Mechanisms of Resilience for Children of Mothers with Depression

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Abstract

Maternal depression is a common mental health disorder that can have significant adverse effects on child functioning, including increased rates of child behaviour problems. Adopting a resilience approach highlights that despite the increased risk there is considerable variation in child behaviour development, although mechanisms through which this occurs are not well understood.

This thesis investigates positive parenting, harsh parenting, and child inhibitory control as developmentally salient processes that may explain why some children of mothers with depression develop more positive behaviours than others.

Analyses were conducted using data from the Early Steps Multisite Study, a longitudinal randomised controlled trial that includes 731 ethnically diverse families from three sites across the United States. Baseline measures were completed at child age 2, with annual follow-up assessments until age 8. These analyses used mother self-reported depressive symptoms, observed measures of parenting, alternate caregiver-reported child inhibitory control, and mother- and teacher-reported child externalising behaviours. Categorical and continuous variables of maternal depression and child behaviour were tested to explore the implications of different analytic approaches, particularly with reference to the concept of resilience.

Logistic regression results indicate that child inhibitory control is a robust predictor of developmentally normative behaviours for children of mothers with depression and children in general. Linear regression results support a risk-specific effect of harsh parenting, such that it interacts with maternal depression to predict increased externalising behaviours specifically for children of mothers with depression. Positive parenting appears to predict the behaviour of children in general but not the behaviour of children of mothers with depression.

Path analyses indicate that between the ages of 2 and 4, harsh parenting partially mediates the association between maternal depression and child externalising behaviours. Moderated mediation results suggest that children with lower levels of inhibitory control elicit increased harsh parenting behaviours from mothers both with and without depression. Cross-lagged path analyses provide support for reciprocal influence between maternal depression, harsh parenting, and child externalising behaviour, and suggest an impact of maternal depression severity on the establishment of negative patterns of mother-child interactions from age 2.

The findings of this thesis support the importance of reducing harsh parenting behaviours particularly for mothers with depression and of improving child self-regulation from an early age. The concept of resilience as a dimensional and potentially reciprocal process is discussed in the context of maternal depression and child behaviour development. Results emphasise that both mother and child are actively involved in influencing processes of resilience. From early childhood, there is a need to support more adaptive patterns of behaviour between mothers with depression and their children in order to increase the likelihood of positive child outcomes over time.

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Chapter 1: Introduction

1.1 Thesis rationale

Young children of mothers with depression are at an increased risk for a range of adverse outcomes, including behaviour problems (e.g. Avenevoli & Merikangas, 2006; Beardslee, Versage, & Gladstone, 1998; Beck, 1999; Campbell, Morgan-Lopez, Cox, & McLoyd, 2009). Resilience research emphasises that despite this increased risk, there is notable variation in child behaviour development (Garmezy, Masten, & Tellegen, 1984; Luthar, 2003; Rutter, 2007). Mechanisms that might help to explain the variability in behaviours for children of mothers with depression are not well understood (Radke-Yarrow & Klimes-Dougan, 2002; Seifer, 2003). The overarching aim of this thesis is to address this gap in the literature and contribute to an improved understanding of the processes through which more positive behaviours might be promoted for young children of mothers with depression (Rutter, 2012). The interest is not in extraordinary processes or levels of functioning, but in the "ordinariness" of resilience (Masten, 2001). The emphasis is thus on normative functioning of basic systems that are salient in early childhood and that might account for more positive child behaviours despite the experience of early risk (Luthar & Bidwell Zelazo, 2003; Masten & Powell, 2003). Acknowledging that processes of resilience involve more than just the individual child, particularly in early childhood, this thesis investigates different types of parenting behaviours as well as the child's early capacity to self-regulate. Operating from a resilience perspective, the purpose is to investigate the possible role of these developmentally salient processes in promoting more positive behaviours for young children of mothers with depression.

1.2 Resilience

A review of the literature points to the substantial shift in understanding of resilience. What was once understood as a trait-like phenomenon is now conceptualised as a dynamic developmental process that reflects adaptive functioning despite the experience of adversity

(Cicchetti, Rogosch, Lynch, & Holt, 1993; Luthar, 2003; Rutter, 2012; Yates, Egeland, & Sroufe, 2003). Resilience research has a unique starting point that explicitly emphasises the heterogeneity in outcome to similar experiences of risk, highlighting that not all individuals who experience adversity will develop maladaptive outcomes (Garmezy et al., 1984). The aim of resilience research is to explore causal explanations for observed variation in outcome, particularly in terms of processes that are specific to the experience of risk (Roosa, 2000; Rutter, 2006). Drawing on the risk-specific focus of resilience research, this thesis explores whether different types of parenting behaviours and child self-regulation might be differentially predictive of the behaviour development of children of mothers with depression compared to other children.

Rather than directly measuring the construct of resilience, this thesis adopts the perspective that resilience is inferred through the dynamic interplay of risk, intermediary mechanisms, and outcomes (Garmezy, 1981; Luthar & Bidwell Zelazo, 2003; Yates et al., 2003). Particularly in the context of an interpersonal risk factor, it may be that a mother with depression both influences and is influenced by her child. Furthermore, the experience of risk may not be a discrete event but could be an ongoing challenge to child behaviour development. As such, this thesis builds on the traditional resilience research paradigm, which analyses a defined experience of risk discretely preceding a specified outcome, to then explore risk, mechanisms, and outcomes as mutually influential processes over time. The purpose of doing so is to contribute to how resilience as a dynamic process might be understood in the context of behaviour development for young children of mothers with depression, and to explore the role that both mother and child might be playing in actively influencing the nature of processes over time.

1.3 Thesis aims

Previous research has highlighted correlates of child functioning and maternal depression but causal mechanisms are not well understood (Hammen, 2003b; Radke-Yarrow & Klimes-Dougan, 2002). The aim of this thesis is to build on the existing literature to investigate family- and child-level factors that might help to explain why some children of mothers with depression develop more positive behaviours than others. Throughout this thesis, the focus is on positive parenting and harsh parenting behaviours at the family-level, and on self-regulation at the child-level. These three factors are first investigated as potential predictors of child behaviour outcome, to determine whether parenting behaviours and child self-regulation predict more positive behaviours for children in general or differentially for children of mothers with depression. The analyses build in a sequential fashion to then investigate parenting as a potential process through which maternal depression might influence child behaviour outcomes, and whether this indirect effect might vary depending on the child's ability to self-regulate. Mediation and moderated mediation models build on previous research to test theorised associations between constructs from early in child development. The purpose of doing so is to contribute to the understanding of mechanisms of behavioural resilience for young children of mothers with depression.

The primary goal in addressing questions of early child behaviour development in the context of maternal depression is to determine ways through which it might be possible to improve the likelihood of establishing adaptive trajectories of behaviour for these children. The child however is not a passive recipient of effects but is an active agent who influences his or her environment (Bell, 1968; Sameroff, 1975). It is therefore important to address the potential reciprocal influence of the child on his or her mother, both in terms of her parenting behaviours and her mental health (Gross, Shaw, Moilanen, Dishion, & Wilson, 2008; Hammen, Burge, & Stansbury, 1990; Pardini, 2008). The analyses in this thesis are extended to include the investigation of bidirectional effects between maternal depression, parenting, and child

behaviours, and to test whether these effects might vary depending on the child's ability to self-regulate. The overall aim is to better understand the dynamic nature of processes linking maternal depression and child behaviour problems in early childhood. By beginning to disentangle the complex ways in which these factors might be mutually influential, the goal is to more effectively support positive mother-child relationships, thus setting the stage for more positive behaviour development over the long-term.

A review of the resilience literature contributed to shaping the aims of this thesis, in terms of how best to address questions of resilience that build in a logical and sequential fashion, and by raising important methodological and analytical issues. To address the need for improved clarity of constructs and research methodology (Masten & Powell, 2003; Rutter, 2006), this thesis explicitly defines key constructs of risk, adaptation, and protective mechanisms, and specifically details the measurement and operationalization of each. The utility and applicability of constructs is strengthened through the use of measures with well-validated psychometric properties (Achenbach, 1991; Achenbach & Rescorla, 2000; Radloff, 1977). The rigour of operationalization contributes to improved clarity and transparency of resilience-related research. Substantial variation in research methodology also informed the decision to compare theoretical models using categorical and continuous variable analyses. In doing so, not only is a more comprehensive set of results generated but the strengths and limitations of each approach are explicitly addressed. Furthermore, the inclusion of both analytic approaches serves to facilitate a more detailed understanding of how the presence and continuum of risk severity might influence intermediary factors, as well as both the presence and continuum of child externalising behaviours in early development.

1.4 Data

To investigate the aims of this thesis, analyses were conducted using data collected by the Early Steps Multisite Study, an ongoing longitudinal study of a randomised controlled trial of a

family-based intervention (Shaw, Dishion, Gardner & Wilson, 2002-present). The sample is comprised of 731 ethnically diverse families from across three sites in the United States: Eugene, OR (suburban); Pittsburgh, PA (urban); and Charlottesville, VA (rural). Families with a child deemed at-risk for problem behaviour were recruited from a national food supplement programme (WIC: Women, Infants, Children), and were randomised to either the Family Check-Up (FCU) intervention or control condition. The FCU is a brief, three-session intervention based on motivational interviewing theory (Dishion & Kavanagh, 2003; Miller & Rollnick, 2002). Baseline measures were completed when the child was 2 years of age, with follow-up assessments completed on an annual basis. This thesis analyses multi-informant report and observed data for children from ages 2 to 8 years. Permission to access the data to conduct the analyses was granted by the Principal Investigators of the Early Steps project in April, 2010.

The Early Steps data address many of the main limitations raised within the resilience literature as it is a large-scale, longitudinal study with multi-informant measures of the child and family. The findings of this thesis are strengthened by the availability of measures collected on an annual basis, beginning when the child was 2 years of age, enabling the unique investigation of the early onset and development of processes over time. The key parenting mechanisms are measured through the use of observational methods (Jabson, Dishion, Gardner, & Burton, 2004) and early childhood self-regulation is reported by the alternate caregiver (Rothbart, Ahadi, Hershey, & Fisher, 2001). The measurement method of key processes thus addresses the potential reporting bias related to a mother who may have depression, as well as the concerns raised by single informant measurement (Kroes, Veerman, & De Bruyn, 2003; Najman et al., 2000). The final set of analyses includes teacher reports of child externalising behaviour at age 8, thus extending the prediction of child behaviour further in time and across settings, from the home to the school environment (Snyder, Cramer, Afrank, & Patterson, 2005).

1.5 Chapter summaries

The overall structure of this thesis includes a literature review chapter, a methods chapter, three empirical chapters, and a final concluding chapter. Following this chapter, Chapter Two reviews the relevant literature, with a particular focus on the resilience literature. It begins by defining the concept of resilience and the key constructs of risk, adaptation, and resource and protective mechanisms. The different methodological approaches to the study of resilience are also explored. Empirical evidence is then reviewed by risk condition, with a more extensive review of the literature pertaining to maternal depression. Common criticisms and limitations of the resilience approach are also considered. Following the review of resilience, relevant literature is then reviewed for maternal depression, child externalising behaviours, parenting, child self-regulation, and reciprocal effects. The purpose of reviewing the literature was to gain a more in-depth knowledge of the subject matter as well as to direct the aims and rationale of this thesis.

Chapter Three outlines the methods of this thesis. Information from the Early Steps Multisite Study is provided in terms of recruitment, randomisation, retention, and study participants. The measures included in the analyses are then detailed, providing support for their reliability and validity. Important analytic considerations are then made concerning the approaches taken to address missing data and the positively skewed distribution of the harsh parenting variable. The complete analytic strategy that was uniquely developed for this thesis is then presented in detail.

Chapter Four is the first empirical chapter and tests predictors of behavioural resilience. A brief summary introduction is provided followed by the aims and methods of the chapter. Resilience is defined through the clear and explicit operationalization of risk and adaptation. As an important follow-up procedure, the definition of resilience is validated through the use of within-group and between-group comparisons based on previous research (Jaffee, Caspi, Moffit, Polo-Tomas, & Taylor, 2007). The analytic strategy is then outlined for the primary

analyses of the chapter, explaining the inclusion of the categorical and continuous variable approaches. The results for the primary analyses are presented in three sections. These sections address the extent of child behavioural resilience, predictors of behavioural resilience, and the general or risk-specific nature of these predictors. Each section includes results for both the categorical and continuous variable analyses. The discussion section that follows emphasises the interpretation of these results in the context of resilience research, and also addresses the strengths and limitations of the categorical and continuous variable approaches.

Chapter Five builds on the results of Chapter Four to investigate mediation models examining parenting behaviours as potential processes through which maternal depression might influence child behaviour. Moderated mediation models then test whether potential indirect effects of parenting might vary depending on the child's level of self-regulation. Results are presented in two main sections that separately test for indirect effects of positive parenting followed by indirect effects of harsh parenting. Within each section, three models are conducted across two time points. The three models test the following: a mediation effect of parenting in the relation between maternal depression and child externalising behaviour, a moderation effect by child self-regulation on the indirect effect of parenting, and a competing bidirectional model of the effects of child externalising behaviour on maternal depression. The two time periods during which each of these three models are tested are from ages 2 to 4 and from ages 4 to 7.5. The discussion of the results also draws on the results from the preceding chapter to synthesise the findings into a more clear understanding of how these various processes appear to be operating.

Chapter Six combines the mediation models from Chapter Five into a longitudinal model of maternal depression and child externalising behaviours, with lagged effects for positive parenting and harsh parenting. Reciprocal effects are also included, with the full model predicting teacher-reported child externalising behaviour at age 8. The process of model specification and refinement is outlined, and final models are presented that highlight the

bidirectional effects particularly between maternal depression, harsh parenting, and child externalising behaviours over time. The discussion section builds on the interpretations made in the preceding chapters to present a more unified perspective on the possible dynamic links between key constructs from ages 2 to 8.

Chapter Seven is the concluding chapter of this thesis. The main empirical findings are synthesised and conclusions are drawn in light of the discussed limitations. Contributions to the current state of empirical evidence are outlined, and specific implications for the dimensional and reciprocal conceptualisation of resilience. Suggestions are made concerning possible directions for future research.

1.6 Summary

Children of mothers with depression are at an increased risk for adverse effects. By focusing on the variation in behaviour outcomes of these children, the main purpose of this thesis is to better understand the mechanisms involved in promoting more positive behaviour development for these children. Starting with early risk and predictors of child behaviour, moving through to mediating and moderating effects, and then considering the potential for reciprocal influence, the analyses build in a sequential fashion to shed light on how the constructs of maternal depression, positive parenting, harsh parenting, child self-regulation, and child externalising behaviour might be related over time. Theoretically-driven research that explores key processes and how they might operate over time contributes to evidence in the field of resilience research. The aims are to better support mothers with depression in the mental health domain as well as in their role as mothers, and to facilitate more positive behaviour development for their children from an early age, in order to increase the likelihood of adaptive trajectories over time.

Chapter 2: Literature Review

2.1 Resilience

2.1.1 Introduction

The concept of resilience emerged from the field of risk research, as growing evidence pointed to considerable individual variation in outcome in high-risk populations (Garmezy et al., 1984; Luthar & Bidwell Zelazo, 2003; Masten et al., 1999). That certain individuals were doing well despite exposure to severe adversity suggested that insight could be offered into the processes through which adaptive development occurs in the context of risk (Rutter, 2007). In general, risk and resilience research are both concerned with the same fundamental aim of investigating the processes that shape adjustment. The two approaches differ however in the nature of their focus. Risk research is concerned with the processes by which vulnerabilities translate into maladaptive behaviours, starting with a focus on variables and moving to broadly generalizable outcomes. Conversely, resilience research has a unique starting point that explicitly emphasises the heterogeneity in outcome to various risk experiences, highlighting that not all those who experience situations of adversity will develop maladaptive behaviours (Rutter, 2012). The idea is that there is much to be learned from those individuals who experience significant adversity yet go on to live relatively healthy lives. A better understanding of the underlying mechanisms through which such variation is likely to occur can have valuable implications for intervention design, as intervention and prevention programmes try to increase the likelihood of promoting adaptive outcomes over time (Luthar & Bidwell Zelazo, 2003; Rutter, 2006).

Resilience research largely emerged from the empirical literature on offspring of individuals with schizophrenia. Evidence from children of mothers with schizophrenia began to accumulate, suggesting a wide range in outcomes for these children despite the strong heritability of the disorder (Bleuler, 1978; Luthar, Cicchetti, & Becker, 2000a). Such variation in

outcome, and the suggestion that poor outcomes were not inevitable, encouraged researchers to look at other situations of adversity from the perspective of stress resistance (Garmezy et al., 1984). The first major research project with a primary focus on resilience was that of Emmy Werner, conducted in Hawaii in the 1970's (Werner & Smith, 1977). Werner's research with the families on the island of Kauai expanded upon the schizophrenia literature to include risk factors such as parental mental illness more broadly, maltreatment, urban poverty, and community violence. Over time, the study sought to establish differences in trajectories of child outcome and describe the more adaptive patterns of outcomes into adulthood (Werner, 1993).

Early research efforts like the Kauai study focused largely on individual traits and characteristics of the child, such as intelligence and temperament. It was believed at that time that resilience was a trait-like phenomenon, a characteristic that some children possessed and other children lacked (Werner & Smith, 1982). It became increasingly clear however that resilience did not reside entirely within the child (Garmezy et al., 1984; Masten, Best, & Garmezy, 1990). Later research began to include additional variables, such as family factors and environmental influences (Sameroff & Rosenblum, 2006). There was also a shift from the identification of protective factors to the understanding of underlying mechanisms through which change was occurring. These shifts in focus represent important developments of the initial idea of "invulnerable" children (Anthony, 1974), refuting trait-like conceptualisations and beginning to emphasise the dynamic, interrelated nature of resilience as a process over time.

Evolving from earlier research efforts, Masten and colleagues argue that a fourth wave of resilience research is currently being conducted , which is concerned with more complex models of change (Masten & Obradovic, 2006). The first wave was primarily a descriptive approach, and focused on determining a list of important factors that correlated with good

outcomes. The second wave built on this knowledge to investigate the processes and regulatory systems underlying the previously established factors. With an increasing understanding of such mechanisms, the third wave then sought to find ways to promote resilience and improve outcomes through intervention, prevention and policy changes. Finally, the current wave is looking to examine questions of resilience through more sophisticated, multilevel methods of analysis (Masten & Obradovic, 2006). Aligned with the current state of the research, this thesis investigates how processes at the family- and child-level might be interrelated over time to influence early child behaviour development in the context of maternal depression.

2.1.2 Definition

Resilience is a "dynamic developmental process reflecting evidence of positive adaptation despite significant life adversity" (Cicchetti 2003; based on Egeland, Carlson & Sroufe, 1993; Luthar et al., 2000; Masten, 2001). This definition highlights that resilience is not an individual trait but a process reflecting evidence of adaption over time. To label an individual as "resilient" is therefore arguably inappropriate and potentially misleading. Resilience is not a personal attribute, nor does it cause an individual to do well in situations of adversity (Masten & Powell, 2003). Rather, resilience reflects the transactional processes by which individuals acquire and utilise strategies to navigate high risk environments in adaptive ways (Yates et al., 2003).

As a dynamic process, there is consideration for the changing nature of resilience over time. It is not assumed that resilience defines a person in totality or at all points in their life (Masten & Powell, 2003). Individuals with maladaptive outcomes in early childhood are not inevitably bound to experience poor outcomes later in life. Similarly, individuals with adaptive outcomes may nevertheless experience later periods of poorer outcomes, as life presents new risks and challenges to individual capacities and environmental resources. An emphasis on the dynamic

nature of resilience is supported by empirical evidence and has directed the field away from the use of trait-like terms such as “invincibility” or “stress-resistant”, which reflect inaccurate and misleading conceptualisations of resilience (Luthar et al., 2000a). The understanding of resilience as a dynamic process is emphasised throughout this thesis, and becomes all the more evidenced as the analyses build on more conventional research paradigms to investigate the reciprocal nature of effects.

2.1.3 Resilience research methodology

To improve coherence and consistency in the field, it is necessary for resilience-related research to employ clearly defined constructs and methodology (Luthar & Bidwell Zelazo, 2003). Rutter highlights four key considerations for the study of resilience. First, the conceptualisation of resilience must include a clear and severe definition of risk (Rutter, 2006). It is insufficient for resilience to simply reflect adaptive outcomes without an explicit definition of a severe risk condition after which the outcomes occur. Without the inclusion of a sufficiently severe risk, adaptive outcomes reflect normative developmental trajectories that have been relatively unchallenged by experiences of notable adversity (Rutter & Sroufe, 2000).

Second, variations in resilience should not merely reflect variations in risk exposure (Rutter, 2006). That is to say that poorer outcomes should not be accounted for purely by exposure to more severe risk. For example, in the context of child behaviour outcomes and exposure to maternal depression, increased child behaviour problems should not merely be due to exposure to more severe maternal depression. If there is a difference in maternal depression severity between children with adaptive behaviour outcomes compared to children with maladaptive behaviour outcomes, it is necessary to control for the severity of maternal depression.

Third, resilient outcomes should encompass positive adaptation that reflects “good enough” functioning across a range of domains and an extended period of time (Masten, 2001; Rutter,

2006). Outcomes need not reflect outstanding achievements or levels of functioning that are above the expected developmental norm. Rather, resilience is concerned with outcomes that are within or above the expected developmental range (Jenkins, 2008; Masten, 2001). The focal outcome must also be relevant to the risk condition under investigation and account for the possibility that normative functioning in one domain may be accompanied by deficits in another (Jaffee et al., 2007). For example, a focus on child externalising behaviours should also acknowledge the internalising domain, as a child with good behaviour functioning may potentially suffer from notable internalising symptoms. Despite the primary focus of this thesis on child externalising behaviours, additional levels of child functioning across other important domains (e.g., internalising behaviours, social functioning, cognitive ability) are explored to ensure that children do not have poor functioning in other key areas.

