clinical levels of conduct problems, to a posttest class where the index child has moderate clinical levels of conduct problems and sibling severe clinical levels.

Group 4: Intervention (130 families)- Moves from class at baseline where the index child has moderate clinical levels of conduct problems and sibling non-clinical levels, to a posttest class where both children have non-clinical levels of conduct problems.

Group 5: Intervention (10 families)- Moves from class at baseline where both siblings have severe clinical levels of conduct problems, to a posttest class where both children have non-clinical levels of conduct problems.

Group 6: Intervention (25 families)- Moves from class at baseline where both siblings have severe clinical levels of conduct problems, to a posttest class where the index child has moderate clinical levels of conduct problems and sibling severe clinical levels.

Appendix F Study sample and variables (Chapter 5)

Table F.1 Effect sizes for differences between intervention and control conditions at baseline, per trial

Variable	#1	# 2	#3	# 4	#5	# 6	# 7	# 8	# 9	# 10	# 11	#12
Child factors												
Child age	0.34	0.14	0.23	0.13	0.12	0.06	0.10	0.20	0.12	0.31**	0.08	0.00
ECBI score[a]	0.08	0.23	0.11	0.02	0.27	0.52*	0.02	0.08	0.16	0.18	0.03	0.19
Family factors												
Age of main carer	0.18	0.02	0.07	0.21	0.08	0.22	0.04	0.29	0.06	0.31**	0.14	0.03
Single parent	0.04	0.10	0.03	0.04	0.04	0.31	0.01	0.17	0.04	0.04	0.14	0.13
Low education level	0.05	0.22	0.02	0.22	0.23	0.03	0.13	0.03	0.04	0.03	0.11	0.04
BDI[b]	0.22	0.21	0.04	0.39	0.11	0.16	/	0.00	0.24	0.17	0.04	/

Note. [a] ECBI conduct problem score excluding conflict items.

[b] BDI measure of parental depressive symptoms.

Refers to the trial number.

Baseline characteristics included in the table are those identified as differing significantly between conditions in the pooled dataset sample.

Differences between conditions expressed using Cohen's d.

Asterisks indicate a significant difference between the intervention and control conditions for a baseline variable: ** $p < .01$, * $p < .05$.

ECBI= Eyberg Child Behavior Inventory, for this study the nine items measuring children's conflict with others were excluded, as these form the interpersonal conflict measures used in this study.

Depressive symptoms measured using the Beck Depression Inventory (trials 7 and 12 did not collect data on caregiver depressive symptoms).

Low education refers to main caregivers with primary or lower secondary educational status.

Appendix F (Chapter 5)

Table F.2 Overview of child and family characteristics at baseline

Variable	k	*n*	Intervention (*N* = 854)	Control (*N* = 555)	*p* value
Child					
Gender (% boys)	12	1409	61.36	60.00	.649
Age; *M (SD)*	12	1403	5.38 (1.61)	5.76 (1.45)	<.001***
Children's conflict:					
With parents; *M (SD)*	12	1409	3.90 (1.31)	3.80 (1.24)	.180
With siblings *M (SD)*	12	1401	3.85 (1.80)	3.81 (1.75)	.657
With peers; *M (SD)*	12	1409	2.86 (1.47)	2.82 (1.36)	.596
ECBI conduct problems; *M (SD)*	12	1399	104.97 (25.47)	101.24 (24.35)	.007**
SDQ ADHD symptoms; *M (SD)*	10	1308	5.63 (2.51)	5.74 (2.63)	.447
SDQ emotional problems; *M (SD)*	10	1174	3.36 (2.52)	3.11 (2.45)	.102
Family					
Mother main caregiver (%)	12	1402	97.18	95.83	.225
Age main carer; *M (SD)*	12	1371	34.23 (6.75)	35.37 (6.44)	.002**
Depressive symptoms; *M (SD)*	10	838	12.62 (11.26)	9.14 (9.38)	<.001***
Teen parent (%)	12	1371	9.27	6.98	.164
Single parent (%)	12	1387	31.00	25.32	.026*
Low level of education (%)	12	1353	33.62	26.81	.010*
Low income (%)	11	1015	59.06	60.62	.678
No employed parent in the household (%)	9	824	38.51	32.32	.082
% Ethnic minority	12	1396	30.07	30.84	.806

Note. k = number of trials contributing data, *n* = number of participants, *M* = mean, *SD* = standard deviation.