Fourth, resilience involves interactive or conditional effects, such that protective mechanisms are specific to the given risk condition (Rutter, 2006). Mechanisms that confer a positive benefit to both risk-exposed and non-exposed children are said to be resource mechanisms (Luthar, 2003). The need for an interactive effect represents a specific definition of resilience that is not unanimously followed in resilience research. Intervention researchers in particular acknowledge the importance of all factors that significantly contribute to improved outcomes, whether the factor is unique to the risk condition or not. Those factors deemed as resource mechanisms may have meaningful effects that should be considered in programme design, regardless of whether the mechanism is specific to the risk condition or not. Interactive effects are explored in this thesis to investigate whether certain mechanisms confer significantly more benefit to children of mothers with depression compared to children of mothers without depression. This is to highlight those processes that are unique to the condition of risk, being mindful that significant main effects may still provide valuable information regarding processes that more generally promote good behaviour outcomes.

2.1.4 Developmental theory

Developmental theory provides the framework for understanding patterns of behaviour within the wider context of human development (Garmezy et al., 1984). It considers the individual as an active agent within a multilevel system, with development influenced by complex interactions between the individual and the various environmental levels within which he or she lives (Masten, 2004; Rutter & Sroufe, 2000). Developmental theory proposes that the "fit" between the individual child and his or her environment is essential to the child's experience of an adaptive trajectory of outcome. When there is good "fit", the impact of risk factors is lessened and the child is better able to utilise the available resources (Wyman, 2003). Acknowledging that the child is actively influencing his or her environment provides the rationale for considering the potential bidirectional effects between mother and child in the final set of analyses. In accounting for the effect that the child's behaviour might be having on the mother's parenting and depressive symptoms, a more conventional understanding of resilience is challenged. Exploring the interactive nature of risk and adaptation encourages the consideration of the potentially reciprocal nature of resilience and the meaning of resilience as a dynamic process in early child development.

An organisational perspective on development views the transactional processes between the child and levels of his or her environment as hierarchically integrative, with earlier developmental outcomes integrated into later patterns of adaptation (Egeland, Carlson, & Sroufe, 1993). The perspective holds that earlier levels of adaptation are not deterministically related to future outcomes. Instead, the emphasis is on the probabilistic nature of the child's developmental history and the influence this might have on future trajectories of outcome (Masten & Tellegen, 2012; Yates et al., 2003). The organisational perspective elaborates on developmental theory to explain how emerging domains and patterns of behaviour come to influence later outcomes. Its utility and relevance for resilience research is noteworthy,

particularly for this thesis given the focus on processes within the mother-child relationship from early in development and their contribution to later child behaviour outcomes in the context of maternal depression. This thesis aims to explore the dynamic nature of child and family-level processes that might help to explain why some young children of mothers with depression develop more positive behaviours than others, to then increase the likelihood of positive trajectories of behaviour over time.

2.1.5 Conceptualisation of resilience

The concept of resilience is not directly measured but is inferred from the direct measure of its two component constructs: risk and adaptation (Garmezy, 1981; Luthar & Bidwell Zelazo, 2003). Risk factors increase the likelihood of maladaptive outcomes, thus challenging the normative developmental trajectory. Adaptation is the outcome of interest, which is most often operationalized in terms of a specified set of criteria. It is the combination of both these constructs that shapes the understanding of resilience. In the absence of sufficiently severe risk, adaptive outcomes constitute normative development. In the context of risk, however, the manifestation of adaptive outcomes suggests the possibility of specific processes that have enabled the successful negotiation of adversity (Masten & Tellegen, 2012). Conversely, the lack of adaptive outcomes in the context of risk suggests that individual vulnerabilities have manifested as maladaptive outcomes. It is the combination therefore of adaptive outcomes in situations of risk exposure that defines resilience (Garmezy, 1981; Rutter, 2006). Throughout the resilience literature, there is a general need for more precision in the operationalization of key risk and outcome constructs (Luthar, 2003). As discussed in the following section, this is all the more important given the variation in measures and wide range of criteria used across studies.

2.1.5.1 Adaptation

Across studies of resilience, there is considerable variation in terms of how researchers operationalize adaptive outcomes. Given the lack of consistent criteria, to a large extent the specific requirements for an adaptive outcome are established by the individual researcher (Masten & Powell, 2003). Not surprisingly, there is considerable debate in the literature regarding what constitutes the best criteria. In general, however, it is widely held that adaptive outcomes must consider developmentally salient competencies across a range of domains (Luthar et al., 2000a). Grounded in the developmental literature, normative scores on stage salient tasks indicate a healthy and adaptive trajectory of development, with an emphasis on emerging capacities and basic adaptive systems (Jenkins, 2008; Masten et al., 1999).

In early childhood, basic adaptive systems include attachment, mastery motivation, self-regulation and cognitive development (Masten & Powell, 2003). Processes of attachment are crucial for understanding the establishment of secure, health-promoting relationships early in life, and have been shown to have long-term consequences for future relationships (Bates, Maslin, & Frankel, 1985; Kerns, Abraham, Schlegelmilch, & Morgan, 2007; Maccoby, 1992). Mastery motivation is integral to the development of self-efficacy and belief in one's own agency, and involves deriving pleasure in mastering developmental tasks (Kelley, Brownell, & Campbell, 2000). Processes of self-regulation, in terms of emotion, behaviour and attention, are in their formative stages early in development and play a key role in future pro-social, adaptive outcomes (Eisenberg, Spinrad, et al., 2004; Mischel, Shoda, & Rodriguez, 1989; Mostow, Izard, Fine, & Trentacosta, 2002). Cognitive development and systems of learning are also important for the development of flexible and effective problem solving strategies, as well as academic success (Masten et al., 1999; Radke-Yarrow & Klimes-Dougan, 2002; Rutter, 2007). Overall, these basic systems are in their formative stages early in life and their patterns of development form the foundations for future adaptation. They therefore represent key systems to investigate in trying to better understand processes of resilience, in terms of

potential mechanisms through which positive adaptation may be promoted. This thesis specifically focuses on the child's self-regulation as a potential child-level resource that may be particularly relevant within the depressed mother-child relationship. Children who are better able to effectively manage and inhibit their behaviours in response to cues and stimuli from their environment might be less susceptible to potentially negative effects of the mother's dysregulated and depressed emotion.

In addition to developmentally salient measures, it is also important to consider a comprehensive set of outcomes (Rutter, 2006). An overly narrow set of criteria can potentially overestimate processes of resilience, as an individual who is functioning well in one domain may present with difficulties across a number of others (Luthar & Bidwell Zelazo, 2003). At the same time however, a definition of adaptive outcome that is too broad may unreasonably limit the criteria for processes of resilience. It would be overly stringent to expect satisfactory outcomes across numerous domains of functioning over an extended period of time. A definition such at this would represent exceptional functioning rather than good functioning (Masten, 2001). A reasonable balance is necessary, being mindful that the nature and purpose of the research question will influence the operationalization of adaptation. With a specific focus on child behaviour problems, this thesis seeks to avoid issues of an overly narrow criterion of adaptation by validating the externalising behaviour outcome against child functioning in other important domains in Chapter Four. A similar approach was adopted by Jaffee and colleagues (2007) in their investigation of children's behavioural resilience to maltreatment. Their study compared groups of children based on differences in risk exposure and adaptive outcomes, to ensure that children in the resilient group did not present with other domains of poor functioning.

2.1.5.2 Risk

In addition to adaptation, resilience requires the clear definition of sufficiently severe risk. Risk factors are not deterministic but are probabilistic in nature, such that they increase the likelihood of maladaptive outcomes (Sameroff, Morrison Gutman, & Peck, 2003). Particularly in the early years of life, exposure to severe risk can negatively impact the development of key adaptive systems (Goodman et al., 2011; A. Maughan, Cicchetti, Toth, & Rogosch, 2007). In turn, these effects can influence later developmental outcomes and the capacity of the individual to successfully manage future situations of risk (Sandler, 2001). Much like the definition of adaption, there is considerable variation in the definition of risk across the resilience literature. There is no consensus regarding what constitutes a sufficiently severe risk, nor is there agreement on how best to measure the range of risk factors. The lack of consistent criteria and measures makes it difficult to compare findings across studies and to draw more general conclusions. The use of clear and explicit criteria is emphasised in this thesis to ensure the coherence and utility of its findings, and to facilitate cross-study comparisons.

A distinction often made in the risk literature is the difference between proximal and distal risk factors (Bronfenbrenner, 1986; Luthar, 1993). Proximal risk factors are those that are close to the individual and exert their influence more directly. Child maltreatment for example is a proximal risk factor because it directly impacts the child. Distal risk factors are those that are more removed from the individual and exert their influence through more indirect means. Poverty is a distal risk factor because it impacts the individual largely through its influence on intermediary factors. For example, the pressures of financial constraints can increase the level of stress and anxiety of parents (Lovejoy, Graczyk, O'Hare, & Neuman, 2000). In doing so, parent-child interactions might be impacted, namely by increasing the likelihood of negative interactions and straining the quality of relationships. In general, poverty is a modest correlate of risk factors (Owens & Shaw, 2003). To clarify the specific processes relevant to improved

outcome, it is important to be aware of the theoretical distance of risk factors from the individual and the processes through which they might impact individual development.

The evidence also points to both the specific and nonspecific nature of risk factors. A particular risk factor may increase the likelihood of a specific outcome, while at the same time also placing the individual at risk for various other outcomes (Luthar et al., 2000a). For example, outcomes for children of mothers with depression may be quite different, with certain children exhibiting problem behaviours and others displaying increased levels of anxiety or depression. Situations such as this represent examples of multifinality, or the idea that similar starting points, in this case maternal depression, may result in diverse outcomes. In this thesis, the multiple effects of maternal depression on child outcomes are narrowed to focus specifically on the child behaviour domain. Although children of mothers with depression are at an increased risk for depression and other mental health problems in later childhood and adolescence, very young children of mothers with depression are also at an increased risk for problem behaviours. In the context of early childhood, the development of externalising behaviours is particularly relevant with important predictive effects for later child functioning.

At the same time, a range of risk factors can converge on the same outcome. For example, children with problem behaviours do not have identical histories of risk, but present with a range of diverse risk factors despite manifesting similar outcomes (Ashman, Dawson, & Panagiotides, 2008; Beck, 1999; Cummings, Keller, & Davies, 2005). This represents an example of equifinality, or the idea that the same end point may be reached through various means or pathways. This thesis is not specifically aimed at addressing issues of multifinality and equifinality, given the primary focus on the behavioural outcomes of children of mothers with depression. Nevertheless the idea that maternal depression may influence child outcomes in both specific and nonspecific ways is incorporated into the validation of behavioural resilience in Chapter Four. The primary focus of this thesis on the behaviour

development of young children of mothers with depression, but child functioning in the internalising, anxious and affective domains is considered, as are social and cognitive abilities. This is to enable the specific investigation of processes related to child behaviour development, whilst acknowledging the potentially diverse effects of maternal depression on child functioning beyond the externalising behaviour domain.

2.1.5.3 Cumulative risk

A common finding in risk and resilience research is that risk factors are not evenly distributed within the population but tend to cluster within the same individuals (Sameroff et al., 2003). Because risk factors are highly correlated, it is often not the case that risk operates in isolation. Instead, there are multiple risk factors simultaneously influencing individual development. Parental substance abuse, for example, is correlated with additional risk factors such as inter-partner violence and psychopathology (Zucker, Wong, Puttler, & Fitzgerald, 2003). Although it is not always the case, frequently children at-risk are attempting to manage multiple challenges at the same time. Because of this, the study of cumulative risk is a useful approach for trying to better understand how commonly occurring situations of multiple risk translate into maladaptive outcomes (Ackerman, Izard, Schoff, Youngstrom, & Kogos, 1999). It allows for the cumulative nature of risk factors to be explored, and attempts to account for the combined influence of risk in determining how best to support development (Masten et al., 1990).

A limitation of cumulative risk research, however, is that the specificity of processes is lost within a combined variable of risk that emphasises the general accumulation of risk, and which often includes both proximal and distal risk factors (Hall et al., 2010). In doing so, it becomes difficult to isolate the nature of processes involved in buffering specific risk effects. Although the choice of model largely depends on the aims of the study, one strategy is to sequentially build models of risk, beginning with a focal risk factor and then including additional risk factors

in the model. This thesis investigates mechanisms of resilience using this approach, by focusing primarily on the specific effects and processes involved in the context of maternal depression. The analyses then build on the original model with the inclusion of additional family and neighbourhood risk factors, such as parental substance abuse and neighborhood danger. The benefit of adopting this approach is that there can be a primary investigation of processes that are specific to maternal depression, followed by an exploration of how these processes may or may not change when accounting for the possibility of additional risk factors.

2.1.5.4 Protective and resource mechanisms

Across resilience research, findings point to the "ordinariness" of resilience (Masten, 2001). Rather than extraordinary or rare occurrences, the consistent finding is that resilience arises from normative functioning of basic human systems despite exposure to adversity. That individuals draw on normatively functioning capacities rather than extraordinary ones arguably provides a more positive view of human development and a more optimistic outlook for intervention efforts (Masten & Powell, 2003). The focus of this thesis is on basic systems that are relevant in early childhood, to gain insight into the processes that might help account for individual variation in child behaviour outcomes despite the early experience of maternal depression.

Incorporated into the focus on basic developmental systems is the understanding that processes of resilience are concerned with more than just the individual (Egeland et al., 1993). The individual is viewed as a system within multiple interrelated and interacting levels of his or her environment (Bronfenbrenner, 1979). Resilience research must therefore aim to account for processes of reciprocal influence occurring at the level of the individual, the family and the broader social environment. Processes at one level are not isolated within that level, but influence and are influenced by processes at other levels. Personal attributes, such as intelligence and self-regulation, are capacities at the individual-level that carry a strong genetic

heritability, but can also be influenced by socialisation processes within and beyond the family (Yates et al., 2003). The focus is therefore on basic human systems in the context of dynamic multilevel environments. In this thesis, the focus is specifically on positive and harsh parenting behaviours at the family-level, and on child self-regulation at the individual child-level. These are basic processes that are interrelated and potentially of particular importance for early childhood behaviour development in the context of maternal depression.

A common question within the resilience literature concerns whether mechanisms of adaptation are universal or specific (Wyman, 2003). Processes that universally promote positive outcomes are consistent with a main effects model, such that the factor confers benefit regardless of the experience of risk. In general it is found that intelligence fits this model, with positive health-promoting effects across contexts. Universally promotive mechanisms have frequently been termed resource mechanisms and are capacities that are nonspecific in nature (Luthar et al., 2000a). Conversely, those mechanisms that confer differential benefit due to the specific risk condition have been termed protective mechanisms. By this definition, protective mechanisms fit an interactive model, such that individuals at-risk are differentially influenced by the mechanism compared to individuals who are not at-risk (Rutter, 2006).

In an adolescent study looking at processes of antisocial behaviour, an interaction effect was found between self-regulation and peer deviance in accounting for change in antisocial behaviour (T. W. Gardner, Dishion, & Connell, 2008). These findings suggest that self-regulation in adolescence buffers the development of antisocial behaviour specifically in the context of deviant peer relations. Interactive effects are informative for intervention research in terms of highlighting specific mechanisms that might be important to target given the particular risk condition (Roosa, 2000). The finding that self-regulation interacts with peer

deviance suggests a targeted strategy for decreasing antisocial behaviour specifically in the context of deviant peers.

This thesis investigates potential interactive effects between maternal depression and positive parenting, harsh parenting, and child self-regulation. A significant interaction between maternal depression and child self-regulation, in predicting child externalising behaviours, might suggest that the effects of depression vary according to the child's ability to self-regulate. A significant interaction may also point to specific parenting behaviours that are particularly relevant to mothers with depression in influencing the behaviour development of their children. Information such as this is valuable for intervention design and helps to tailor programmes specifically for mothers with depression and their young children, to increase the likelihood of more positive outcomes for both the mother and the child.

In a follow up to Luthar (2000b), Roosa argues that interactive effects are one of the most valuable and unique contributions of the field of resilience research (2000). Turning to the examples outlined by Luthar, Roosa discusses some of the confusion surrounding the distinction between main effects and interaction effects. When studies are conducted with high-risk groups, main effects may in fact be interactions when considered within samples of greater variability. Roosa illustrates that many of the examples described by Luthar are likely interactive in nature, because the absence of a statistical interaction within a high-risk sample is not necessarily indicative of a lack of interaction within the general population.

From a theoretical perspective, the information provided by interaction effects is of particular interest to resilience research because it helps to better understand the processes that are specific to the risk condition. These are situations that begin to explain what factors influence adaptive outcomes in a particular context of adversity but contribute little in other contexts. That is not to say however that main effects do not contribute valuable information, particularly from an intervention perspective (Luthar et al., 2000b). An intervention researcher

will be more generally concerned with those factors that mitigate the negative effects of the risk, whether that factor promotes better outcomes in the non-risk group or not. The significance of interactive effects is therefore to a certain extent dependent upon the nature and purpose of the research question.

The practical challenge for resilience research is not simply to identify relevant mechanisms but also to pinpoint those that are likely to be the most efficacious for intervention efforts (Luthar et al., 2000a). An intervention perspective is therefore particularly concerned with processes that are modifiable in nature. For example, although intelligence plays an important role in future adaptation across domains, there is consistent evidence that it is difficult to change (Sameroff & Rosenblum, 2006). Conversely, regulatory capacities and parenting behaviours have demonstrated greater malleability and responsiveness to intervention efforts (e.g. C. E. Izard, Fine, Mostow, Trentacosta, & Campbell, 2002; Shaw, 2006; Webster-Stratton, Reid, & Hammond, 2008). This thesis is interested in parenting behaviours and child self-regulation as developmentally relevant factors with the potential to explain the variability in child behaviour, being mindful that they are also factors that are susceptible to change through intervention.

2.1.6 Approaches

Within the resilience literature there are two main complementary approaches, the variable-centered and the person-centered approach. Both strategies have certain benefits and limitations, and each has been utilised extensively in investigations of individual variations in outcome (Masten & Powell, 2003). As a point of clarification, the term “dimensional” has also been used to describe the variable-centered approach. This is arguably a misleading label because variables within this approach are not necessarily measured dimensionally. Within the variable-centered approach, variables may be measured categorically or continuously, such that the use of the term dimensional may cause confusion. The term “variable-centered” is

therefore used in this thesis to identify the particular research approach described below, while the use of the terms “continuous” or “dimensional” is in reference to the measurement of variables. Similarly, the person-centered approach has also been called a “categorical” approach. Although the person-centered approach utilises categorical constructs, the term “person-centered” will be used here to describe the approach and “categorical” will be used in reference to the measurement of variables.

2.1.6.1 Variable-centered

The variable-centered approach is focused on the links between risk, outcome, and intermediary variables. Using multivariate statistical analyses, models test hypothesised additive, mediating, and moderating effects of the variables of interest (Masten & Powell, 2003). Compared to the person-centered approach, analyses are generally well-powered due to their ability to draw on the entire sample, allowing for statistical controls to manage issues of covariance (Masten et al., 1999). The emphasis on specific links between variables can have important implications for intervention design, as significant interactive effects can suggest potential processes to target given the risk condition and specified outcome. Although it can serve as models of intervention, the variable-centered approach can fail to reflect naturally occurring patterns of outcomes. It is argued that this strategy overlooks distinctive regularities that occur in the lives of real people, and in doing so fails to capture the “configural” nature of resilience (Masten, 2001).

In the study of childhood maltreatment by Collishaw and colleagues (2007), a variable-centered approach was adopted to investigate processes involved in resilience to adult psychopathology. Relations between childhood maltreatment and adult psychopathology, and various potentially mediating processes, such as peer relationships, perceived parental care and the quality of adult love relationships, were tested using a series of hierarchical logistic regressions. The study is an example of the possible confusion with the use of the term

"dimensional", given that the risk and outcome measures were both categorical variables. Childhood maltreatment was a dichotomous variable indicating the presence or absence of major abuse. Adult psychopathology was also a dichotomous variable indicating the presence or absence of psychiatric disorder and suicidality over the 30 year adult follow-up period. Despite the use of categorical constructs, the approach is nevertheless variable-centered given the methods used to test potential relations between the risk, process, and outcome variables.

2.1.6.2 Person-centered

In contrast to the variable-centred approach, the person-centred approach is focused on comparing groups of people who share specific characteristics. Statistical analyses such as cluster analysis and analysis of variance are used to compare "resilient", "maladaptive", and "competent" groups of individuals (Masten & Powell, 2003). The group of individuals labelled "resilient" suggests that a judgement has been made on the basis of a predetermined set of criteria indicating an adaptive outcome despite severe risk. The comparison of resilient and maladaptive groups is used to determine if there are resources that are specifically related to the promotion of adaptive outcomes in the context of adversity. The comparison of resilient and competent groups is used to determine whether the resources that facilitate similar adaptive outcomes differ in situations of high versus low risk. Further, this comparison allows for the investigation of whether those in the resilient group have similar functioning to the competent group in additional domains, such as mental health and well-being.