ECBI = Eyberg Child Behavior Inventory, for this study the nine items measuring children's conflict with others were excluded, as these are reflected in the conflict measures created in this study, therefore the possible range of scores (27–189) for this item is lower than for the complete ECBI (36–252).

SDQ = Strengths and Difficulties Questionnaire, possible range of scores 0–10.

Conflict measures were created for this study, from the mean of ECBI items which assess children's levels of conflict with others, possible range of scores 1–7.

Depressive symptoms measured using the Beck Depression Inventory, possible range of scores 0–63.

Low education level refers to the percentage of main caregivers with primary or lower secondary educational status.

***$p < .001$; **$p < .01$; *$p < .05$.

Appendix F (Chapter 5)

Table F.3 Comparing baseline variables for the included vs excluded sample

Variable	Included (*N* = 1, 409)	Excluded (*N* = 408)	*p* value
Child			
Gender (% boys)	60.82	57.82	.303
Age; *M (SD)*	5.53 (1.56)	5.36 (1.40)	.055
Children's conflict:			
With parents; *M (SD)*	3.87 (1.28)	3.76 (1.42)	.292
With siblings *M (SD)*	3.83 (1.78)	3.96 (1.86)	.325
With peers; *M (SD)*	2.84 (1.43)	2.78 (1.53)	.543
ECBI conduct problems; *M (SD)*	103.50 (25.09)	99.23 (26.84)	.018*
SDQ ADHD symptoms; *M (SD)*	5.68 (2.56)	5.29 (2.47)	.013*
SDQ emotional problems; *M (SD)*	3.26 (2.49)	3.06 (2.57)	.222
Family			
Mother main caregiver (%)	96.65	97.01	.843
Age main carer; *M (SD)*	34.67 (6.65)	31.65 (6.31)	<.001***
Depressive symptoms; *M (SD)*	11.38 (10.75)	10.98 (10.48)	.573
Teen parent (%)	8.39	14.17	.001**
Single parent (%)	28.77	36.80	.003**
Low level of education (%)	30.97	45.40	<.001***
Low income (%)	59.61	71.66	<.001***
No employed parent in the household (%)	36.04	43.36	.053
% Ethnic minority	30.37	40.25	<.001***

Note. Included data= <30% missingness on ECBI interpersonal conflict items at either baseline or follow-up, Excluded data= >30% missingness on these items at either timepoint. *M* = mean, *SD* = standard deviation.

ECBI = Eyberg Child Behavior Inventory, for this study the nine items measuring children's conflict with others were excluded, as these are reflected in the conflict measures created in this study, therefore the possible range of scores (27–189) for this item is lower than for the complete ECBI (36–252).

SDQ = Strengths and Difficulties Questionnaire, possible range of scores 0–10.

Conflict measures were created for this study, from the mean of ECBI items which assess children's levels of conflict with others, possible range of scores 1–7.

Depressive symptoms measured using the Beck Depression Inventory, possible range of scores 0–63.

Low education level refers to the percentage of main caregivers with primary or lower secondary educational status.

***$p < .001$; **$p < .01$; *$p < .05$.

Appendix F (Chapter 5)

Table F.4 Estimated effects of Incredible Years on children's levels of conflict, excluding outliers

Interpersonal conflict:	**Beta value and [95% confidence interval][a]**	***p* value**	**ICC[b]**
Children's conflict:			
with Parents	-0.23 [-0.32, -0.13]	<.001***	0.022
with Siblings	-0.01 [-0.15, 0.12]	.859	0.003
with Peers	-0.09 [-0.19, 0.02]	.116	0.043

Note. Using complete case responses, n = 1, 278.