In a study of vulnerability and resilience amongst sons of alcoholics (Zucker et al., 2003), a person-centered approach was taken to investigate externalising and internalising outcomes from early childhood to adolescence. The sample was divided into four groups in childhood based on risk exposure and adaptation: resilient, nonchallenged, vulnerable, and troubled. "Resilient" children were those exposed to risk and demonstrating adaptive outcomes according to the specified criteria. "Nonchallenged" children were those with similarly

adaptive outcomes but in the absence of marked adversity. “Vulnerable” children were those exposed to risk but with outcomes below the necessary levels for positive adaption. Finally, “Troubled” children were those with similarly poor outcomes but in the absence of risk exposure. Studies that adopt the person-centered approach utilise similar groupings of individuals based on study-specific criteria of risk and adaptation. Comparisons are then made across various domains to investigate differences in key capacities hypothesised to influence the categorisation of individuals within each group (Seidman & Pedersen, 2003).

The person-centered approach is supported for its use of naturally occurring patterns, and searching for commonalities and differences in these group patterns (Bergman & Magnusson, 1997; Seidman & Pedersen, 2003). A limitation of the approach, however, is that unlike the variable-centred approach it does not provide insight into explanatory processes (Masten & Powell, 2003). Given the differences and complementary aspects of the two main approaches, it is sometimes the case that studies will employ a combination of strategies to provide a more comprehensive set of findings. This thesis is specifically interested in disentangling causal processes that predict improved behaviour outcomes for children of mothers with depression. The variable-centred approach is therefore the primary analytic approach, employed to investigate mediating and moderating effects of key processes. Research questions pertaining to mechanisms of change are addressed with the interest of informing early intervention and prevention programme design. The person-centred approach is utilised uniquely in the validation of behavioural resilience in Chapter Four, to explore group-level differences across additional domains of functioning.

2.1.7 Empirical evidence

As the literature reviewed in the following sections highlights, there are certain general findings that appear consistently across the field of resilience research. It is well supported that resilience is a readily observable phenomenon, reflected in adaptive developmental

outcomes of individuals across diverse situations of risk (Masten & Powell, 2003). Such processes of resilience are repeatedly observed using a variety of measures and differing approaches. When comparing groups of individuals, it is consistently the case that resilient children and youth share much in common with well-adapted peers who have experienced substantially less adversity to reach similar outcomes (Luthar & Bidwell Zelazo, 2003; Masten et al., 1999). It is also the case that resilient children and youth differ notably in many ways from peers who have experienced similar levels of adversity but present with maladaptive outcomes (Masten, 2001).

In general, well-adapted children and youth have considerably more resources available to them, whether they have experienced adversity or not. Such resources often include effective primary caregivers, high quality early education, average or better cognitive development, positive peer relationships, and generally more positive self-regard (e.g., Egeland et al., 1993; Hall et al., 2009; Yates et al., 2003). Conversely, children and youth with maladaptive outcomes in situations of adversity have far fewer internal, family or broader environmental resources. These children seem more likely to have greater difficulty self-regulating, experience more ineffective caregiving, have maladaptive caregiver attachment, lack supportive adult relationships, and appear overall to be more stress-prone (Masten & Powell, 2003; Zucker et al., 2003). Overall, it seems that more adaptive outcomes are related to the availability of resources, with a particular emphasis on those factors that promote effective regulation and healthy supportive relationships.

These general findings suggest that parenting behaviours and child self-regulation may be potentially important processes in supporting a more adaptive mother-child relationship and improved child behaviour development. More specific risk-related evidence is presented in the following sections concerning the effects of poverty, child maltreatment, parental substance abuse, and parental psychopathology. Pertaining to this thesis more specifically, evidence and

methodological issues concerning the effects of maternal depression is then discussed. The final section addresses situations of multiple risk more generally, followed by a discussion of common criticisms of resilience research. The purpose of reviewing the resilience literature more broadly is to inform the theoretical rationale and methodological approach of this thesis. Drawing from previous research provides the foundation for the research questions and how they build sequentially throughout this thesis, as well as the analytical approach for their investigation. The literature also raises key issues and limitations to consider, particularly with regards to the operationalization of risk, adaptation, and intermediary factors, and the difficulty in researching resilience conceptualised as dynamic processes over time.

2.1.7.1 Poverty

Of the longitudinal studies in the field of resilience research, those investigating the effects of poverty are the most extensive. As a distal risk factor, poverty is often correlated with other risk factors, such as community violence, limited access to quality education, parental unemployment and other associated stress within the family (Yates et al., 2003). As such, research findings concerning children living in poverty can provide a broad, contextual look at the effects of poverty and its associated stressors. Despite providing invaluable information, the use of poverty as an indication of risk can however make it difficult to disentangle underlying processes of change.

In a longitudinal study of high-risk children and families, Egeland and colleagues (1993) followed 267 women from their last trimester of pregnancy until their child reached early adulthood. Not only did they find that poverty and its associated factors have negative effects on child outcome, but also that they seem to operate in an additive fashion. Possible gender differences emerged, suggesting that boys seemed to benefit more from the protective effects of intelligence and language skills, and a more structured home environment. Conversely, girls seemed to benefit more from positive personality characteristics of their mothers (Egeland et

al., 1993). These findings were only preliminary in nature, and served more to suggest that the way in which poverty affects child development is complex and may vary depending on the child's gender, age, developmental history and capacities.

One study in particular that investigated the effects of variations in poverty over time is the Pitt Mother and Child Project, a longitudinal study that focused on the developmental precursors of antisocial behaviour among boys (Shaw, Gilliom, Ingoldsby, & Nagin, 2003). The study found that aggressive and hostile maternal personalities, infant attachment security, and mother-child relationship quality contributed significantly to the likelihood of child antisocial behaviours over time. Further, whereas 26% of the children in the impoverished group were high on behaviour problems, 53% of those in the chronically impoverished group showed increased levels of behaviour problems. Children with insecure attachment were also more than twice as likely to manifest subsequent maladjusted behaviours when compared to those children with secure attachments (Owens & Shaw, 2003; Shaw et al., 2003). Results from this study stress the importance of positive mother-child relationships as potential processes through which resilience might be promoted in the context of poverty. They also highlight the need to consider that risk is not necessarily a static concept, and that understanding the changing nature of poverty over time may suggest those children who are most at risk. The changing nature of risk, as well as the possibility that risk might be enduring over time, is an important concept that applies to this thesis. Given the chronic, episodic nature of depression, it may be that young children are experiencing risk over an extended period of time and to varying degrees of severity.

The Rochester Child Resilience project provides further evidence regarding the correlates and antecedents of resilient outcomes for children in low income families (Cowen, Wyman, & Work, 1996; Wyman, 2003). The study defined resilient outcomes as those children scoring in the top third on adjustment in relation to the sample, as assessed from a universal

developmental assets perspective. Using this approach, it was found that children with resilient outcomes were those with an overall easy temperament, higher intelligence, higher levels of empathy, more realistic perceptions of competence and control, and more skilled social problem solving. It was also found that parental wellness and mental health, and the quality of the parent-child relationship were important contributors to improved child outcome (Cowen et al., 1996; Wyman et al., 1999).

More recently emphasised within the poverty literature is child self-regulation, which consistently appears to be an important characteristic of children and youth with resilient outcomes, in situations of poverty as well as across other adversities (e.g. T. W. Gardner et al., 2008; Silk, 2006; Yates et al., 2003). Self-regulation is influential in terms of the disruptive behaviours that are a frequent outcome for children growing up in situations of adversity. Using cross-sectional data, Buckner and colleagues (2003) found a strong correlation between self-regulation and adaptive functioning for youth living in poverty. When all predictors of outcomes, except for self-regulation, were entered in the regression model, they accounted for 53% of the variance. When self-regulation was added to the model, it accounted for an additional 16% of the variance and was the strongest independent predictor in each of the models (Buckner et al., 2003). Because the study design was cross-sectional, the findings are limited in nature. They do however suggest that self-regulation is likely an important variable linked to more adaptive functioning in the context of poverty and one that requires further investigation using longitudinal designs and multiple measures of risk and outcome.

2.1.7.2 Child maltreatment

Children who experience maltreatment are at an increased risk for various maladaptive outcomes, reflected not only in current levels of adjustment but also adjustment over time. Such maladaptive outcomes include internalising and externalising problems, difficulties in developing autonomy, low self-esteem, and relationship difficulties (Bolger & Patterson, 2003;

Maughan, 2007). Similar to findings from the poverty literature, child maltreatment frequently co-occurs with other risk factors. Situations of child maltreatment often represent environments in which there is a failure to provide for many of the necessary developmental needs of the child. Further, child maltreatment does not represent a uniform construct. There is considerable heterogeneity in experience in terms of chronicity, severity, type of maltreatment, age of exposure, and relation of child to the abuser (Bolger & Patterson, 2003).

Because of the difficulty inherent in measuring child maltreatment, accounting for such variations is particularly challenging. Nevertheless, two factors that appear to be consistently protective in nature are perceived control and friendship (Bolger & Patterson, 2003; Flores, Cicchetti, & Rogosh, 2005). Perceived control is the "belief about the sources of one's successes and failures". In situations of maltreatment, an internal locus of control, or the belief in one's own agency, seems to help protect against the detrimental effects of maltreatment. Friendship seems to be similarly protective, with the presence of supportive personal relationships contributing to improved social adjustment and a more positive sense of well-being (Bolger & Patterson, 2003).

Data from the Virginia Longitudinal Study looked at child experiences of maltreatment, in terms of variations in type, age of onset, and chronicity (Bolger & Patterson, 2003; Hetherington, 1993). The effects of various experiences of maltreatment were measured in terms of behavioural and emotional adjustment, peer relationships, self-esteem, and academic achievement. The potential protective factors were perceptions of control, and friendship reciprocity and quality. It was found that children who experienced maltreatment, especially chronic maltreatment, had more problems with peer relationships and were more often unpopular and rejected by their peers. Chronic maltreatment was linked to peer rejection through aggressive behaviours, which accounted for 27% of the variance. Internalising behaviours, such as social withdrawal, did not mediate the relation. When looking at

internalising problems as the outcome, external locus of control was an important contributor, accounting for 23% of the variance. Perceived control also moderated the relation between maltreatment and internalising problems, such that greater internal control was associated with lower levels of internalising problems among the maltreated children but not the non-maltreated children (Bolger & Patterson, 2003).

Having a reciprocal friend was also a protective factor that moderated the relation between maltreatment and self-esteem (Bolger & Patterson, 2003). Whereas children who were not maltreated displayed a general increase in self-esteem over time, of the maltreated children only those with a reciprocal friend showed an increase, those without showed a decrease. Overall, the findings point to the importance of an internal locus of control and friendship for increasing the likelihood of adaptive outcomes following experiences of child maltreatment. Additionally, the type and timing of maltreatment are essential to understanding the impact of risk, given the particularly negative outcomes for those experiencing chronic and early forms of maltreatment.

Using data from the Isle of Wight longitudinal study, Collishaw and colleagues (2007) investigated resilience to adult psychopathology following childhood maltreatment. Resilience was defined as repeated, ongoing or severe sexual and/or physical abuse, with no reported psychiatric disorders or suicidality over a 30-year adult follow-up. A series of logistic regressions was conducted, adjusting for study design and abuse severity. As hypothesised, a substantial minority of individuals with a history of abuse reported no mental health problems, related to perceived parental care, adolescent peer relationships, the quality of adult love relationships, and personality style. The quality of adult love relationships was independently associated with resilient outcomes when controlling for abuse severity variations (Collishaw et al., 2007).

The findings of Collishaw and colleagues echo those from an earlier longitudinal study, investigating the factors protecting against adjustment difficulties in young adults with a history of child sexual abuse. Using a birth cohort of 1,025 children in New Zealand, it was found that of those children exposed to sexual abuse, outcomes were influenced by affiliation with delinquent substance abusing peers in adolescence and paternal care and support in childhood (Lynskey & Fergusson, 1997). Both of these studies provide rigorous evidence from representative community samples of resilience following experiences of severe childhood abuse. Importantly, the evidence points to the factors that predict adaptive outcomes over time, emphasising the protective role of high-quality interpersonal relationships and their importance for long-term adjustment.

2.1.7.3 Parental substance abuse

In an investigation of resilience and vulnerability of sons of alcoholics, developmental outcomes were assessed from early childhood to adolescence (Zucker et al., 2003). The sample was divided into four groups based on risk exposure and childhood outcome, and comparisons were made across groups on externalising and internalising behaviours into adolescence. In terms of externalising behaviours, it was found that resilient children were not distinguishable from nonchallenged peers as preschoolers, but began to show small but reliably higher levels as they grew older. In terms of internalising behaviours, by early adolescence the nonchallenged group was significantly lower than all the others, with no difference between any of the other three groups. That is to say that by the adolescent years, children in the resilient group had developed levels of internalising behaviours that were indistinguishable from those of both the vulnerable and troubled groups of children (Zucker et al., 2003). These findings highlight the importance of addressing not only outward manifestations of adjustment but measures of internal well-being. Further group comparisons indicate certain key differences between children with resilient outcomes and those with poorer outcomes. Children in the resilient group were in the upper range of intellectual functioning and did not

differ significantly from the children in the nonchallenged group. The resilient group of children also differed in terms of their temperament and overall were less emotionally reactive. Conversely, the vulnerable group differed from the resilient group in terms of higher activity levels, lower attention span, lower verbal IQ and higher emotional reactivity (Zucker et al., 2003).

For children of an alcohol-abusing caregiver, variations in maladaptive outcomes are also likely due in part to the presence or absence of parental comorbid antisocial behaviour and psychopathology. Alcoholism is highly correlated with additional risk factors, within the alcohol-abusing individual as well as within his or her partner. It can therefore be difficult to determine the extent to which the negative outcomes are due to parental alcoholism per se, and not the combination of factors. The results from the study by Zucker and colleagues (2003) highlight the importance of maternal characteristics, such as psychopathology, in conferring additional risk in the context of substance abuse. They also point to certain characteristics at the level of the child, such as temperament, intellectual functioning and verbal abilities, in reducing the likelihood of maladaptive behaviours over time. Although the interaction between early individual characteristics and environmental adversity appears to be modest in magnitude, this nevertheless may serve to indicate certain key mechanisms through which change can be encouraged for those children who are most at risk.

Maternal drug use is another potential risk factor that may impact child adaptation over time. However, much like parental alcohol abuse, it is difficult to determine the extent to which the drug abuse itself is detrimental versus the frequently co-occurring risk factors, such as psychiatric disorders. According to Luthar et al. (2003), maternal drug use is not necessarily more damaging to children's social-emotional well-being than other maternal psychiatric disorders. When maternal substance abuse co-occurs with maternal depression, it is the latter that seems to be the more risk-inducing. Looking at children's psychiatric diagnoses, the

highest rates were amongst children of mothers with affective/anxiety disorders. The second highest rates were the children of mothers with comorbid affective/anxiety disorders and drug use, and third were the children of mothers with drug use only (Luthar, D'Avanzo, & Hites, 2003). A proposed reason for these differences is related to the perceptions of the child. It may be that with parental drug and alcohol abuse, there is a more clear and tangible "cause" of the problem, whereas psychiatric disorders may be more difficult for the child to understand (Luthar, 2003). Overall, research related to childhood resilience in the context of parental substance abuse highlights the importance of key factors within the caregiving environment. The findings suggest that often it is not so much the substance abuse per se, as the frequently co-occuring conditions and behaviours that negatively influence child development. Some of these behaviours, particularly the parenting behaviours of mothers with depression, and how they relate to child outcomes are investigated in this thesis.

2.1.7.4 Parental psychopathology

Children of a mentally ill parent are at an increased risk for maladaptive outcomes aside from the diagnosis of their parent (Seifer, 2003). For example, children of a parent with depression are not only at an increased risk for depression but are more likely to exhibit disruptive externalising behaviours as well (Avenevoli & Merikangas, 2006). It is therefore necessary to investigate the outcomes of children of parents with psychopathology across domains of functioning, and not solely in terms of mental health outcomes. It is also important to bear in mind that diverse risk amongst parents may converge on similar outcomes in children. For example, children with mental health problems do not all have parents with mental health problems. The use of a comprehensive set of measures at both the child and parent level is emphasised, to investigate the diverse pathways that may link various risk factors and outcomes (Seifer, 2003).

For young children of a parent with a mental illness, the literature highlights that the focus should be on parent-child relationships and the family system (Seifer, 2003). Particularly with very young children, it can be difficult to identify processes of resilience within a population that has yet to establish independence from their caregivers. Given that young children have not yet lived long enough for processes of resilience to unfold into more clear manifestations of adjustment, arguably the child-caregiver system should be emphasised. In terms of possible effects on parent-child attachment, there are trends towards insecurity and disorganisation, possibly due to less well organised parental affective responsiveness (Seifer, 2003).

In general, poor parenting sensitivity appears to be a consistent factor that influences the effects of mental illness and adverse child outcome across domains (Brennan, Le Brocque, & Hammen, 2003; Shaw, Connell, Dishion, Wilson, & Gardner, 2009). Parent emotion processing has been suggested as a potential mediating factor but the evidence remains unclear. Nonspecific aspects of parent mental illness, such as emotion processing, have been hypothesised as common factors that may result in the similarities of child outcome across various forms of mental illness (Seifer, 2003). Overall, the chronicity of mental illness seems to be a consistently relevant factor in terms of the child resilience literature. It seems that parent mental illness is most detrimental to long-term child well-being when it is experienced on a frequently recurring basis.

Within the general psychopathology literature, maternal depression is most often researched because of its high frequency and recurrent nature, meaning that families are often significantly impacted at multiple points over time. Maternal depression is discussed in more detail in Section 2.2, but certain key issues as they relate to resilience are introduced here. The literature on children of parents with depression highlights some of the challenges in trying to synthesise findings from across multiple studies (Hammen, 2003b).

Across the field of depression research, there is considerable variation in definitions of depression, and considerable variation in terms of the relevant depression information gathered. For example, some studies may require a clinical diagnosis of depression, whereas others require self-reported depressive symptoms above a specified cut-off. To varying degrees, studies gather pertinent information such as depression severity, chronicity, age of onset, current or past depression, and duration of current depressive episode. As with the previously discussed risk factors, such variations in defining the risk can make it difficult to draw sound comparisons across studies. It can also challenge the ability to understand those characteristics of the risk condition that are particularly risk-inducing. For example, it seems that chronicity of depression is particularly important (Alpern & Lyons-Ruth, 1993). Few studies, however, measure and report on depression chronicity. With varying degrees of information, it can be difficult to assess the relative importance of other characteristics, such as depression severity, to determine those aspects that are most implicated in conferring risk to child development (Hammen, 2003b).

Despite the heterogeneity in defining depression, maternal depression increases the risk for generally poorer child development (Avenevoli & Merikangas, 2006; Hammen, 2003b). Mothers with depression are more likely to interact with their children in unpredictable and less responsive ways than mothers without depression. For example, mothers with depression tend to be less attentive and show less reciprocity and synchronicity, alternating between disengagement and intrusiveness (Hammen & Brennan, 2003). They are also more likely to display hostility and anger, and make negative attributions about their child (Lovejoy et al., 2000). Such maternal behaviours can disrupt the mother-child relationship and negatively influence the social and emotional development of the child. For example, maternal depression is associated with an eightfold increase in childhood onset of depression, and a fivefold increase in early adulthood (Hammen, 2003b). The mechanisms of risk transmission between generations remains unclear, with the suggested implication of more reactive

biological stress responses, disrupted affectivity, or a combination of factors (Masten et al., 1990). It does seem however that dysfunctional neuroregulatory processes are implicated, particularly as they relate to emotion regulation capacities (Yates et al., 2003).

In a cross-sectional study of over 800 adolescents in Australia, it was found that low levels of parental psychological control, high levels of maternal warmth, and low levels of maternal over-involvement interacted with maternal depression to predict resilient mental health outcomes in adolescents (Brennan et al., 2003). Maternal parenting behaviours appear to play an integral role in influencing the extent to which the mother's depression may or may not influence child development. Empirical evidence also points to the bidirectional links between mother and child, suggesting that not only do mothers affect their children, but children also affect their mothers. Maternal depression increases the risk for impairments in the mother-child relationship and for maladaptive child behaviour. Such maladaptive child behaviour seems to reinforce and maintain negative maternal attitudes and behaviours (Shaw, Connell, et al., 2009). Early childhood noncompliance was found to predict more chronic and elevated trajectories of maternal depression, which in turn predicted teacher- and self-reports of antisocial behaviours in adolescence (Gross, Shaw, Burwell, & Nagin, 2009). To better explore the nature of the relations between maternal depression and child adjustment, analyses in this thesis investigate possible bidirectional influences over time.

The depression literature is largely focused on maternal depression, as women are at a higher risk for depression than men and are more often the primary caregiver. Despite being less common, paternal depression is an important factor that requires further consideration. Paternal depression is associated with an increased risk of behavioural problems in offspring, particularly boys, with the greatest risk for children of fathers with chronic depression (Ramchandani, Stein, Evans, & O'Connor, 2005). The role of fathers within the family is also important, given their potential to buffer the effects of a depressed co-parent or exacerbate

negative effects. Brennan and colleagues (2003) did not find strong support for protective effects of father-child relationship qualities but were limited by the use of cross-sectional data, and suggested that perhaps such factors operated as resource mechanisms. Overall, the nature of paternal effects is not well understood, and may vary with the characteristics of maternal health, as well as other contextual factors (Conrad & Hammen, 1993).