All models controlled for children's baseline levels of conflict with parents, siblings, and peers, and also the following variables which were identified in the starting sample as differing significantly between the intervention and control conditions: child age; child ECBI score (excluding conflict items); age of parent; educational level of the parent; and single parent status.

[a] The beta value represents group differences expressed in baseline standard deviations. For all outcomes, a negative regression coefficient reflects benefits of the Incredible Years programme.

[b] ICC= Intraclass Correlation Coefficient, values closer to 0 indicates that there is relatively little variation between trials in terms of children's levels of conflict, most variation is between individuals.

***p < .001.

Appendix G Sensitivity analyses: parental depression measure (Chapter 5)

Table G.1 Comparing full sample to a filtered sample with a measure of parental depressive symptoms at baseline

Variable	Full sample (*N* = 1, 409)	Sample with BDI at baseline (*N* = 838)	*p* value
Child			
Gender (% boys)	60.82	62.77	.383
Age; *M (SD)*	5.53 (1.56)	5.53 (1.52)	.979
Children's conflict:			
With parents; *M (SD)*	3.86 (1.28)	3.88 (1.38)	.711
With siblings *M (SD)*	3.83 (1.78)	4.01 (1.81)	.023*
With peers; *M (SD)*	2.84 (1.43)	2.94 (1.50)	.132
ECBI conduct problems; *M (SD)*	103.50 (25.09)	103.56 (27.42)	.958
SDQ ADHD symptoms; *M (SD)*	5.68 (2.56)	5.71 (2.70)	.761
SDQ emotional problems; *M (SD)*	3.26 (2.49)	3.13 (2.39)	.273
Family			
Mother main caregiver (%)	96.65	98.08	.065
Age main carer; *M (SD)*	34.67 (6.65)	33.95 (6.75)	.016*
Teen parent (%)	8.39	9.80	.298
Single parent (%)	28.77	35.41	.001**
Low level of education (%)	30.97	37.72	.002**
Low income (%)	59.61	58.69	.729
No employed parent in the household (%)	36.04	33.28	.300

Variable	Full sample (*N* = 1, 409)	Sample with BDI at baseline (*N* = 838)	*p* value
% Ethnic minority	30.37	27.69	.196

Note. M = mean, *SD* = standard deviation.

BDI = Beck Depression Inventory measure of parental depressive symptoms

ECBI = Eyberg Child Behavior Inventory, for this study the nine items measuring children's conflict with others were excluded as these are reflected in the conflict measures created in this study, therefore the possible range of scores (27–189) for this item is lower than for the complete ECBI (36–252).

SDQ = Strengths and Difficulties Questionnaire, possible range of scores 0–10.

Conflict measures were created for this study, from the mean of ECBI items which assess children's levels of conflict with others, possible range of scores 1–7.

Low education level refers to the percentage of main caregivers with primary or lower secondary educational status.

***$p < .001$; **$p < .01$; *$p < .05$.

Appendix G (Chapter 5)

Table G.2 Overview of child and family characteristics at baseline in sample filtering for those with parental depressive symptoms measure at baseline

Variable	k	n	Intervention (*N* = 539)	Control (*N* = 299)	*p* value
Child					
Gender (% boys)	10	838	62.34	63.55	.649
Age; *M (SD)*	10	834	5.40 (1.59)	5.76 (1.35)	<.001***
Children's conflict:					
With parents; *M (SD)*	10	838	3.89 (1.39)	3.87 (1.37)	.180
With siblings *M (SD)*	10	834	3.86 (1.81)	4.11 (1.81)	.657
With peers; *M (SD)*	10	838	2.93 (1.53)	2.95 (1.47)	.596
ECBI conduct problems; *M (SD)*	10	833	104.96 (25.20)	101.06 (27.68)	.007**
SDQ ADHD symptoms; *M (SD)*	8	742	5.64 (2.62)	5.84 (2.83)	.447
SDQ emotional problems; *M (SD)*	8	623	3.20 (2.41)	3.00 (2.35)	.102
Family					
Mother main caregiver (%)	10	833	98.51	97.30	.339
Age main carer; *M (SD)*	10	804	33.63 (6.78)	34.57 (6.65)	.058
Depressive symptoms; *M (SD)*	10	838	12.62 (11.26)	9.14 (9.38)	<.001***
Teen parent (%)	10	806	10.36	8.73	.540
Single parent (%)	10	819	36.04	34.26	.665
Low level of education (%)	10	790	38.49	36.26	.591
Low income (%)	10	811	58.22	59.57	.766
No employed parent in the household (%)	8	595	35.64	30.00	.166