2.1.7.5 Multiple risk

In a study of New Zealand youth, Lynskey and Fergusson (1997) looked at adolescent resilience to family adversity more broadly. Youth were categorised as resilient if they had a high exposure to family adversity during childhood and an absence of externalising problems during adolescence (including substance abuse, juvenile offending and school problems). It was found that the youth in the resilient group had a higher IQ, lower novelty seeking and fewer affiliations with delinquent peers. These characteristics were also found to operate in a cumulative fashion. Similarly, it was found that more specific risk factors within the general construct of adversity were only modestly associated with negative outcomes. The most powerful predictor of poor functioning was the accumulation of risk factors acting in combination (Lynskey & Fergusson, 1997).

In their study of protective factors and resilient outcomes for maltreated children, Jaffee and colleagues (2007) adopted a cumulative stressors model. The study included a list of 10 potential stressors, dichotomised into presence or absence, such that each child received a cumulative stressors score from 1 to 10. It was found that those children with poorer outcomes were exposed to significantly more stressors in addition to maltreatment than those children with resilient outcomes. Additionally, non-maltreated children experienced significantly fewer stressors than maltreated children with resilient outcomes (Jaffee et al., 2007). Consistent with the study's hypotheses, children's strengths only predicted resilience to maltreatment when they experienced relatively few additional family and neighbourhood

stressors. Similarly, high efficacy youth in high risk conditions did worse than low efficacy youth in low risk conditions (Sameroff et al., 2003).

Risk factors are not evenly distributed across the population but tend to cluster in the same individuals (Masten & Coatsworth, 1998). It has therefore been argued that the focus should not be on any particular risk but on the number of risk factors (Rutter, 1987). Adopting this approach, longitudinal effects of multiple risk were examined from birth to adolescence using a multiple risk score (Sameroff & Rosenblum, 2006). Multiple risk was associated with preschool intelligence, such that no child with zero risk factors scored below 85 on the IQ assessment and each risk factor reduced a child's IQ by an average of 4 points. Ratings of clinical mental health symptoms were over 12 times higher for children with five or more risk factors. When the results were extended into adulthood, 30% of the variance in global functioning was explained by early multiple risk (Sameroff & Rosenblum, 2006). Their findings highlight the additive nature of adverse effects of multiple risk but also point to the difficulties of disentangling the nature of intervening processes when diverse risk factors are collapsed into one measure of risk. The results also indicate that individual differences can only explain a small proportion of the variability in behaviour development and that processes that promote more adaptive behaviour development will most likely extend beyond the individual.

The findings from these studies of multiple risk suggest that, in general, negative environmental effects can be more powerful contributors to child development than the individual strengths and characteristics of the child. Overall they point to the limitations of resilience, and highlight that despite the importance of protective factors, children's resources can be overwhelmed by contexts of multiple risk. It is therefore important for resilience research to investigate not only the influence of a single risk factor, to better understand the nature of more specific processes, but to proceed by then considering the child's environment more broadly. Because risk factors are not evenly distributed within the population, and seem

to operate in an additive fashion, it is arguably important to expand models to consider additional risk variables that might also be operating to influence child development. This thesis therefore utilises the information available on additional stressors at the family and neighbourhood levels (e.g., conviction in the home, neighborhood dangerousness), to follow-up the primary analyses on maternal depression with multivariate models of cumulative risk. The purpose of doing so is to investigate the effects of predictors and processes specifically in relation to the focal risk factor of maternal depression, and to then consider whether effects become non-significant when accounting for additional contextual risk.

2.1.8 Common criticisms

Resilience research is an increasingly more popular approach but is not without criticism. The most common critiques of resilience research point to inconsistencies in definitions and terminology, and variability in the operationalization of focal constructs (Luthar et al., 2000a). Further critiques point to the heterogeneity of risks and competence, and question the ability of resilience to accurately model such variation. It is also argued that the apparent instability of resilience over time refutes the long-term applicability of the construct, with some critics questioning the very usefulness of the construct for contributing to empirical knowledge of human development (Luthar et al., 2000a).

There is a notable degree of variation in the definition and operationalization of resilience. Comprised of both risk and adaptation, the criteria for resilience vary across studies (Garmezy, 1991; Luthar, 1991; Rutter & Sroufe, 2000). Risk has been defined as a single factor, such as childhood maltreatment or parental substance abuse (Lynskey & Fergusson, 1997; Zucker et al., 2003). It has also been defined as an aggregate of multiple risk factors, such that participants are measured on a continuum of adversity that includes the presence or absence of a wide range of risk (Jaffee et al., 2007; Lynskey & Fergusson, 1997). Similarly, adaptation has also been defined as a single focal outcome or as multiple domains of functioning. Certain

studies look uniquely at mental health outcomes (Collishaw et al., 2007), while others focus on behavioural outcomes (T. W. Gardner et al., 2008). Still others may use a composite of outcomes, or focus on one primary domain but validate the outcome against other important areas of adjustment (Jaffee et al., 2007).

In addition to the many ways in which adaptation has been operationalized, there is also a lack of agreement in terms of the level at which individuals should be functioning to meet the criteria for adaptive outcome. For example, some studies require that individuals present with no past or current diagnoses within the clinical range (Brennan et al., 2003). Other studies may not use the general population but the study sample itself as the reference, and require that participants score within a particular range of sample scores (Cicchetti et al., 1993). While most studies now define resilient outcome in terms of normative functioning, there are still instances when the outcome of interest requires individuals to excel beyond the average range. Such definitions of adaptation arguably do not reflect the generally held view that resilience is concerned with individuals who are "doing ok" and not with exceptional levels of performance (Masten, 2001).

Not only are there variations in defining and operationalizing resilience, there are also differences in how researchers choose to model the links between risk and adaptation. As mentioned above, person-centered and variable-centered approaches are both used, at times in isolation and at other times in a complementary fashion (Masten et al., 1999). Within the variable-centered approach, variables of interest may be categorically or continuously measured, often without clear explanations for why researchers have chosen a particular measurement strategy. A degree of variability in the methods used in resilience research is important and the consistency in findings across varying methodological approaches strengthens the validity of the construct (Luthar, 1993). Future research does however need to

provide more clear justification for the choice of methodology and the operationalization of constructs, supported by theory and empirical findings.

Coherence in the field will also be improved with increased clarity of key terms, which will support more consistent use of terminology across studies. In particular, “resource” versus “protective” mechanisms requires an agreed definition and usage (Luthar & Bidwell Zelazo, 2003). Whereas some researchers define protective mechanisms as those factors that improve outcomes in both high- and low-risk groups, others require that protective mechanisms show differential benefit to those in the high-risk group (Rutter, 2006). Whether an interaction effect is needed or not for a variable to be deemed protective is not agreed upon. Further, variations in how resilient outcomes are operationalized leads to disagreement in terms of whether the same construct is being assessed. Research is required to be more comprehensive in defining outcomes, but also to be more specific in labelling outcomes that reflect domains of adaptive outcomes. Luthar has argued that the use of terms such as “behavioural resilience” or “psychosocial resilience” may help to address this concern (Luthar, 1993). In general, more detailed definitions and more explicit rationale will facilitate improved coherence in the field as well as cross-study comparisons.

The usefulness of resilience as a construct has been debated, in terms of the extent to which it adds unique and valuable insight to the body of existing research knowledge. Despite the criticism that resilience research contributes little more than more general terms such as “positive adaptation”, it does however provide valuable insight into our understanding of human development. By focusing on trajectories of outcomes that defy general expectations, it becomes possible to better understand the conditions under which a person is more likely to experience positive development despite the odds favouring poorer outcomes (Luthar et al., 2000a). The resilience framework for considering development therefore differs from that of classical developmental theories, and contributes a valuable perspective on human

development in varying contexts of adversity. Because the processes underlying adaptive developmental pathways are often different in situations with and without adversity, the resilience framework is necessary to clarify how mechanisms operate across contexts. Resilience research has substantial potential to contribute to developmental theory, in terms of normative and atypical human development, and in turn inform intervention and prevention science. With improved clarity and consistency of definitions and methodology, resilience research will increase its utility and continue to provide valuable insights into the complex processes of human development.

2.2 Maternal Depression

2.2.1 Introduction

Depression is a significant public health problem that, having been experienced once, is very likely to be experienced again (Keller et al., 1992). With reported relapse rates between 30% and 50% for the 12 months following a depressive episode (Belsher & Costello, 1988; Coryell, Endicott, & Keller, 1991), depression is the leading cause of disability of all chronic diseases (Avenevoli & Merikangas, 2006; Murray & Lopez, 1997). The main predictor of recurrence is a past history of depression, such that the less time a person stays well the more likely they are to relapse after recovery (Keller et al., 1992). Additional predictors of recurrence include recent stress, a lack of social support, and persistent neuroendocrine dysregulation (Belsher & Costello, 1988; Wildes, Simons, & Harkness, 2002).

The highly recurrent nature of depression has significant treatment implications. It points to the importance of determining intervention strategies for the depressed individual that will effectively improve the long-term prognosis of the disorder, and preventative measures aimed at reducing the risk of initial onset (Hammen, 2003a). On a broader level, it also suggests the potential for ongoing difficulties within the depressed person's family, and the challenges with assessing the changing nature of depression over time (Downey & Coyne, 1990). This means

that when considering the effects of a mother's depression on her child, it can be difficult to measure the extent of child exposure to maternal depression and the associated levels of risk (Ackerman et al., 1999; Goodman & Gotlib, 1999). The recurrent nature of depression also suggests that depressed individuals and their families will likely need long-term intervention strategies and support for managing the disorder, during depressive episodes as well as during times of recovery, to reduce the risk of future relapse (Riley et al., 2008).

2.2.2 Stress generation hypothesis

The stress generation hypothesis of depression suggests that individuals with a history of recurrent depression generate stressful life events due to their symptoms, behaviours, characteristics, and social context, which in turn contributes to furthering the cycle of depression (Coyne, Kahn, & Gotlib, 1987; Hammen, 1991). It was found that women with unipolar depression had significantly more interpersonal event stress than non-depressed women (Hammen, 2003a). They were also more likely to have experienced dependent events, or those events that are at least partly dependent upon the behaviour or characteristics of the individual (Brown & Harris, 1989; Hammen, 2006). Events such as intentional acts, probable negligence, or interpersonal conflicts are considered dependent events and include examples such as quitting a job, getting into an accident due to carelessness, or breaking up a relationship. The implication is that individuals with depression, in shaping and responding to their environments, contribute at least in part to the generation of further stress and in the maintenance and/or recurrence of their depressive symptoms (Coyne et al., 1987; Hammen, 1991, 2003a).

The added implication of the stress generation hypothesis is that a depressed person, in shaping his or her environment, is also influencing the environments of others. For example, if through her behaviours and characteristics a depressed mother is contributing in part to the generation of additional life stress, this will in turn have an impact on her family. There is

therefore an increased risk that the child of a mother with depression will be exposed to further stress, with the possibility of negative effects on the child's development (Ackerman et al., 1999; Goodman & Gotlib, 1999). Although there is an important need to reduce the mother's depressive symptoms, the interpersonal element of the disorder means that the woman's relationships and social environment are also in need of attention, particularly the ways in which she may be having a long-term impact on child development (Downey & Coyne, 1990; Hammen, 2003a). It is argued that intervention efforts must address the characteristics of both the child and the parent, including possible clinical comorbidity, as well as the family environment and social context more broadly (Avenevoli & Merikangas, 2006).

Evidence supports the broad range of potential adverse effects of maternal depression on child and family functioning. In a community sample of 235 families, higher levels of depressive symptoms were associated with increased marital conflict and insecure marital attachment, decreased parental warmth and increased parental control, and increased child dysfunction across multiple domains (Cummings et al., 2005). From infancy to age 6.5, it was found that children of mothers who were chronically depressed had higher levels of externalising behaviours and lower social competence (Ashman et al., 2008). Physical effects were also found in terms of reduced frontal brain activation and higher respiratory sinus arrhythmia reactivity. The study was strengthened by assessments of maternal depressive symptoms on a monthly basis, which enabled a more rigorous investigation of the effects of trajectories of maternal depression over time (Ashman et al., 2008).

In a recent meta-analysis of 193 studies, it was found that maternal depression was significantly associated with higher levels of child internalising and externalising behaviour problems, higher child negative affect and negative behaviours, lower child positive affect and positive behaviours, and increased psychopathology in general (Goodman et al., 2011). Associations were small in magnitude and varied in terms of moderation effects. More

specifically concerning child externalising behaviours, it was found that effect sizes did not significantly differ between studies in which maternal depression was assessed with a symptom rating scale or by meeting diagnostic criteria. This is particularly relevant to this thesis, which measures maternal depression using the Center for Epidemiologic Studies Depression Scale (CES-D; Radloff, 1977), a self-reported measure of depressive symptoms. The lack of significant moderating effect provides important support for the validity of symptom scales in assessing the association with child outcomes to a similar degree as diagnostic criteria. The meta-analysis also did not find a significant difference between the weighted mean effect sizes for studies of girls compared to studies of boys. There were, however, effects of income, such that studies of low-income families reported larger effect sizes compared to studies with middle-income or higher or mixed-income samples (Goodman et al., 2011).

2.2.3 Transmission of risk

There is strong empirical evidence for the increased risk of adverse effects for children of mothers with depression (Avenevoli & Merikangas, 2006; Beardslee et al., 1998; Goodman et al., 2011). What is less clear however are the processes through which children may be affected (Radke-Yarrow & Klimes-Dougan, 2002). Because of the high prevalence rates of maternal depression and the significant associated risk for offspring, it is important to improve the understanding of the ways through which maternal depression is related to child development (Goodman & Gotlib, 1999). The mechanisms linking maternal depression and child outcomes, and the variety of potential interactive effects and bidirectional influences, points to the complexity of trying to better understand these processes (Shaw, Gross, & Moilanen, 2009).

Potential mediating variables are the mechanisms through which the mother's depression may be exerting an influence on the child's functioning, and could be any of the factors that differ between children and families of mothers with and without depression (Ashman et al., 2008;

Goodman & Gotlib, 1999; Radke-Yarrow & Klimes-Dougan, 2002). For example, this might be differences in parenting behaviours that are linked to mother's depressive symptoms. The variables that potentially moderate the relation are those for which the effects of the mother's depression on child functioning differ according to varying levels or categories of that variable (Brennan et al., 2003; Goodman & Gotlib, 1999). Characteristics of the child, such as age, gender or temperament, or characteristics of the mother's depression, such as severity or chronicity, might for example be involved in moderating the relation between maternal depression and child outcomes (Alpern & Lyons-Ruth, 1993; Ashman et al., 2008). The added likelihood of reciprocal and transactional relations amongst both mediating and moderating variables suggests the difficulty in trying to establish a comprehensive theoretical model of how children are influenced by, and in turn might influence, mothers with depression (Gross et al., 2009; Hammen et al., 1990).

The literature suggests a variety of specific ways through which children might be influenced by maternal depression (Hammen, 2003b; Seifer, 2003). It may be that children inherit a direct vulnerability to depression, and/or personality traits, cognitive or interpersonal style, environmental characteristics or experience (Hammen, 2005). In adulthood, first degree relatives of patients with unipolar depression have a 20-25% risk for affective disorders, compared to approximately 7% risk in the general population (Goodman & Gotlib, 1999). Furthermore, it seems that when comparing clinical and subclinical levels of depression, the heritability rates are higher for clinical levels. The suggestion is that more common and milder subclinical levels are influenced to a greater extent by environmental factors. When considering the influence of heritability of depression however, the issue is further complicated by the possibility that environmental factors themselves may also be heritable (Goodman & Gotlib, 1999). In a recent study that sought to disentangle the complexities of environmental and inherited factors, patterns of environmental and genetic mediation in the

transmission of intergenerational psychopathology differed between genetically related and genetically unrelated parents and their children (Harold et al., 2011).

2.2.4 Theory of association

Three key sets of mechanisms through which maternal depression may influence child outcomes are genetic factors, parenting by a depressed person, and characteristics of the depressed parent's broader interpersonal context (Brennan et al., 2003; Seifer, 2003). The primary focus of this thesis is on the potential influence of parenting by a depressed mother on the development of child externalising behaviours. Few studies have been designed to specifically investigate processes of parenting as a potential means through which parent mental illness might influence the variation in child behaviour development (Seifer, 2003).

A theorised association between maternal depression and child externalising behaviours proposes that depression can negatively influence a mother in her role as a parent. In general, women with depression tend to have a less positive view of themselves as parents compared to control mothers. Previous research found that these women perceived themselves to be less competent as mothers and less adequate than other parents (Davenport, Zahn-Waxler, Adland, & Mayfield, 1984). Mothers with depression also displayed more negative attitudes towards the demands of parenthood, and were more likely to experience feelings of hostility and rejection towards their child (Colletta, 1983; Webster-Stratton & Hammond, 1988). Elevated symptoms of depression also appear to influence the choice of parenting strategies, such that mothers with depression more frequently utilised strategies that required less cognitive effort than control mothers (Kochanska, Kuczynski, & Maguire, 1989). It seems that the negativity and irritability that is often characteristic of individuals with depression can influence mothers' self-perceptions as well as the ways in which they interact with their children.

This thesis is interested in mechanisms that might link maternal depression and child externalising behaviours in early childhood, with a particular focus on explaining why some children of mothers with depression present with normative behaviour development despite the early experience of risk whereas others do not. Parenting behaviours are investigated as potential risk-specific predictors as well as mechanisms through which maternal depression might be associated with child behaviour. Given the evidence discussed above, harsh parenting in particular is hypothesised to play a key role in influencing the behaviour development of children of mothers with depression. The potential interactive effects and bidirectional influences between mother and child highlight the complexity of trying to better understand how these processes might operate. The analyses of this thesis attempt to address research questions in a sequential fashion, beginning with predictors of behavioural resilience, followed by mediation and moderation effects, and finally testing reciprocal influences to better understand the nature of processes linking maternal depression and child behaviour outcomes.

2.3 Child externalising behaviour

2.3.1 Introduction

The purpose of this thesis is to investigate the variability in behaviour outcomes for young children of mothers with depression. As detailed in the previous section, maternal depression in early childhood increases the risk for the development of maladaptive child behaviours (e.g., Ashman et al., 2008; Chronis et al., 2007; Goodman et al., 2011). The specific focus of this thesis is on disruptive or problematic child behaviours, known as externalising behaviours. In early childhood, the broad-band Externalising factor on the CBCL includes attention problems and oppositional or aggressive behaviours, as well as the corresponding disorders of Attention-Deficit Hyperactivity Disorder (ADHD) and Oppositional Defiant Disorder (ODD) (Achenbach & Rescorla, 2000; F. Gardner & Shaw, 2008; Lahey, Loeber, Quay, Frick, & Grimm, 1992). In

middle childhood, the broad-band Externalising factor also includes rule-breaking behaviours (Achenbach, Howell, Quay, Conners, & Bates, 1991). The purpose of this thesis is to explore processes that might explain why some young children of mothers with depression develop such problematic behaviours whereas other children do not.

Externalising behaviours are the most common type of behaviour problem during toddlerhood and into childhood, coinciding with the increase in parental expectations for child compliance (Egger & Angold, 2006; F. Gardner & Shaw, 2008). The problematic nature of these behaviours for both the child and the child's family is indicated by the high frequency of referral, such that the majority of clinical referrals to child and adolescent mental health services are made for externalising symptoms and their associated problems (Dodge & Pettit, 2003). Beyond the family, disruptive child behaviour problems and their associated outcomes into adolescence and adulthood also have a tremendous societal impact. It was estimated that the financial savings to society of diverting an adolescent at high risk for a life of crime ranges from $2.6 to $5.3 million USD, and diverting that course from birth would save between $2.6 and $4.4 million USD (M. Cohen & Piquero, 2009).

2.3.2 Predictors of externalising behaviour

Theorised models of causal predictors of child externalising behaviours highlight the dynamic interplay between factors at multiple levels of the child's environment (Bronfenbrenner, 1979; F. Gardner & Shaw, 2008). Transactional models outline the reciprocal influences between the child, family, and broader social environment, which either promote an adaptive developmental course or reinforce negative patterns of interaction that exacerbate maladaptive behaviour development (Dodge & Pettit, 2003; Sameroff, 1975; Yates, Obradović, & Egeland, 2010). The impact of environmental risk can begin prior to birth, with in-utero exposure to alcohol and tobacco demonstrating adverse consequences for child behaviour development (Tremblay et al., 2004). In infancy, the nature of the caregiver-child relationship

is most salient and the quality of attachment security can have a predictive effect on the manifestation of conduct problems over time, particularly in high-risk families (Trentacosta & Shaw, 2012). The literature highlights parenting behaviours as central to child behaviour development, particularly the role of rejecting and harsh parenting behaviours at predicting the onset and increase in disruptive behaviour problems (Shaw et al., 2003; Trentacosta et al., 2008). Not only are parenting behaviours especially important in early childhood, but they remain predictive of child behaviour functioning into the adolescent years (Laird, Pettit, Bates, & Dodge, 2003; Trentacosta & Shaw, 2012).

The impact of individual child characteristics as well as the role of parenting behaviours in influencing the course of child behaviour development is evidenced from as early as infancy. The family environment and caregiving behaviours in particular predict child externalising behaviours at school entry (Shaw, Owens, Giovannelli, & Winslow, 2001). Parenting is also predictive of aggressive behaviours more specifically. In a community sample of 572 families, physical aggression at 42 months of age was most strongly predicted by coercive parenting and family dysfunction at 5 months (Tremblay et al., 2004). Persistently elevated levels of physical aggression at 17, 30, and 42 months was distinguished by mothers with antisocial behaviours in adolescence, young age at first childbirth, low family income, and mothers who smoked during pregnancy (Tremblay et al., 2004).

Individual differences in child temperament are an early predictor of externalising behaviours. A more difficult temperament in infancy, characterised by poor behaviour and emotion regulation, is predictive of increased behaviour problems into childhood (Calkins, Blandon, Williford, & Keane, 2007; Calkins, Dedmon, Gill, Lomax, & Johnson, 2002). Compared to children with internalising problems and children without disorders, those with externalising problems between the ages of 4.5 and 8 years demonstrated poorer regulation, higher impulsivity, and more frequent displays of anger (Eisenberg et al., 2001). Poorer regulation and

higher impulsivity at age 4.5 also directly predicted higher levels of child externalising behaviours at age 8 (Eisenberg, Spinrad, et al., 2004). The authors highlight the importance of the individual child's capacity to effectively manage and inhibit behaviours given situation-specific cues and stimuli. Although individual differences in child temperament interact dynamically with the environment, previous research suggests that the prediction of behaviour problems from aspects of child temperament is substantially due to genetic factors (Schmitz et al., 1999).

2.3.3 Developmental trajectories and influencing factors

There is an extensive body of empirical evidence demonstrating that the developmental course of child behaviour problems shows both notable continuity over time and a marked increase during adolescence (e.g., Moffitt, 1993; Shaw et al., 2003; Tremblay et al., 2004). For example, in a community sample of 332 children, it was found that externalising behaviours in preschool were predictive of their associated DSM-V diagnoses 8 years later (Mesman & Koot, 2001). Similarly, in a five year follow-up study, externalising behaviours predicted higher rates of disruptive behaviour disorders (Pettit, Laird, Dodge, Bates, & Criss, 2001). The continuity of behaviour problems into adolescence was also supported by teacher reports of conduct problems at age 8, which independently predicted externalising behaviours at age 16 (Sourander & Helstelä, 2005).

In general, the findings support that there is a small group of children who demonstrate a consistently elevated trajectory of problem behaviour beginning in early childhood. The majority of children, however, present with elevated levels of behaviour problems only during adolescence. In a comparison of childhood-onset and adolescent-onset conduct problems in boys from ages 3 to 18 years, differences in temperament were found as early as 3 years of age (Moffitt, Caspi, Dickson, Silva, & Stanton, 1996). Males with a persistent childhood-onset pattern of conduct problems differed from their adolescent-onset peers in terms of

convictions for violent crimes, personality profiles, school drop-outs, and quality of family relationships. These differences were linked to differences in developmental history given that the two groups were comparable on adolescent measures of antisocial conduct across informants (Moffitt et al., 1996). Similar comparisons were made using data from the Dunedin longitudinal study, which included both boys and girls (Moffit & Caspi, 2001). Evidence was again found in support of the more pathological developmental histories of those individuals with childhood-onset behaviour problems. Compared to their adolescent-onset peers, these individuals had experienced poor quality parenting, early temperament and behaviour problems, and neurocognitive difficulties. There was also a marked difference between the two groups in the male-to-female ratio, such that 10:1 ratio was found for childhood-onset behaviour problems but only 1.5:1 ratio for adolescent-onset (Moffit & Caspi, 2001). The evidence points to both the continuity of behaviour problems over time as well as the adolescence-limited nature of behaviour problems for both boys and girls.

Advances in analytic techniques have enabled the more specific investigation of trajectories of child behaviour problems over time. In a sample of 284 low income boys, four trajectories of conduct problems were identified from ages 2 to 8 years: a persistent problem trajectory, a high-level desister trajectory, a moderate-level desister trajectory, and a persistent low trajectory (Shaw et al., 2003). Compared to children with initially low levels of conduct problems, children with high levels of conduct problems had higher levels of fearlessness and mothers with elevated depressive symptoms. Furthermore, of those children with initially high levels of conduct problems, a desisting trajectory was predicted by lower rates of maternal rejecting parenting (Shaw et al., 2003). Similar support was found for the importance of maternal characteristics in predicting the decline in high levels of aggression in preschool boys, particularly the effects of maternal education and teenage childbirth (Nagin & Tremblay, 2001). The study also found that high levels of both hyperactivity and oppositional behaviours in the child predicted increased odds of high levels of aggressive behaviours. The results

provide support for the importance of child characteristics in determining initial problem behaviour levels and emphasise the role of parenting behaviours in predicting the decline in such behaviours over time.

Similarly, in a sample of 441 children from ages 2 to 5, longitudinal growth patterns of externalising behaviours showed a general decline over time but with notable individual variability (Calkins et al., 2007). Their five indicators of contextual risk (socioeconomic status, marital status, number of siblings, parent stress, and parent psychopathology) predicted externalising behaviour at age 5. The effects of parenting were risk-specific, such that contextual risk factors interacted with responsive maternal parenting to predict a decrease in externalising behaviours from age 2 to 5 (Calkins et al., 2007). The disadvantage of considering a combined factor of contextual risk is that it is not possible to disentangle the operation of processes.

This thesis addresses the need for unpicking the nature of specific processes, in terms of how different types of parenting behaviours might interact with maternal depression to explain the variability in child externalising behaviours. By adopting a resilience research approach, the aim is to better understand why some children of mothers with depression demonstrate normative behaviour development despite the increased risk for maladaptive externalising behaviours (Masten & Coatsworth, 1998). Externalising behaviours are of particular interest not only because they are developmentally salient in early childhood and are influenced by maternal depression, but also because they are strongly predictive of future outcomes across domains of functioning (Moffit & Caspi, 2001; Moilanen, Shaw, & Maxwell, 2010; Pettit et al., 2001). By investigating early predictors and processes, the aim is to contribute to the evidence on how to avoid early onset problem behaviours and support more positive trajectories of behaviour development from a young age, particularly for children of mothers with depression.

2.4 Parenting

2.4.1 Introduction

The resilience perspective provides the overarching focus of this thesis, which is to better understand the variation in behaviour outcomes for children of mothers with depression and to promote more positive development for these children. Parenting behaviours and child self-regulation are potential protective mechanisms of interest because they are developmentally salient in early childhood (e.g. F. Gardner, Shaw, Dishion, Burton, & Supplee, 2007; Kopp, 1989; Maccoby, 1992), and are associated with maternal depression and child externalising behaviour (Brennan et al., 2003; Eisenberg, Smith, Sadovsky, Spinrad, & Baumeister, 2004; Lovejoy et al., 2000). They have also been shown to be modifiable through intervention efforts (e.g., C. E. Izard, Trentacosta, King, & Mostow, 2004; Reading, 2009; Shaw, 2006; Webster-Stratton et al., 2008).

Theories of socialisation processes have evolved over time, from viewing the child as a passive recipient to appreciating that children are active agents within their environments (Patterson, 1982; Sameroff, 1975). It is now well-known that from birth, children are equipped with inner capacities that are primed for development within a social world (Masten & Coatsworth, 1998). Particularly in early childhood, the family is seen as the primary domain within which these processes unfold. To a certain extent, the view is that children come to develop a degree of self-regulation with regards to internalised social norms and expectations (Maccoby, 1992), and are better prepared to effectively navigate the complexities of life in a social context (Dodge & Pettit, 2003; Mischel et al., 1989).

2.4.2 Theoretical perspectives

The theoretical perspectives underpinning processes of socialisation have notably evolved over time. Whereas theories were once all-encompassing, now they are more limited in scope, focusing on specific behaviours and developmental periods (Maccoby, 1992). There has also

been a notable shift from top-down approaches, which emphasised the parent-to-child relationship, to an improved understanding of bidirectional effects (Bell, 1968; Patterson, Bank, & Stoolmiller, 1990; Sameroff, 1975). Further, models are increasingly accounting for the complex nature of socialisation and looking to better understand the mechanisms through which they operate (Pardini, 2008). Current theoretical models acknowledge the important interplay of cognitive and affective processes, as well as biological and genetic mechanisms, within a dynamic sociocultural context (Gross et al., 2009; Yates et al., 2010). Before reviewing the literature in support of more current theoretical perspectives, a brief historical overview of the development of socialisation theories is first provided.

Psychoanalytic theory represents the first formal theoretical approach that sought to explain processes of socialisation. According to Sigmund Freud, the child was viewed as possessing uncontrollable impulses that followed a predetermined set of psychosexual stages (Maccoby, 1992). The role of the parent and society was to intervene in such impulses, imposing unwanted restrictions to shape children such that they adhered to socially appropriate norms. Conversely, the behaviourist perspective was focused on simple learning theories (Gewirtz & Pelaez-Nogueras, 1992). The general notion was that children acquired knowledge much in the same way as the processes of learning that were being studied at the time. Principles of conditioning held that child behaviours, once learned, could be unlearned with the removal of external reinforcement (Maccoby, 1992).

Advances in the field of psycholinguistics, however, questioned the principles of simple reinforcement theory. Developmental psycholinguistics began to discover that children's early language acquisition was not a process of simple imitation of adult language. Rather, children were equipped with a specific readiness for language development (Carpenter, Nagell, Tomasello, Butterworth, & Moore, 1998; Chomsky, 1959). The top-down approach of previous theories began to be replaced with an increased understanding of the child as an active

participant in the learning process. Further, with the development of attachment theory (Bowlby, 1969), the Freudian characterisation of the parent-child relationship as one in conflict was replaced with a more positive and adaptive view. The parent and child were viewed as possessing the readiness to establish a close and reciprocal relationship (Belsky, 1984). Although the mother's behaviours could direct the relationship along a maladaptive course, it eventually became clear that there was a substantial diversity of behaviours that could generate well-functioning relationships (Maccoby, 1992).

The advent of microanalytic techniques enabled the analysis of moment-to-moment sequences of interactions between the parent and child. Using such techniques, it was initially theorised that deviant child behaviours, particularly aggressive behaviours, were the result of ineffective parenting strategies (Patterson, 1980). The detailed analysis of parent-child interactions, however, pointed instead to mutually coercive patterns of behaviour. The work of Patterson and colleagues shifted the theoretical understanding of socialisation processes from social learning to a social interactionist view (Patterson, DeBaryshe, & Ramsey, 1989). Their findings supported that it was no longer sufficient to conceive of unidirectional processes from parent to child. Instead, the emphasis became one of parent-child dyads that are mutually influential in nature.

While theories of socialisation were developing, Belsky proposed a process model that addressed the multiple determinants of parenting (Belsky, 1984). The model outlined three key domains of influence: the parent's personal psychological resources, characteristics of the child, and contextual sources of stress and support. The parent domain acknowledged the personal characteristics and unique developmental history of the individual. It was also considered the most important domain in terms of buffering the parent-child relationship from stress. The child's contribution to the model largely focused on child temperament, and acknowledged that certain children, by virtue of their nature, would be more or less difficult to

parent than others. Rather than child characteristics directly influencing parenting however, it was the "goodness-of-fit" between the parent and child that was emphasised (Belsky, 1984). Finally, Belsky's model also incorporated the context of the parent-child relationship and the potential for sources of contextual stress as well as support. The marital relationship was highlighted as the main source of stress and support, and it was argued that greater attention needed to be given to the ways in which the marital relationship influenced the quality of parenting behaviours. Belsky's model was an important development in the understanding of parenting, by detailing the complex set of factors that operated in determining parenting behaviours.

Two theoretical approaches for understanding the parent-child association therefore emerged. The first approach, based on principles of attachment theory, emphasised the relationship between parent sensitivity and the child's emotional reactivity. It assumed that both parent and child develop an internal working model for understanding the relationship, and suggested that the stability of the attachment relationship is of particular importance (Main, Kaplan, & Cassidy, 1985). A second theoretical approach was the social interactionist perspective. This approach emphasised the developmental significance of early childhood and also proposed that difficult child temperament might be a risk factor for coercive-parent child exchanges (Patterson et al., 1990; Scaramella & Leve, 2004). As the child develops and enters school, the social interactional perspective further proposed that the nature of parent-child interactions influenced the quality of peer interactions (Patterson, Reid, & Dishion, 1998).

2.4.3 Parenting and maternal depression

Empirical evidence supports the impact of depression on mothers' parenting behaviours and is suggestive of the risk for negative parenting effects. Mothers with depression tend to display more irritable, intrusive and conflictual behaviours during their interactions with their children, and are also more likely to use harsh and punitive disciplining strategies (Brennan et al., 2003;

Lovejoy et al., 2000). Furthermore, mothers with depression tend to spend less time in mutually engaged shared activities with their children, and demonstrate more negative appraisals and lower tolerance of their child's behaviour (Kochanska et al., 1989). Such instances of insensitive and unresponsive parenting have been shown to predict insecure attachment and difficulty with self-regulation in children (Goodman & Gotlib, 1999).

To investigate maternal depression and parenting behaviours, Lovejoy and colleagues (2000) conducted a meta-analytic review of 47 observational studies. Their first aim was to examine the strength of the association between depression and various parenting behaviours, and then to consider the variables that might moderate these effects. The results of their meta-analysis indicated that the associations were most strong between depression and negative maternal behaviours, and then somewhat less strong for maternal disengagement from the child. There was a relatively weak, albeit significant, association between maternal depression and maternal warmth. The effect sizes (*r*) for these 3 categories of maternal behaviours were: 0.40 for negative (moderate), 0.29 for disengaged (moderate), and 0.16 for positive (small) (Lovejoy et al., 2000).

Upon examination of possible moderating effects, Lovejoy et al. (2000) found that the timing of the mother's depression moderated the relation between depression and negative parenting behaviours, with currently depressed mothers presenting the largest effects. The age of the child moderated the relation of maternal depression and positive parenting behaviours, such that the youngest children were least likely to experience positive parenting behaviours. Socioeconomic status also moderated the relation between depression and positive parenting behaviours, which resulted in an average effect size across studies of essentially zero for positive parenting in families with adequate finance. In economically disadvantaged families, however, the average effect size across studies was moderate (Lovejoy et al., 2000). That is to say that maternal depression appeared to be associated with decreased

positive parenting only in the context of economic stress. Socioeconomic status is an important additional risk factor that appears to increase the likelihood of potentially negative effects of depression on parenting behaviours. Further moderator analyses that considered method variables resulted in weak and inconsistent effects (Lovejoy et al., 2000).

Overall the findings from the meta-analytic review suggest that the largest effects for maternal depression on parenting behaviours are in terms of negative and coercive behaviours. Considering a symptoms-based approach, these findings are somewhat inconsistent with what might be predicted. It would seem more likely that involvement sensitivity and warm, positive interactions would suffer the most from the effects of the mother's depressed mood and behaviours (Lovejoy et al., 2000). However, the results of the meta-analysis suggest that unless there is also the added strain of financial difficulties, depression appears to have a virtually negligible effect on positive parenting behaviours. Instead, the greatest impact of depression appears to be in terms of increasing the likelihood of more hostile and coercive parenting behaviours. The symptoms of depression therefore do not necessarily predict patterns of parenting behaviours. The suggestion is that a dimensional approach to understanding mood disturbances may be more beneficial, as parenting difficulties might not be specific to depression per se but might be more related to general psychological distress (Lovejoy et al., 2000).

Empirical evidence provides support for the influence of maternal depression on parenting behaviours, and suggests that parenting behaviours might be an important mechanism through which mothers influence their child's outcomes. Operating from a resilience framework, an important question concerns the specific parenting factors that might protect children of depressed parents from maladaptive outcomes (Goodman & Gotlib, 1999; Hammen, 2003b). It may be that specific parenting behaviours are protective in the context of maternal affective disorder, which supports the need for examining parenting qualities in

relation to adaptive child outcomes. In the study by Brennan and colleagues (2003), it was found that high levels of perceived maternal warmth and acceptance, and low levels of perceived maternal psychological control and emotional over-involvement, interacted with maternal depression to predict mental health outcomes in adolescence (Brennan et al., 2003).

Despite the importance of parenting, there nevertheless needs to be a consideration for those stressors that are likely to be associated with the mother's depression. In comparisons of family levels of stress, it was found that those with a mother with unipolar depression had higher levels of stress than families with a mother who was medically ill (Conrad & Hammen, 1993; Goodman & Gotlib, 1999). Although there is good reason to better understand the specific characteristics of parenting that contribute to differences in child outcome, there nevertheless is the need to build on such findings by then accounting for the effects of other influential variables. Measuring and controlling for associated stressors is also necessary to help avoid overestimating the effect of the mother's depression on child functioning (Goodman & Gotlib, 1999). For this reason, this thesis focuses on aspects of parenting controlling for poverty and maternal education, and incorporates other influential family and community-level variables into later analyses (e.g., maternal substance abuse, conviction in the home, neighborhood dangerousness).

There are relatively few studies that have established parenting as a mechanism linking parental depression and child outcomes (Hammen, 2003b). More research is needed to investigate if parenting might be an important process through which a mother's depression influences her child's development. Because of the research supporting a stronger association between depression and harsh rather than positive parenting (Lovejoy et al., 2000), the focus of this thesis is particularly on harsh parenting in relation to child behaviour outcomes. It is hypothesised that the more overtly critical and negative parenting strategies associated with depressive symptoms might be an important mechanism through which maternal depression

influences child behaviour development over time. A measure of cumulative risk is included in the analyses to account for certain key aspects of the depressed mother and child's broader social context.

2.4.4 Parenting and child behaviour problems

The behaviours of parents clearly influence the developmental course of their child's behaviours. Harsh and more negative parenting practices in particular have been found to relate to the onset and maintenance of child externalising behaviour problems. Not only was harsh or excessively lax discipline significantly associated with overall child externalising problems (Acker & O'Leary, 1996; Del Vecchio & Rhoades, 2010), but harsh parenting also predicted an increase in the frequency of externalising behaviours over time (Kim et al., 2003). Further, a decrease in the use of harsh parenting strategies predicted a decrease in child externalising behaviours over time (August, Realmuto, Joyce, & Hektner, 1999). As evidenced by the research of Tremblay and colleagues (2000), although the trajectories of children's conduct problems generally decrease over time, certain trajectories remain high. It is therefore important to determine those factors from early in child development, particularly within the parent-child relationship, that contribute to the onset and maintenance of high levels of problem behaviour. A reduction of such key factors would be instrumental in reducing the likelihood of maladaptive child behaviours over time.

Additional support for the importance of parenting behaviours contributing to child behaviour problems is the Pitt Mother and Child Project (Shaw et al., 2003; Shaw, Lacourse, & Nagin, 2005). The longitudinal investigation focused on the developmental precursors of antisocial behaviour amongst boys. Aggressive and hostile maternal personality traits negatively influenced infant attachment security, contributing to poor mother-child relationship quality and an increased risk for maladaptive child behaviours (Shaw, Bell, & Gilliom, 2000; Trentacosta & Shaw, 2008). Conversely, early maternal sensitivity and responsiveness,

acceptance of child behaviour, and maternal involvement each emerged as significantly associated with secure attachment and low levels of behaviour problems (Owens & Shaw, 2003; Shaw et al., 2000). The potential protective effects of parenting were also supported by the finding that maternal warmth substantially mitigated the combined negative effects of delinquent peers and father absence (Cauce, Stewart, Domenech Rodriguez, Cochran, & Ginzler, 2003). The evidence therefore points not only to detrimental effects of harsh parenting but also to the potential buffering effects of positive parenting.

Parenting affects children's behaviour not only in the home but appears to carry over to the school setting. In one study, ineffective and irritable parenting predicted changes in child conduct problems in kindergarten and the first grade (Snyder et al., 2005). The association was further exacerbated when parents also held hostile attributions about their child's behaviour. These changes in child conduct problems at home predicted changes in teacher reports of child conduct problems at school. It would therefore seem that parenting continues to play an important role during the school-aged years by indirectly influencing child conduct problems at school through the child's behaviours at home (Snyder et al., 2005).

Evidence provided by the Minnesota Longitudinal Study highlights the long-term importance of the early caregiving relationship. It was found that those children with adaptive developmental outcomes were characterised by social competence, well-regulated emotion and a sense of self-efficacy, each of which was predicted by the child's history of consistent, supportive care (Yates et al., 2003). Further, an early developmental history of support not only contributed to positive adaptation over time, but increased the likelihood that an individual would return to more adaptive patterns of behaviour following times of difficulty. A history of supportive caregiving and secure attachment therefore seemed to function as a self-righting resource during periods of maladaptive behaviour (Yates et al., 2003). The argument is made for the

central role of a sensitive and responsive early caregiving relationship in contributing to adaptive development and to ensuring generally adaptive patterns of behaviours over time.

2.5 Self-regulation

2.5.1 Introduction

Empirical evidence points to the role of self-regulation in promoting more competent functioning across domains and over time, and highlights self-regulation as an important resource in more effectively managing various situations of risk (S. W. Baron, 2003; Eisenberg, Champion, & Ma, 2004; Gilliom, Shaw, Beck, Schonberg, & Lukon, 2002; Lengua, 2003). Children who are better able to inhibit and manage their behaviours in response to their environment demonstrate fewer conduct problems (Eisenberg, Smith, et al., 2004; Snyder et al., 2005), more positive social-emotional functioning (Kochanska, Murray, & Harlan, 2000), and improved academic performance (Blair & Razza, 2007; McClelland et al., 2007). Furthermore, there is a strong association between parenting behaviours and child self-regulation, with a detrimental impact of more negative parenting styles and a promotive effect of more positive parenting behaviours on child self-regulation (Karreman, van Tuijl, van Aken, & Deković, 2006; Piotrowski, Lapierre, & Linebarger, 2012).