Variable	k	n	Intervention (*N* = 539)	Control (*N* = 299)	*p* value
% Ethnic minority	10	827	26.78	29.35	.478

Note. k = number of trials contributing data, note that the maximum number of trials contributing data for this sample is 10 (compared to 12 trials in the full sample) as trial 7 and 10 had no measure of parental depression.

n = number of participants, note that the maximum number of participants in this sample is 838.

M = mean, *SD* = standard deviation.

BDI = Beck Depression Inventory, measure of parental depressive symptoms

ECBI = Eyberg Child Behavior Inventory, for this study the nine items measuring children's conflict with others were excluded, as these are reflected in the conflict measures created in this study, therefore the possible range of scores (27–189) for this item is lower than for the complete ECBI (36–252).

SDQ = Strengths and Difficulties Questionnaire, possible range of scores 0–10.

Conflict measures were created for this study, from the mean of ECBI items which assess children's levels of conflict with others, possible range of scores 1–7.

Depressive symptoms measured using the Beck Depression Inventory, possible range of scores 0–63.

Low education level refers to the percentage of main caregivers with primary or lower secondary educational status.

***$p < .001$; **$p < .01$; *$p < .05$.

Appendix G (Chapter 5)

Table G.3 Estimated effects of Incredible Years on children's levels of conflict for sample with parental depressive symptoms measures

Interpersonal conflict:	**Beta value and [95% confidence interval][a]**	***p* value**	**ICC[b]**
Children's conflict:			
with Parents	-0.22 [-0.34, -0.09]	<.001***	0.001
with Siblings	-0.08 [-0.26, 0.10]	.374	0.006
with Peers	-0.06 [-0.21, 0.09]	.457	0.021

Note. Using complete case responses, $n = 820$.

[a]The beta value represents group differences expressed in baseline standard deviations. For all outcomes, a negative regression coefficient reflects benefits of the Incredible Years programme.

[b]ICC= Intraclass Correlation Coefficient, values closer to 0 indicates that there is relatively little variation between trials in terms of children's levels of conflict, most variation is between individuals.

All models controlled for children's baseline levels of conflict with parents, siblings, and peers, and also the following variables which were identified in the starting sample as differing significantly between the intervention and control conditions: child age, child ECBI score (excluding conflict items); and parent depressive symptoms (measured using the Beck Depression Inventory.

***p < .001.

Appendix H Post-hoc analyses (Chapter 5)

Table H.1 Estimated effects of Incredible Years on children's levels of conflict, excluding those who answer 'never' to sibling conflict items at both baseline and follow-up

Interpersonal conflict:	Beta value and [95% confidence interval][a]	*p* value	ICC[b]
Children's conflict:			
with Parents	-0.23 [-0.34, -0.12]	<.001***	0.028
with Siblings	-0.11 [-0.25, 0.03]	.121	0.038
with Peers	-0.04 [-0.19, 0.10]	.550	0.050

Note. Using complete case responses, $n = 877$.

All models controlled for children's baseline levels of conflict with parents, siblings, and peers, and also child age and baseline ECBI score (excluding conflict items) as these were identified as differing significantly between intervention and control conditions.

[a] The beta value represents group differences expressed in baseline standard deviations. For all outcomes, a negative regression coefficient reflects benefits of the Incredible Years programme.

[b] ICC= Intraclass Correlation Coefficient, values closer to 0 indicates that there is relatively little variation between trials in terms of children's levels of conflict, most variation is between individuals.

***$p < .001$.