Overall, the literature provides support for the importance of self-regulation as an individually-based resource for promoting more positive outcomes across development. In this thesis, the purpose of investigating the early capacity for self-regulation is to address the question of how individual differences in this domain might moderate the risk of maternal depression on the development of child problem behaviour. Considered as a potential moderator of risk, the aim is to determine whether the effects of maternal depression on parenting and child behaviour differ according to varying levels of child self-regulation (Brennan et al., 2003; Goodman & Gotlib, 1999). The purpose is to determine whether self-regulation might play a protective role

in buffering the adverse effects of maternal depression and poor parenting on child behaviour development.

2.5.2 Early development

Self-regulation is a complex construct, with multiple conceptualisations and definitions used in current research. This thesis measures child self-regulation using the Child Behaviour Questionnaire, and focuses particularly on child inhibitory control as part of the broader domain of effortful control. According to Rothbart, effortful control is defined as ‘‘the ability to inhibit a dominant response to perform a subdominant response’’(Rothbart & Bates, 2007, p. 137), and includes attentional control and activation or inhibitory control. Throughout this thesis, the term self-regulation is used to indicate this definition. Alternate terminology is used in the review and discussion of previous research according to the terminology used in the specific research.

The capacity for self-regulation emerges early in development, from as young as two years of age (Kopp, 1982), and increases throughout childhood (Dennis, Brotman, Huang, & Gouley, 2007; Kochanska et al., 2000; Murphy, Eisenberg, Fabes, Shepard, & Guthrie, 1999). In general, girls tend to display a greater capacity for early self-regulation than boys, as do children from higher income homes (Moilanen, Shaw, Dishion, Gardner, & Wilson, 2010). Early self-regulation appears to be multiply determined, with important effects of early child and caregiver behaviours (e.g., Kochanska et al., 2000; Lengua, Honorado, & Bush, 2007; Piotrowski et al., 2012). For example, higher levels of infant attentional control as early as 9 months, and maternal responsiveness at 22 months, predicted greater effortful control at 33 months. Higher levels of effortful control in turn predicted more regulated anger and joy (Kochanska et al., 2000).

More specifically for children of mothers with and without depression, evidence was found for differences in the development of self-regulatory strategies (Silk, Shaw, Skuban, Oland, &

Kovacs, 2006). In a Wait Task paradigm conducted in a laboratory setting, children of mothers who had childhood-onset depression were more likely to focus on the delay object or task compared to children of mothers who had never been depressed. In particular, daughters of mothers with depression were more likely to engage in passive waiting and were less likely to adopt more active regulation strategies (Silk et al., 2006). Although perhaps less relevant to externalising behaviour outcomes, such passive strategies for regulation have the potential to increase the risk for more maladaptive psychosocial functioning. Importantly, the findings suggest that the development of specific strategies of self-regulation in childhood might be influenced by having a mother with depression.

2.5.3 Predictive effects

Delay of gratification in young children has been found to be strongly predictive of later outcomes across domains of functioning (Mischel et al., 1989). The capacity to inhibit behaviours and postpone immediate gratification is an important asset for planned, goal-driven behaviour. The seminal delay of gratification research by Mischel and colleagues (1989) found that individual differences in self-regulation in the preschool years predicted outcomes into adolescence. Those children at age four who were better able to delay gratification in experimental conditions demonstrated more competent cognitive and social functioning in adolescence. These adolescents reported more positive academic results and were better able to cope with frustration and stress (Mischel et al., 1989). The early capacity to inhibit behaviour and delay immediate gratification for the sake of future goals appears to be an important resource for supporting more competent development across the social-emotional, behaviour, and academic domains over an extended period of time.

Inhibitory control plays a role in the development of social-emotional competence from as early as the preschool years (Kochanska et al., 2000). In an ethnically diverse, low-income sample of 146 preschool children, higher levels of inhibitory control were associated with

higher ratings of social skills and lower internalising behaviours (Rhoades, Greenberg, & Domitrovich, 2009). In the adolescent years, the self-regulation of emotion more specifically was predictive of depressive symptoms and problem behaviour (Silk, Steinberg, & Morris, 2003). Adolescents in grades 7 and 10 who reported less effective regulation of more intense and labile emotions also reported higher depressive symptoms and more problem behaviours. The importance of effective regulation, both behaviourally and emotionally, appears to be an important resource from early childhood through adolescence.

Increasingly empirical support is being provided for the importance of self-regulation to early emergent academic functioning. Between three and five years of age, child self-regulation accounted for unique variance in academic functioning independent of general intelligence scores (Blair & Razza, 2007). Initial self-regulation, as well as the growth in behavioural regulation, have been shown to predict specific academic outcomes in the preschool years. Those children with a greater capacity to manage and inhibit their behaviours, as well as those who demonstrate an increase in behaviour regulation during the preschool years, report higher literacy, vocabulary and math skills (Blair & Razza, 2007; McClelland et al., 2007).

Of specific relevance to this thesis, evidence was found in support of unique predictive effects of effortful control and impulsivity on child externalising behaviours (Eisenberg, Smith, et al., 2004). Higher levels of effortful control and lower levels of impulsivity at age 4.5 directly predicted lower externalising behaviour problems at age 8. The significant main effect of effortful control remained predictive through to age 10. The study also reported that effortful control and impulsivity were predictive of "resiliency" at age 8. It is important to note however that in their study, "resiliency" was conceptualised based on previous work concerning "ego resiliency" (Block & Block, 1980). It was defined as a "personality measure reflecting how the individual responds and adapts to stress in various situations". In their analyses, "resiliency" was a specific outcome variable measured using the Block Q-Sort (Block & Block, 1969),

reduced to 24 items based on those deemed by the authors to reflect "resiliency". Although the authors argued that the outcome was related to the construct of resilience defined by Luthar and colleagues (e.g., 2000a), it is largely conceptualised as a measure of positive outcome rather than reflecting processes of resilience as defined in this thesis.

2.5.4 Self-regulation and parenting

There is substantial evidence in support of an association between parenting and child self-regulation (e.g., Colman, Hardy, Albert, Raffaelli, & Crockett, 2006; Piotrowski et al., 2012). A meta-analysis of 41 studies investigated the strength of association between self-regulation in pre-schoolers and three types of parenting behaviours: positive control, negative control, and responsiveness (Karreman et al., 2006). In the meta-analysis, positive control was described as directive parenting behaviour, providing appropriate support and management of the child. In contrast, negative control was authoritarian control that was harsh and critical, and included physically punitive disciplining strategies (Karreman et al., 2006). Although this thesis is not specifically analysing parental control, the parenting behaviours associated with positive and negative control are in line with behaviours of the positive and harsh parenting variables analysed here. Results of the meta-analysis indicated significant but small associations between both types of control and self-regulation of pre-schoolers.

More recent research with children from ages 2 to 4 found a significant association between harsh parenting and child inhibitory control (Moilanen, Shaw, Dishion, et al., 2010). Higher levels of harsh parenting at age 2 were associated with initially low levels of child inhibitory control at age 2. Growth in inhibitory control from ages 2 to 4 was associated with positive parenting, such that high levels of positive parenting resulted in stronger growth in child inhibitory control. Demographic differences were highlighted, particularly the effect of extreme family poverty on slowed growth in child inhibitory control (Moilanen, Shaw, Dishion, et al., 2010).

Results for similar effects in a slightly older sample of children ages 4 to 9 were also found. Higher levels of maternal warmth and lower levels of physically punitive discipline at ages 4 and 5 predicted a greater capacity for self-regulation at ages 8 and 9 in a large, ethnically diverse sample of children (Colman et al., 2006). In their study, child self-regulation was measured according to the conceptualisation of Kopp (1982), encompassing behaviour regulation as well as the regulation of attention and affect. The significant effects did not vary by gender or ethnicity (Colman et al., 2006). In a frustration task conducted with a sample of young boys, positive maternal control was associated with more effective regulation strategies (Gilliom et al., 2002). Additionally, specific regulatory strategy use was associated with specific outcomes, such that the boys that utilised attention-shifting strategies demonstrated lower externalising behaviour problems and higher levels of cooperation with their peers (Gilliom et al., 2002). The evidence supports the role of early parenting behaviours in influencing the child's ability to effectively manage and inhibit their behaviour in response to their environment, suggesting the importance of dynamics within the family for the promotion of adaptive self-regulation.

Preliminary evidence is also provided for the relative predictive strength of parenting behaviours compared to contextual risk on preschool children's effortful control (Lengua et al., 2007). Contextual risk had a direct negative effect on effort control at follow-up assessment. Positive parenting behaviours, specifically limit setting and scaffolding, had a direct positive effect on effortful control and accounted for the effects of contextual risk. The results suggest that in the preschool years, the more distal effects of contextual risk on effortful control are largely accounted for by the more proximal processes of parenting behaviours (Lengua et al., 2007).

Recent evidence in support of these findings is provided by a nationally representative survey of 1,141 parents and their children, aged 2 to 8 years, in America (Piotrowski et al., 2012). The

survey found evidence of improved self-regulation over time, such that older children had fewer difficulties self-regulating than younger children. Boys and children from low income homes demonstrated greater difficulties. Support was not found for effects of minority status, household composition or parent education on child self-regulation. In line with previous research, there was a strong association between parenting behaviours and child self-regulation. Those parents who engaged in authoritative parenting styles had children with more competent self-regulation, and parents who were over-controlling had children with poorer self-regulation. The children with the greatest difficulties self-regulating were those whose parents who were overly permissive and demonstrated a significant absence of control.

In a recent review of parenting and child temperament, it was found that children who were low in effortful control were more susceptible to adverse effects of negative parenting, which then predicted lower levels of effortful control (Kiff, Lengua, & Zalewski, 2011). The evidence therefore supports that child self-regulation is an important individual resource, in terms of predicting future outcomes, but that its influence extends beyond the child. Individual differences in child inhibitory control plays a role in determining the nature of parenting behaviours, specifically in terms of eliciting more negative parenting behaviours. Reciprocal effects are discussed in the following section. In the context of maternal depression, this individual resource might be particularly relevant given the mother's increased tendency towards the use of harsh parenting. The inclusion of inhibitory control in this thesis is to investigate its potential predictive effects on behaviour outcomes for children of mothers with depression. Furthermore, the aim is also to determine whether inhibitory control has a moderating effect on parenting processes as they relate to mothers with depression and their young children.

2.6 Reciprocal effects

2.6.1 Introduction

The seminal paper of Bell (1968) made the argument that it was no longer sufficient to conceive of effects simply from parent-to-child. Drawing from human and animal research at the time, he pointed to the overly limited focus of unidirectional models. The effects of child-to-parent, although assumed in theory, had to be accounted for and explicitly investigated in future research. Following on from Bell, Sameroff developed a model that emphasised the transactional nature of parent-child relations over time (Sameroff, 1975). His transactional model outlined a process of mutual influence, whereby characteristics and behaviours of the child elicited specific responses from the parent, which then served to further influence the child's behaviour in the future. The transactional model is in line with the social coercion theory of Patterson and colleagues discussed in the preceding section, based on the finding that aggressive children tend to live in highly coercive family environments (Patterson, 1982; Patterson et al., 1998). According to their theory, a cycle of mutually coercive behaviours is established when the child and parent engage in increasingly more aversive behaviours, which then provoke further hostile behaviours.

2.6.2 Parenting and child behaviour

Empirical evidence supports theories of reciprocal influence between caregiver and child. For example, it was found that mothers of competent children were positive and reciprocal toward their own children as well as children of others (Dumas, LaFreniere, & Serketich, 1995). Mothers of aggressive children however were only positive and reciprocal toward unfamiliar children. It was not only the behaviours of mothers however that varied in the exchanges; the study also found that aggressive children were only positive with mothers who were not their own (Dumas et al., 1995). It is therefore necessary to be mindful that it is not simply mothers that influence parent-child exchanges, but that children also play an important role in

influencing the nature of these interactions. As one study found, the influence of child conduct problems on changes in parenting behaviours was as strongly predictive as parenting behaviours on changes in child conduct problems (Pardini, Fite, & Burke, 2008).

Previous research has found that whilst more negative parenting styles predict increased child behaviour problems, child noncompliance and more difficult temperament styles predict increased levels of harsh parenting and more punitive disciplining strategies. For example, child antisocial behaviour at age 9 predicted poorer parental monitoring and less effective disciplining strategies at age 11, controlling for parenting at age 9 (Patterson et al., 1990). Higher levels of child externalising behaviour at age 5 were also found to predict higher levels of parental psychological control and lower levels of parental monitoring at age 13 (Pettit et al., 2001). With regards to physical disciplining strategies more specifically, there is some preliminary evidence for bidirectional effects (Lansford et al., 2011). More frequent use of physical discipline predicted higher levels of child externalising behaviour, which in turn predicted more frequent use of physical discipline. This pattern however was only found in one of the two samples that the study analysed. In the second sample, physical discipline predicted child externalising, but child externalising did not predict later physical discipline (Lansford et al., 2011). Overall, the evidence supports the reciprocal nature of effects between parent and child, particularly with regards to negative parenting styles and child problem behaviour.

Empirical evidence is also provided for the effects of child temperament on negative parenting from infancy into toddlerhood (Bridgett et al., 2009). Latent growth models of infant regulatory capacity from 3 to 12 months, measured using the Infant Behaviour Questionnaire-Revised (Gartstein & Rothbart, 2003), found that steeper decreases in infant regulatory capacity explained the greatest proportion of variance in negative parenting at 18 months compared to other temperament domains. The early emerging capacity for self-regulation in the first year of infancy appears to have strong predictive effects on the subsequent use of

negative parenting behaviours. The effect appears to be similarly present in middle childhood, with higher levels of effortful control at ages 8-12 predicting decreases in parental rejection three years later (Lengua, 2006).

2.6.3 Maternal depression and child behaviour

The literature also supports the mutually influential nature of the relation between maternal depression and child behaviours (Elgar, McGrath, Waschbusch, Stewart, & Curtis, 2004). In addressing the question of how children affect trajectories of maternal depression, it was found that child non-compliance was the only consistent factor that predicted trajectory group membership (Pelham et al., 1997). In their study of the developmental transactions between boys' conduct problems and maternal depression, Shaw and colleagues (2009) found that negative emotionality, noncompliance and aggression in sons predicted trajectories of maternal depression. In line with previous findings, noncompliance demonstrated the most consistent pattern of results. The more chronic and elevated trajectories of maternal depression predicted by these early childhood behaviours in turn discriminated teacher and self-reports of antisocial behaviours in adolescence (Gross et al., 2009). Interestingly, trajectories of maternal depression did not discriminate between adolescent levels of internalising symptoms, suggesting a more dynamic interplay between the mother's depression and overt child behaviours over time.

2.7 Summary of thesis rationale

In this thesis, child externalising behaviours are of specific interest, with the aim of exploring processes that improve the likelihood of positive behaviour development in the context of maternal depression. The validity of this thesis' operationalization of behavioural resilience is first explored through a series of within- and between-group comparisons based on previous research (Jaffee et al., 2007). Parenting behaviours and child inhibitory control are then explored as predictors of behavioural resilience, with an interest in determining whether they

predict adaptive behaviours for children in general or more specifically for children of mothers with depression. To determine the general or risk-specific nature of effects, interactions with maternal depression are investigated. A composite measure of cumulative risk is then included to determine if any significant predictive effects become overwhelmed by the experience of additional life stress. Moving beyond predictors of outcome, the analyses then consider whether parenting might be a process through which maternal depression influences child behaviour development. Positive and harsh parenting are analysed as potential mediating mechanisms and child inhibitory control is tested as a possible moderator of indirect effects. To try to capture the dynamic nature of the mother-child relationship, mediation models are extended to include bidirectional effects. The final models investigate the reciprocal relations between maternal depression, positive parenting, harsh parenting, and child externalising behaviour, and the potential moderating effect of child inhibitory control.

The overarching focus of this thesis is on mechanisms of resilience for young children of mothers with depression, in an effort to contribute to an improved understanding of the dynamic nature of child behaviour development in the context of maternal depression. Key processes are those that are developmentally salient and well-supported as relevant to maternal depression and child externalising behaviours. This thesis therefore investigates positive parenting, harsh parenting, and child inhibitory control as potential mechanisms linking maternal depression and child behaviour development in early childhood. In trying to disentangle the complex ways in which different types of parenting behaviours and child inhibitory control might operate, the aim is to more effectively promote adaptive behaviour development for young children of mothers with depression. Operating from the resilience perspective, the emphasis is on the insight offered by children who are doing well behaviourally despite the early experience of risk, and on behaviours of mothers with depression who are supporting this adaptive behaviour development.

Chapter 3: Methods

3.1 Early Steps Multisite Study

This thesis analyses data collected by the Early Steps Multisite Study, a randomised controlled trial of the Family Check-Up (FCU) (Shaw, Dishion, Gardner & Wilson, 2002-present). As a large-scale, longitudinal study that includes multiple informant reports and multi-method observed measures from child age 2, Early Steps data enables a well-powered, rigorous investigation of the research questions of this thesis. The theoretical rationale, the specific research questions and hypotheses detailed in each empirical chapter, and the choice of measures from the dataset are unique to this thesis. The development of the analytic strategies, which includes an exploration of categorical and continuous variable models, is original and highlights an important area of resilience-related research that requires further consideration by future studies. The analyses of this thesis build on questions concerning predictors of behaviour for children of mothers with depression to try to understand the more dynamic nature of processes over time. In doing so, while this thesis utilises Early Steps data, it is making an original contribution to the literature on early child development, and more specifically, to the conceptualisation of resilience in the context of maternal depression and child behaviour.

Early Steps is an ongoing longitudinal study of a randomised controlled trial of the FCU, a family-based intervention programme conducted in the United States (Shaw, Dishion, Gardner & Wilson, 2002-present). The sample is comprised of 731 ethnically diverse families (African American, European American and Latino) from across three sites: Eugene, OR (suburban); Pittsburgh, PA (urban); and Charlottesville, VA (rural). Families were randomly assigned to either the FCU intervention or control condition. The FCU is a brief, three-session intervention based on motivational interviewing (Dishion & Kavanagh, 2003). Baseline measures were completed at child age 2, with follow-up assessments completed on an annual basis. Multi-

informant report and observed data are currently available for each year from child ages 2 to 8, except for age 6. The research protocol was approved by the Institutional Review Board at the respective universities, and participating primary caregivers provided informed consent. Permission to access the data and to conduct the proposed analyses was agreed upon by the Principal Investigators of the Early Steps Study in April, 2010. A description of the FCU, including intervention rationale and procedures, is provided for further information in Appendix A.

3.1.1 Recruitment

Mother-child dyads were recruited between 2002 and 2003 from a national food supplement programme (WIC: Women, Infants, Children) from across the three study sites. Families were invited to participate if they had a son or daughter between 2 and 3 years of age, and if they met study inclusion criteria on measures of socioeconomic, family and/or child risk factors for future problem behaviour. Risk criteria for inclusion required scores at or above one standard deviation above normative averages on several screening measures in the following three domains: child behaviour (conduct problems, high-conflict relationships with adults), family problems (maternal depression, daily parenting challenges, substance use problems, teen parent status), and socioeconomic risk (low education achievement and low family income using WIC criterion). Sufficiently high scores in two or more of the three risk domains were required for study inclusion.

Of the families contacted at WIC sites, 1,666 families had children within the necessary age range, of which 879 met eligibility requirements. Across the three sites, this represented 52% of families first contacted in Pittsburgh, 57% in Eugene and 49% in Charlottesville. Of the 879 eligible families, 731 (83%) agreed to participate, represented by 88% in Pittsburgh, 84% in Eugene and 76% in Charlottesville.

3.1.2 Participants

Participants in the Early Steps Multisite Study include 731 mother-child dyads recruited from the three study sites between 2002 and 2003. The number of participating families comprised: 272 (37%) in Pittsburgh, 271 (37%) in Eugene and 188 (26%) in Charlottesville. Sample children were two years of age at baseline assessment (*M* = 29.91 months, *SD* = 3.12 months), and included 358 girls (49%) and 373 boys (51%). Primary caregivers self-identified as: 28% African American, 50% European American, 13% Biracial, 9% Other (e.g., American Indian, Native Hawaiian), with 13% reporting as Hispanic American. Between 2002 and 2003, more than two thirds of the sample families had an annual income of less than $20,000 and the mean number of family members per household was 4.5 (*SD* = 1.63). In total, 41% of primary caregivers reported having a high school diploma or GED, and 32% reported having 1-2 years of post-high school training.

3.1.3 Randomisation

The randomisation sequence used in the Early Steps trial was computer generated by staff not involved in recruitment. Randomisation was gender-balanced to produce equal numbers of boys and girls in the intervention and control groups. Randomisation was also blinded, such that the sealed envelope containing group allocation was opened only after the baseline assessment was complete.

3.1.4 Retention

Of the initial 731 families who participated at age 2, 659 (90%) participated at age 3 follow-up, 619 (85%) participated at age 4 follow-up, 621 (85%) participated at age 5 follow-up, and 566 (77%) participated at age 7.5 follow-up. Selective attrition analyses revealed no significant differences in maternal depression, child externalising behaviour, poverty, maternal education, child race, child gender, or intervention status at ages 3, 4, 5, and 7.5.

3.2 Measures

3.2.1 Maternal depression

Center for Epidemiologic Studies Depression Scale (CES-D). The CES-D (Radloff, 1977) is a well-established and widely used 20-item self-report measure of depressive symptoms, designed to measure depression in epidemiologic studies of the general population. The purpose of the CES-D differs from diagnostic or depression severity scales; it measures current depressive symptomology with an emphasis on the affective component. Questionnaire items were used in previously validated longer measures and assess the major factors of depressive symptomology: depressed mood, feelings of guilt and worthlessness, feelings of helplessness and hopelessness, psychomotor retardation, loss of appetite, and sleep disturbance. Respondents report how frequently they have experienced the list of depressive symptoms during the past week on a scale ranging from 0 (less than a day) to 3 (5-7 days). Items are summed to create an overall depressive symptoms score, with a cut off score of 16 and above indicating the presence of depressive symptoms.

The CES-D has high internal consistency, adequate test-retest reliability and good validity (Radloff, 1977). The CES-D discriminated well between in-patient groups and the general population, was moderately sensitive to levels of depression symptom severity, and reflected improvements in symptoms after treatment (Ensel, 1986; Roberts, 1980; Roberts & Vernon, 1983). The measure also correlated well with other depression scales and demonstrated expected associations with the Life Events questionnaire (Ensel, 1986). Factor analysis results were consistent across three groups, resulting in four factors: depressed affect, positive affect, somatic and retarded activity, and interpersonal difficulties. The depressed affect factor accounted for the largest proportion of variance (Radloff, 1977). Due to high internal consistency, Radloff (1977) argued against an emphasis on separate factors and recommended using the total score only. Researchers are cautioned that the CES-D is not intended as a

clinical diagnostic tool, such that group averages should be interpreted in terms of levels of depressive symptoms and not rates of illness (Ensel, 1986). This thesis therefore reports on maternal depression in terms of the presence or continuum of depressive symptoms; it does not presume to report on a clinical diagnosis of depression.

3.2.2 Child externalising behaviour

Child Behaviour Checklist (CBCL). The Child Behaviour Checklist (CBCL) is a standardised caregiver- or teacher-report measure of a child's competencies and behaviour problems. There are two versions of the measure, one for children ages 1.5 to 5 years (Achenbach & Rescorla, 2000) and one for children and adolescents ages 6 to 18 years (Achenbach, 1991). The version for young children includes 99 items and assesses behaviour problems. The version for older children includes 20 competence items and 120 items on behavioural and emotional problems. Both versions are based on the preceding 6 months and rate items on a 3-point scale (0 = not true as far as you know, 1 = somewhat or sometimes true, 2 = very true or often true). In the Early Steps Multisite study, the CBCL version for younger children was administered between ages 2 and 4, and the version for older children between ages 5 and 7.5.

Child externalising behaviour is measured in this thesis using scores on the broad-band Externalising factor of the CBCL. In the version for younger children, the Externalising factor includes the Attention Problems and Aggressive Behaviour subscales. In the version for older children, the Externalising factor includes Rule-Breaking Behaviour and Aggressive Behaviour. The age-appropriate CBCL was completed by the primary and alternate caregivers during the home visits at ages 2, 3, 4, 5, 7.5, and 8. Teacher reports of the CBCL are available at age 8. CBCL t-scores represent a rank order of scores relative to a standardised group, whereas the actual change in child behaviour is represented by the raw scores. CBCL raw scores were therefore used in all analyses except for where specifically indicated in Section 4.4, in the validation of resilience.

3.2.3 Secondary child outcomes for Chapter Four analyses

Eyberg Child Behaviour Inventory. The Eyberg is a 36-item measure of early childhood problem behaviours. It is comprised of two factors: perceived intensity of the behaviour and the degree to which the behaviour is a problem for the caregiver. The Intensity factor is similar in content and structure to the CBCL Externalising factor. The focus in this thesis is therefore on the Eyberg Problem factor, which is highly correlated with independent observations of the child's behaviour. It is also capable of differentiating clinic-referred and non-clinical samples (Robinson, Eyberg, & Ross, 1980) and shows high test-retest reliability and high internal consistency (Webster-Stratton, 1985). As outlined above, the Problem factor will be used in the validation of the resilient child behaviour outcome.

Child Behaviour Checklist (CBCL). With an emphasis on the description of problems and not a diagnosis, the CBCL identifies 8 syndromes: anxious/depressed, withdrawn, somatic complaints, social problems, thought problems, attention problems, rule-breaking behaviour, and aggressive behaviour. The 8 syndrome structure fit well in a large-scale confirmatory factor analytic study conducted across 30 societies (Ivanova et al., 2007). The CBCL also identifies two broad groupings of syndromes: internalising and externalising. The internalising measure includes withdrawn behaviours, somatic complaints, and anxious and/or depressed mood. Although the primary outcome measure of this thesis is child externalising behaviour, a more comprehensive conceptualisation of child functioning is validated with the inclusion of scores on CBCL measures of social problems, affective disorder, anxious problems, and internalising symptoms.

Woodcock-Johnson III Tests of Achievement. Three subtests from the Woodcock-Johnson III Tests of Achievement (WJ-III; McGrew & Woodcock, 2001) were administered to assess children's pre-academic achievement. These subtests comprise the Academic Skills cluster and include: Letter-Word Identification, Calculation, and Spelling. Due to the extent of missing

data, the Calculation measure was excluded from the analyses in this thesis. The Letter-Word Identification subtest is designed to measure children's abilities to identify letters written in the stimulus book. The book contains 76 words that increase in difficulty and children are required to identify as many written words as possible. The Spelling subtest contains 59 items and measures children's pre-writing skills (e.g., drawing lines and tracing letters) as well as writing uppercase and lowercase letters, and spelling orally-presented words. The overall measure of Academic Skills is calculated from the total scores on the subtests.

The WJ-III is appropriate for use with individuals ranging in age from 2 to 40 years. Each subtest takes approximately 5 minutes to administer with a total administration time of 15 minutes. The WJ-III was normed on a sample of 8,818 individuals from over 100 geographically diverse communities in the United States. In addition to grade-equivalent norms, age-graded norms are available for comparison (McGrew & Woodcock, 2001). This thesis includes scores on the Letter-Word Identification, Spelling, and Overall Academic Skills at age 5 to assess cognitive abilities as part of the validation of early childhood behavioural resilience.

3.2.4 Observed parenting behaviour

This thesis utilises composite measures of positive parenting and of harsh parenting. At age 3, the parenting measures are comprised of items from the Relationship Process Code (RPC) coding scheme and have been used in previously published Early Steps research (e.g., Dishion et al., 2008; Shaw, Gross, et al., 2009). At age 5, the parenting measures are comprised of comparable items from the Relationship Affect Coding System (RACS) coding scheme, a newly implemented method of data coding (Peterson, Winter, Jabson, & Dishion, 2008). The procedure for the construction of the age 5 parenting variables is outlined in Appendix B.

Observed positive parenting (age 3). The observed positive parenting variable (Dishion et al., 2008) is comprised of the four subscales outlined below.

1. Parent involvement: based on the home visitor's ratings of the parents' involvement, it

includes the following three items from the Home Observation for Measurement of the Environment inventory (HOME; Bradley, Corwyn, McAdoo, & García Coll, 2001): (1) parent keeps child in visual range, looks at often, (2) parent talks to child while doing household work, and (3) parent structures child's play periods.

2. Positive behaviour support: based on videotape coding of caregivers prompting and reinforcing young children's positive behaviour, as reflected in the Relationship Process Code (RPC; Jabson et al., 2004). Items include: (1) positive reinforcement (verbal and physical), (2) prompts and suggestions of positive activities, and (3) positive structures (e.g., providing choices in a request for behaviour change).

3. Engaged parent-child interaction time: reflects the average length of parent-child sequences that involve talking or physical interactions, such as turn taking or playing a game, using RPC codes of "Talk" and "Neutral physical contact".

4. Proactive parenting: based on ratings made by videotape coders of the parent's tendency to anticipate problem behaviours, and to provide prompts or other structural changes to avoid young children becoming upset and/or involved in problem behaviour. The six items include: (1) parent gives child choices for behaviour change whenever possible, (2) parent communicates to the child in calm, simple and clear terms, (3) parent gives understandable, age-appropriate reasons for behaviour change, (4) parent adjusts/defines the situation to ensure child's interest, success and comfort, (5) parent redirects the child to more appropriate behaviour if the child is off task or misbehaves, (6) parent uses verbal structuring to make the task manageable.

Observed positive parenting (age 5). At age 5, the observed positive parenting composite is comprised of coder impression items under the newly implemented RACS coding system. The 7 RACS coder impression items included are: (1) parent uses directives that seem specific and clear to the child, (2) parent sets limits without using aversive control, (3) parent is appropriately contingent in responding to positive or compliant child behaviour, (4) parent

communicates to child in calm, simple, and clear terms, (5) parent defines the situation so as to assure the child's interest, success and comfort, (6) parent is mindful of the child's behaviour, whereabouts, activities, and feelings, and (7) parent uses verbal structuring to make the tasks manageable. The parenting composite also includes the following 5 items from the HOME: (1) parent keeps child in visual range and looks often, (2) parent structures the child's play period, (3) parent seemed in good control of the child, (4) parent disciplines the child appropriately, and (5) parent has good problem solving skills.

Observed harsh parenting (age 3). The observed harsh parenting variable is comprised of three items from the Relationship Process Code (RPC) and six items from the coder impressions (COIMP). The three RPC codes include duration proportions of: (1) parental negative verbal, (2) parental negative directive, and (3) parental negative physical behaviour. The six COIMP items include: (1) parent provides developmentally inappropriate reasons for child's behaviour changes, (2) parent displays anger or annoyance with the child, (3) parent criticises or blames the child for family problems, (4) parent uses physical discipline, (5) parent ignores/rejects the child, and (6) parent makes statements about the child's worthlessness.

Observed harsh parenting (age 5). As with the positive parenting variable, the observed harsh parenting variable at age 5 utilises items from the new RACS coding system. The variable is comprised of two items from the RACS duration proportions, three items from the RACS coder impressions, and three items from the HOME Inventory. The two RACS duration proportion items are: (1) parent to child negative physical and (2) parent to child conflict or tension. The three RACS coder impression items are: (1) parent displays anger and frustration/annoyance with the child, (2) parent makes statements indicating that TC is worthless, and (3) parent displays nonverbal expressions of disengagement to the child. The three items from the HOME are: (1) parent scolds/yells at/derogates the child more than once, (2) parent uses physical restraint during visit, and (3) parent slaps or spanks the child during the visit.

3.2.5 Child inhibitory control

Child Behaviour Questionnaire (CBQ). Child inhibitory control is a dimension of the broader Effortful Control factor on the CBQ Temperament scale. It measures the child's "capacity to plan and to suppress inappropriate approach responses under instructions or in novel or uncertain situations" (Rothbart et al., 2001). It is a theoretically appropriate measure of child self-regulation in early childhood, measuring the child's ability to both plan and suppress behaviour, in compliance with instruction but also in new situations. The primary measure of child inhibitory control is reported by the alternate caregiver and corroborated with reports made by the primary caregiver.

3.2.6 Cumulative risk

Cumulative risk index. The measure of cumulative risk in this thesis utilises the index that was constructed and analysed in previously published Early Steps research (Trentacosta et al., 2008). The index focuses specifically on distal indicators of socio-demographic risk, to enable the investigation of more proximal mediating and moderating processes of child outcome. Risk indicators were selected because they are relevant to caregiving in early childhood, with factors included that are likely to strain caregivers' psychological resources and impair provision of nurturing and involved caregiving. The following seven indicators are included: (1) poverty, (2) parent education level, (3) single adult in the home, (4) household overcrowding, (5) household member legal conviction, (6) parent drug or alcohol problem, and (7) neighbourhood dangerousness. A score of '1' is received for each indicator if the risk is present and a score of '0' if the risk is absent. A total score is then calculated by summing the scores of the individual indicators. The cumulative risk index developed by Trentascosta et al. (2008) aimed to have approximately 25% of the sample meet criteria for each risk indicator and established their risk criteria accordingly. Because the incidence of baseline poverty in this sample was notably higher than 25%, family income was excluded from their index of

cumulative risk. For the purposes of this research, poverty was included due to its theoretical relevance to the constructs of interest, as well as a lesser concern with achieving a rate of risk of 25%. Despite the importance of accounting for multiple risk factors, the investigation of cumulative risk is not a primary focus of this thesis and the limitations of using a simple composite measure rather than newer confirmatory factor analytic methods are acknowledged (Hall et al., 2010).

3.2.7 Covariates

The analyses in this thesis control for: intervention status, maternal education, poverty, child gender, and child race. Where appropriate, the analyses also control for the severity of maternal depression. The intervention status variable is a dichotomous variable indicating the intervention group (intervention or control) to which the family was randomised. Previous Early Steps studies have found modest intervention effects on child behaviour problems, positive parenting and maternal depression (Connell et al., 2008; Dishion et al., 2008; Shaw, Connell, et al., 2009). It is therefore necessary to control for the potential influence that intervention effects may have on the nature of the relations investigated in this thesis.

Maternal education is controlled for in the analyses to address the possibility that notably lower levels of education of the mother might influence the relation between mental health and parenting behaviours. The maternal education variable is self-reported at baseline assessment and is measured on a 9-point scale reflecting increasing levels of education, as per the American education system: (1) no formal schooling, (2) 7th grade or less, (3) junior high completed, (4) partial high school, (5) high school graduate/GED certificate, (6) partial college, specialized training, (7) junior college, (8) standard college graduation, (9) graduate degree. In line with previous Early Steps publications, the maternal education variable was recoded into a dichotomous variable of risk (Trentacosta et al., 2008), such that the risk group on this measure represents those mothers with less than a high school level education.

The poverty risk variable was also recoded into a dichotomous risk variable according to the United States poverty line using mother reports of gross annual income. The income measure is a 9-point scale of $5,000 increments and mothers were instructed to include child support and other financial aid into their reports. The poverty risk group comprises those mothers who reported an annual income below the poverty line (i.e., lower than $20,000 USD) at baseline assessment.

Child gender and child race are also controlled for in the following analyses, to address the potential that processes might vary between boys and girls, and for families of differing ethnicities. It is important to control for such possible influences, and to determine if processes were significant over and above the effects of gender and race. Gender is a binary variable (0 = boys, 1= girls) and in keeping with past Early Steps work (Trentacosta et al., 2008), race is also a binary variable (0 = non-African American, 1 = African American).

3.3 Data

3.3.1 Missing data

The analyses reported in Chapter Four do not include missing data for the variables of maternal depression and child externalising behaviour. The absence of missing data is because the categorical variable definition of resilience requires the presence of positive child behaviour given the presence of maternal depression. It is not possible to meet the requirements of this definition of resilience if data are missing on either the risk or outcome measure. As detailed further in Chapter Four, participants with missing data on either maternal depression at age 2 or age 3, or child externalising behaviour at age 5, were excluded from the analyses in Chapter Four. The predictor variables of positive parenting, harsh parenting, and child inhibitory control used in the analyses in Chapter Four do however include missing data.

The analyses in Chapter Five and Six are conducted using maximum likelihood estimation with

robust standard errors (MLR) in Mplus. MLR is an estimation method that accounts for data Missing At Random (MAR; Little & Rubin, 1987) by estimating parameters of all available data for estimation. MAR indicates that data can be missing as a function of the covariates and outcomes. Mplus is capable of estimating models with missing data for continuous and binary variables, which are the variable types included in the analyses of this thesis. Using this estimation method, the standard errors for the parameter estimates are computed using the observed information matrix, not the expected information matrix (Kenward & Molenberghs, 1998).

3.3.2 Non-normality of harsh parenting

The observed variable of harsh parenting used in this thesis is a composite measure including items from coded interactions between the mother and child in the home, and the impressions of coders following videotape analysis. The frequency of harsh parenting behaviours is generally very low, in part due to the measurement method but also because the behaviours are not of a type that happen very often in most families. Not surprisingly, the most overtly harsh parenting behaviours (e.g., slapping the child) occur rarely in general, and are all the more unlikely to occur when the family is aware of being observed. Other harsh parenting behaviours, like being critical of the child or blaming the child, occur relatively more often, but overall still on an infrequent basis.

Unsurprisingly, the distribution of the harsh parenting variable is highly non-normal at both ages 3 and 5. Tests for skew and kurtosis were conducted for the harsh parenting variables at both time points. The distributions of the results score outside the suggested range for acceptable skew and kurtosis (+/- 2; Field, 2009). The results for kurtosis at age 3 in particular are of concern, with the high positive value indicating a very pointy, heavy-tailed distribution. To address issues of non-normality, harsh parenting variables were transformed by adding a constant of 5 (because of the negative values) and taking the natural log. The results for skew

and kurtosis of the log transformed variables of harsh parenting were within the acceptable range at both time points. The results for the skew and kurtosis tests are presented in the table below.

Table 3.1 Skew and kurtosis of harsh parenting: Untransformed and log transformed

Normality statistics	Untransformed	Transformed
Age 3 (RPC coding)		
Skew	2.76	.15
Kurtosis	10.09	-.30
Age 5 (RACS coding)		
Skew	1.73	1.04
Kurtosis	3.40	.49

Due to the extent to which the age 3 harsh parenting variable in particular is non-normal, it was decided that the log transformed variables would be used in the analyses of this thesis. Analyses were conducted using both the untransformed and the log transformed variables, with minimal differences found between the two. Overall, the log transformed variables provided somewhat more conservative estimates however the general pattern of key results remained the same. To avoid reporting overinflated estimates of the effects of harsh parenting due to the non-normal distribution of data, this thesis reports results for the log transformed variable. Because harsh parenting is not measured on a meaningful scale, whereby a particular value is indicative of a defined level of harshness, the implications for interpretation of the data are not of significant concern (Field, 2009).

3.4 Analytic strategy

3.4.1 Chapter Four: Predictors of behavioural resilience

Chapter Four investigates positive parenting, harsh parenting, and child inhibitory control as potential predictors of behavioural resilience for children of mothers with depression. Analyses test both categorical and continuous variable approaches to the conceptualisation of risk (i.e., maternal depression) and adaptation (i.e., child externalising behaviour). Binary logistic

regression is used to test the categorical variable outcome of child externalising behaviour and linear regression is used to test the continuous variable outcome of child externalising behaviour. All analyses control for intervention status, family income, maternal education, child race, and child gender. The second and third sets of analyses testing parenting and child inhibitory control as predictors of child behaviour also control for the severity of maternal depression. This is to ensure that parent- and child-level factors are predictive over and above the severity of the focal risk factor, a necessary requirement of the resilience approach. The final model for each set of analyses includes all relevant predictors to assess their relative predictive effects and the proportion of variance accounted for by each. Cumulative risk is also included to evaluate whether predictors remain significant when accounting for the possible presence of additional risk. The analyses in Chapter Four are conducted using SPSS 19.

The analytic strategy for addressing the aims of Chapter Four comprises four sections: (1) validation of resilience, (2) maternal depression and child behavioural resilience, (3) predictors of child behavioural resilience, and (4) general- or risk-specific predictors. The validation of resilience is included as a preliminary step to ensure that the definition of resilience in this thesis captures a sufficiently comprehensive understanding of resilience despite choosing to adopt a more focused child outcome. This study is explicitly interested in child problem behaviours in the context of maternal depression and seeks to better understand the nature of processes involved in linking these specific constructs. The child outcome reflects this aim by measuring child externalising behaviour. The focus is on promoting positive child behaviour outcomes, with the idea that certain processes might be particularly relevant to this specific outcome in the context of maternal depression but not necessarily other outcomes. Despite this focus, within the resilience research paradigm it is important to address the concept of child outcome more broadly, to ensure that there are no marked deficiencies in child functioning across other important domains.

The validation of behavioural resilience proceeds first by testing the level of child functioning across additional measures within the "resilient" group of children. Measures of interest include: internalising symptoms, social problems, affective disorder, anxiety problems, and academic functioning. Following this, comparisons are made within the group of children exposed to maternal depression, between the "resilient" group of children (i.e., children with externalising behaviours below the developmentally normed cut-off) and the "vulnerable" group of children (i.e., children with externalising behaviours above the developmentally normed cut-off). A final set of comparisons is then made between the children in the "resilient" group and the "non-exposed" group of children (i.e., those children whose mothers did not have depression in early childhood).

Following the validation of behavioural resilience, the three primary aims of Chapter Four are addressed. The three results sections are divided into categorical and continuous variable analyses. The first results section investigates the extent to which maternal depression at child ages 2 and 3 increases the risk for child externalising behaviours at age 5. Two binary logistic regressions are conducted, testing separately the categorical and continuous variables of maternal depression as predictors of the categorical variable of child externalising behaviour. The results indicate the (log) odds of child externalising behaviours given the presence and severity of maternal depression. Two linear regressions are then conducted, testing the categorical and continuous variables of maternal depression predicting the continuous measure of child externalising behaviours. The results provide information on the proportion of variance in child externalising behaviours accounted for by the presence and severity of maternal depression.

The second section investigates positive parenting, harsh parenting, and child inhibitory control as predictors of child behaviour specifically for children of mothers with depression. The regression analyses therefore include only those children whose mothers scored above

the depression cut off at ages 2 and 3 (i.e., within the "risk" group only, n = 149). Separate binary logistic regressions are conducted to test each of the predictors and the categorical outcome of child externalising behaviour. A complete binary logistic regression is then conducted including all three predictors plus the cumulative risk variable. The same procedure is followed for the linear regression analyses, to test the proportion of variance in child externalising behaviours accounted for by each predictor separately, and then for the three predictors together with cumulative risk. In the final regression model, each independent variable is entered into a separate step of the regression to specify the unique contribution of each (J. Cohen & Cohen, 1975).

The third section addresses whether predictors are general or specific to the experience of maternal depression. The analyses include all children (N = 554), and in line with the previous analyses, first test the categorical variable outcome of child externalising behaviour using binary logistic regression, followed by the continuous variable outcome of child externalising behaviour using linear regression. The categorical and continuous variable approaches first test positive parenting, harsh parenting, and child inhibitory control as predictors of child externalising behaviour. A significant main effect is then followed up with a test of the interaction between the predictor and maternal depression, measured categorically and continuously. The results of the interaction provide information on whether the effect of the predictor varies as a function of maternal depression, either in terms of the presence or absence of maternal depression or the severity of maternal depressive symptoms. A final regression model is then conducted including main effects and any significant interaction, as well as cumulative risk, to investigate the extent to which the interaction effect remains predictive over and above other important predictors and indicators of risk.

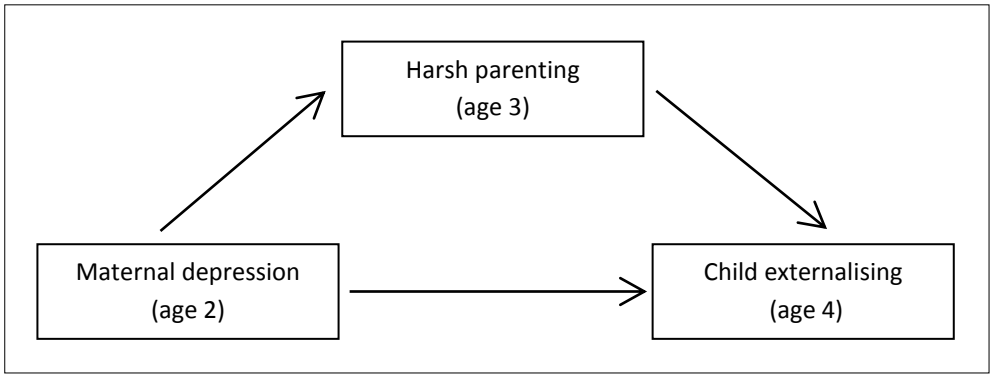
3.4.2 Chapter Five: Mediation, moderated mediation, and competing effects

Chapter Five builds on the analyses of Chapter Four to investigate positive and harsh parenting as potential mechanisms through which maternal depression influences child externalising behaviours. The analyses test for indirect effects using mediational path analyses in Mplus Version 6. Path analysis is a structural equation modelling technique that can be used when there is only a single measure of each variable (Kline, 2010). Because multiple measures are not used to create latent constructs in this thesis, it is possible to test the specified models using path analyses. Using this method, path coefficients are statistical estimates of the direct effects in the model and are interpreted as regression coefficients in multiple regression. Given path models use only one observed measure for each variable, it is especially important that measures have good psychometric properties. As previously detailed, this thesis includes well-validated, widely used measures for maternal depression and child externalising behaviour (Achenbach, 1991; Radloff, 1977), and observed parenting measures that were rigorously coded with validated coding systems and analysed in previously published research (Dishion et al., 2008; Shaw, Gross, et al., 2009).

Three sets of analyses are conducted for each parenting variable: mediation (Shrout & Bolger, 2002), moderated mediation (Preacher, Rucker, & Hayes, 2007), and competing effects (Kline, 2010). The three sets of analyses are conducted separately for positive parenting and for harsh parenting, first from ages 2 to 4 (labelled “early childhood”) and second from ages 4 to 7.5 (labelled “middle childhood”). This thesis is limited by testing mediator relations within the framework of a pre-existing dataset, rather than within a uniquely specified research design as ideally advocated by the literature (Wu & Zumbo, 2008). However, the findings of this thesis are strengthened by the analysis of a large dataset with well-validated measures and by testing theoretically-driven models informed by the literature and empirical evidence.

Mediation analyses separately test positive parenting and harsh parenting as potential processes through which maternal depression affects later child externalising behaviour. Given the focus of this thesis on better understanding the use of categorical and continuous variable definitions, maternal depression is tested using both categorical and continuous variable approaches. The decision to do so was also to address the possibility that the severity of risk might be an influential factor in determining the processes linking maternal depression and child externalising behaviour. The causal relation between maternal depression and child externalising behaviour is tested by specifying a structural model (Rose, Holmbeck, Coakley, & Franks, 2004). The indirect effects, or mediator effects, of positive parenting and harsh parenting are tested in separate models in early childhood and in middle childhood. Each mediation model investigates whether the parenting behaviour operates as an intermediary process through which some of the effect of maternal depression on child externalising behaviour is transmitted (R. M. Baron & Kenny, 1986; Kline, 2010). An example of a hypothesised mediation is provided in Figure 3.1 below, illustrating the potential indirect effect of harsh parenting in early childhood. The limited evidence on potential indirect effects of parenting in the relation between parental depression and child behaviour has been analysed predominantly through the use of hierarchical linear modelling (Elgar, Mills, McGrath, Waschbusch, & Brownridge, 2007). The advantage of testing mediational effects using MLR in Mplus is the estimation of missing data for continuous and binary variables and robust standard errors for parameter estimates (Kenward & Molenberghs, 1998). The mediation models of this thesis therefore provide rigorous statistical analyses of indirect effects based on theoretically-driven hypotheses.

Figure 3.1 Mediation effect of harsh parenting in the relation between maternal depression and child externalizing behaviour in early childhood

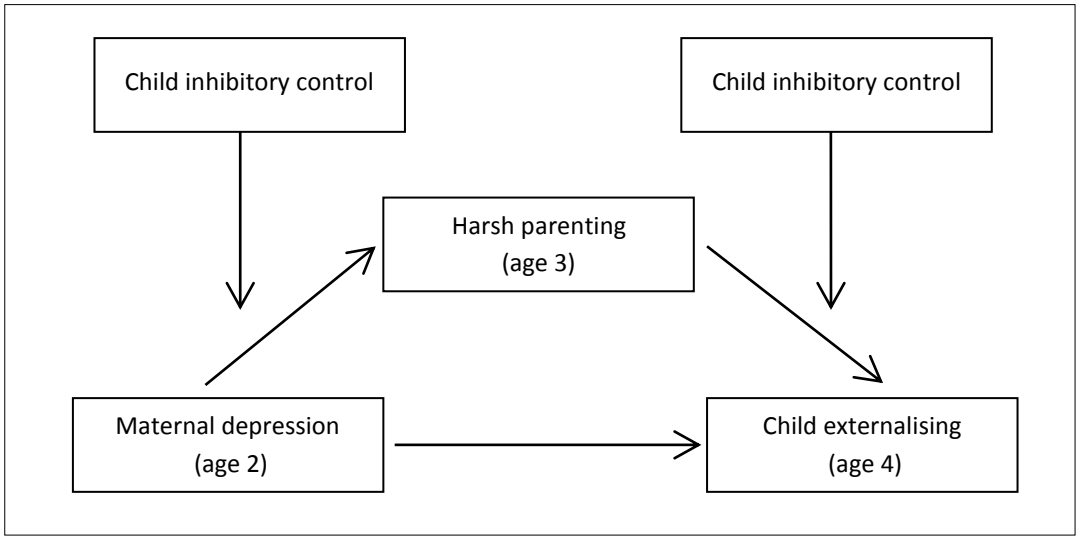


Moderated mediation analyses then investigate whether the indirect effect of positive parenting or harsh parenting differs depending on the child's baseline capacity for inhibitory control. Moderation analyses are interested in factors that modify the magnitude or direction of a causal relation (Frazier, Tix, & Barron, 2004; Rose et al., 2004). In moderated mediation analyses, the causal relations of interest are the indirect effects. The purpose of moderated mediation therefore is to investigate whether mediation effects are constant or vary according to levels of the specified moderator (Preacher et al., 2007). There are various models that fit the definition of what Preacher and colleagues labelled "conditional indirect effects" (2007). This thesis is specifically interested in testing whether the association between the predictor and the mediator varies according to levels of the moderator, and whether the association between the mediator and the outcome varies according to levels of the moderator.

In Chapter Five, indirect effects of positive parenting and harsh parenting are tested with the inclusion of a moderator effect of child inhibitory control on the path from maternal depression to parenting, and on the path from parenting to child externalising behaviour. An example of a hypothesised moderated mediation is provided in Figure 3.2, illustrating the potential moderating effect of child inhibitory control on the indirect effect of harsh parenting in early childhood. Because moderator effects are interaction effects, product terms are created using dichotomous or standardised continuous measures (Frazier et al., 2004). To

conduct the moderated mediation analyses, product terms were calculated for maternal depression (dichotomous and continuous) and child inhibitory control, and for each parenting variable and child inhibitory control, using standardised continuous measures and the dummy-coded dichotomous maternal depression variable. In the analyses from ages 2 to 4, child inhibitory control at age 2 was tested as a potential moderator of the indirect effect of parenting, and in the analyses from ages 4 to 7.5, child inhibitory control at age 4 was tested. Path analyses were conducted using MLR, including the specified covariates, main effects of the standardised predictor and moderator variables, and the interaction term. A test for the indirect effect of parenting was also calculated.

Figure 3.2 Moderation effect of child inhibitory control on the indirect effect of harsh parenting in early childhood



The third set of analyses comprises the competing bidirectional effects models, which test for effects specified in the direction from child to mother. The purpose was to begin to investigate strength of effects in the opposite direction to the primary analyses, acknowledging that effects do not strictly operate from mother to child (Kline, 2010). Potential effects from child externalising behaviour to maternal depression are analysed from ages 2 to 4, as well as from ages 4 to 7.5. The indirect effect of positive parenting and harsh parenting is included in the path models, to investigate the potential effect of child externalising behaviour on different types of parenting behaviours, and of parenting behaviours on maternal depression. The

inclusion of the parenting variables was not to test for an indirect effect of parenting but simply to investigate the strength of potential associations specified in the alternate direction.

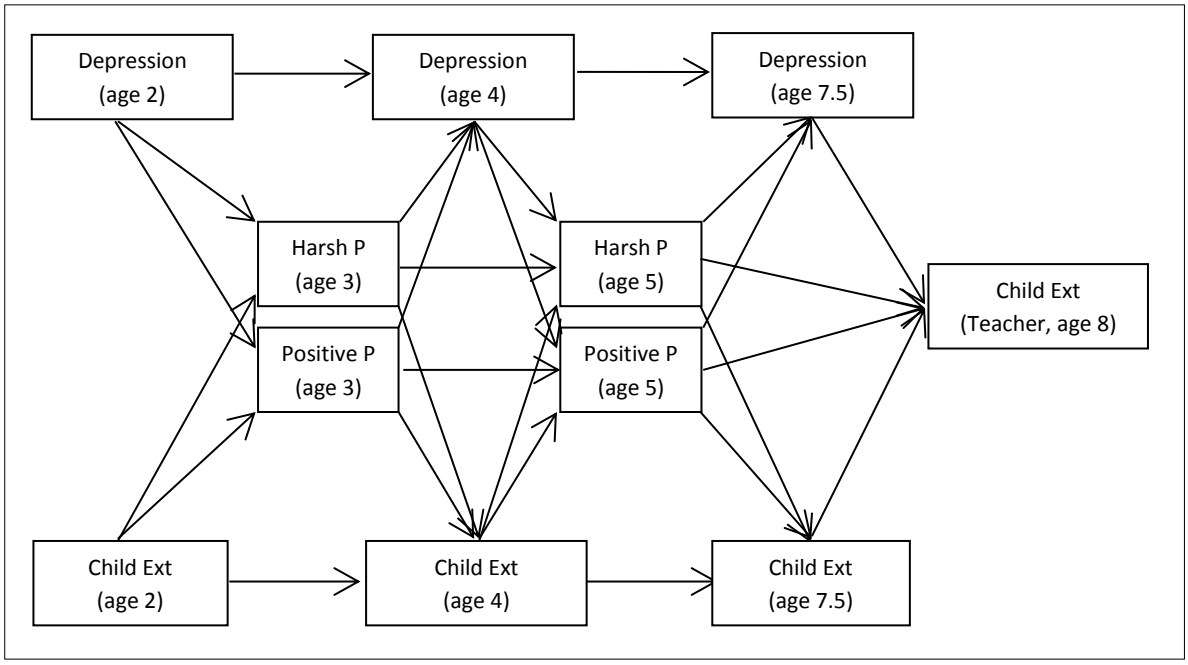
As in Chapter Four, all analyses control for intervention, family income, maternal education, child race, and child gender. The mediation and moderated mediation analyses in this chapter also control for child externalising behaviour at the time of maternal depression (i.e., age 2 in the early childhood models and age 4 in the middle childhood models). Similarly, the competing effects models control for maternal depression at the time of child externalising behaviour.

3.4.3 Chapter Six: Longitudinal models with reciprocal effects

Chapter Six combines the early and middle childhood models from Chapter Five into one longitudinal path model from ages 2 to 7.5. The model is expanded from the Chapter Five analyses to predict child externalising behaviour reported by the teacher at age 8, to assess the child's functioning across informants and environments. Two longitudinal models are conducted, first testing categorical definitions of baseline maternal depression and child externalising behaviour to investigate the impact of predictors above a validated threshold of severity. The second model tests continuous baseline variables of maternal depression and child externalising behaviour to investigate the effect of the continuum of depressive symptoms and child externalising behaviours. The models are lagged, such that the parenting variables (ages 3 and 5) are between the time points of maternal depression and child externalising behaviour (ages 2, 4, and 7.5). Lagged effects enable a more rigorous analysis of potential indirect effects of parenting with discrete time points between predictor, mediator, and outcome variables (Kline, 2010). There is the inclusion of paths testing reciprocal effects, from child externalising behaviour to parenting and to maternal depression, and from parenting to maternal depression. Figure 3.3 illustrates the reciprocal effects between maternal depression, positive parenting, harsh parenting, and child externalising behaviours.

Not included in the diagram are the direct reciprocal effects that are tested between maternal depression and child externalising behaviours, and the correlations between constructs in time. The two models of categorical and continuous baseline measures are conducted testing for an indirect effect of parenting at age 3 in the association between maternal depression at age 2 and child externalising behaviour at age 4. Testing for an indirect effect is to investigate whether parenting at age 3 is a process through which maternal depression at age 2 influences child externalising behaviour at age 4. Each model is then analysed with the inclusion of the moderating effect of baseline child inhibitory control. As detailed in the previous section, moderator effects are included to determine whether the nature of effects changes depending on the child's early ability to self-regulate (Preacher et al., 2007). Moderator effects are tested to investigate whether the effect of maternal on parenting varies depending on levels of child inhibitory control, and whether the effect of parenting on child externalising behaviour varies depending on levels of child inhibitory control.

Figure 3.3 Reciprocal effects between maternal depression, positive parenting, harsh parenting, and child externalizing behaviours



The analyses in this thesis build in a sequential manner, from testing predictors of child externalising behaviour in the context of maternal depression to the investigation of dynamic processes of mutual influence. The aim is to better understand the nature of effects linking maternal depression and child externalising behaviour in early childhood, to try to explain why some children of mothers with depression demonstrate more adaptive behaviour development than others. By attempting to disentangle the ways in which different types of parenting behaviours and child self-regulation operate to influence the association between maternal depression and child behaviour over time, the purpose is to contribute to the literature on how child development unfolds from early through to middle childhood, particularly for children of mothers with depression. With the resilience approach underpinning the analyses of this thesis, the purpose is to investigate salient processes that might help to explain the variability in child outcome despite the risk conferred by maternal depression. An improved understanding of how and when the processes of positive parenting, harsh parenting, and child inhibitory control might operate will inform more targeted early intervention and prevention strategies, promoting more adaptive behaviour development for young children of mothers with depression.

Chapter 4: Predictors of Behavioural Resilience

4.1 Introduction

There is strong empirical evidence for the possible adverse effects of maternal depression on diverse child outcomes from infancy through adolescence (Avenevoli & Merikangas, 2006; Beardslee et al., 1998; Cummings & Davies, 1994). What is less clear however are the processes through which children's development may be affected (Radke-Yarrow & Klimes-Dougan, 2002). The purpose of Chapter Four is to investigate factors that might predict more positive child behaviour outcomes in the context of maternal depression, focusing on processes as they operate at varying levels of the child's environment (Bronfenbrenner, 1979; Yates et al., 2003). From a developmental perspective, the interest is in family- and child-level processes that are relevant in early childhood and are most likely to promote adaptive child behaviours given the early experience of maternal depression (Masten, 2001; Seifer, 2003).

The focus of Chapter Four is on positive parenting, harsh parenting, and child inhibitory control as predictors of behavioural resilience for young children of mothers with depression. These potential predictors are developmentally salient in early childhood (e.g. F. Gardner et al., 2007; Kopp, 1989; Maccoby, 1992), are relevant to maternal depression and child externalising behaviours (Brennan et al., 2003; Eisenberg, Smith, et al., 2004; Lovejoy et al., 2000), and have been shown to be susceptible to change through intervention efforts (e.g. C. E. Izard et al., 2004; Reading, 2009; Shaw, 2006; Webster-Stratton et al., 2008).

Despite being less common than maternal depression, paternal depression is an important factor to consider. Paternal depression is associated with an increased risk of child behaviour problems, especially for boys, with the greatest risk for children of fathers with chronic depression (Ramchandani et al., 2005). The role of fathers within the family is also important to consider, particularly given their potential to buffer the effects of a depressed co-parent. Brennan and colleagues (2003) did not find strong support for protective effects of father-child

relationship qualities, suggesting that perhaps such factors operate as general resource mechanisms, although their results were limited by the use of cross-sectional data. Due to the limited number of fathers as primary caregivers in this sample, it was unfortunately not possible to analyse processes in relation to paternal depression. The analysis of alternate caregiver-reported child inhibitory control however incorporates paternal reports of child functioning, as the largest number of alternate caregivers was biological fathers (n = 119).

Adopting both a categorical and a continuous variable approach, the analyses examine whether positive parenting, harsh parenting, and child inhibitory control operate as general or risk-specific predictors of behaviour outcomes for children of mothers with depression. General predictors are relevant for all children, whereas tests for interaction effects between predictors and maternal depression highlight those factors that are particularly predictive for children of mothers with depression (Roosa, 2000). The effect of cumulative risk is then accounted for to examine the possibility that predictors might become overwhelmed in the context of additional risk (Jaffee et al., 2007). The purpose of these analyses is to better understand key processes in early childhood, particularly those that are differentially predictive for children of mothers with depression. An improved understanding of those factors that are risk-specific will serve to inform early intervention and prevention research for children and mothers with depression, improving support for these families and minimising the risk of maternal depression on early child behaviour development.

4.2 Aims

(1) Validate the operationalized definition of early childhood behavioural resilience of this thesis (Section 4.4)

(2) Investigate the extent to which maternal depression in early childhood is a risk factor for maladaptive child behaviour development within this sample (Section 4.6.1)

(3) Test positive parenting, harsh parenting, and child inhibitory control as predictors of behavioural resilience for children of mothers with depression (Section 4.6.2)

(4) Investigate whether positive parenting, harsh parenting, and child inhibitory control operate as general or risk-specific predictors of child behaviour, such that they have a differential effect for children of mothers with depression (Section 4.6.3)

4.3 Methods

4.3.1 Inclusion criteria

Of the original sample (N = 731), 655 primary caregivers reported depression scores at both child age 2 and age 3. At child age 2, this included primarily biological mothers (n = 633), with a small number of biological fathers (n = 10) and grandmothers (n = 4). At child age 3, the number of biological mothers decreased slightly (n = 625). Given the limited number of fathers as primary givers in the sample, it was not possible to investigate processes in the context of paternal depression. Being mindful that processes may differ between different caregivers, primary caregivers other than biological mothers were excluded from the analyses.

The categorical and continuous risk variables of maternal depression analysed in this chapter include reports of depression at both child age 2 and age 3. Of the biological mothers who reported at age 3, three different primary caregivers reported depression scores at age 2, including a foster mother, a step-father, and a biological father. These three participants were excluded from the analyses in this chapter. In line with the definition of risk detailed in Section 4.3.3 below, only biological mothers who reported depression scores at both child age 2 and age 3 (n = 622) were included in the analyses. In addition, given the focus on developmentally normative child behaviours as the focal outcome, reports of child externalising behaviour at age 5 were necessary to satisfy the categorical variable definition of resilience. To address the research questions of this chapter, only the subset of families for whom there was information on both risk at ages 2 and 3, and child outcome at age 5, could be included in the analyses

(n = 554). Rather than include missing data on the variables of maternal depression and child externalising behaviour in the continuous variable analyses, the same sample was analysed. The decision to do so was to maintain consistency and to facilitate comparisons between the two analytical approaches.

It was important to address the possibility that excluding mother-child dyads because of missing maternal depression data could bias the results. The most vulnerable families may have been those without maternal depression reported at both time points. It was therefore necessary to ensure that those families who were excluded did not differ on other important measures, particularly child externalising behaviours. Comparisons revealed no significant differences on maternal education, poverty, child race, child gender, or child externalising behaviour between the families included in the analyses in this chapter and those who were excluded due to missing data.

4.3.2 Demographics

At baseline assessment, children were between the ages of 2 years and 2 years 11 months, and included 277 girls (50.0%). The sample of biological mothers included 326 White (58.8%), 156 African American (28.2%), and 57 Hispanic or Latino (10.3%) women. Reported marital status included 204 (36.8%) married, 179 (32.3%) single, 106 (19.1%) living together, 39 (7.0%) separated and 22 (4.0%) divorced. In total, 319 (57.6%) mothers reported living with a partner. At baseline, the largest proportion of mothers had a high school level education (n = 243, 43.9%), followed by partial college/specialised training (n = 133, 24.0%) and partial high school (n = 96, 17.3%). In total, 121 (21.8%) mothers reported having less than a high school education. Gross annual income reports are in US dollars, and at baseline (including child support and other financial aid) indicated that 103 (18.6%) mothers received between $10,000 and $14,999 annually, and a similar number (n = 102, 18.4%) received between $15,000 and $19,999. There were 82 (14.8%) mothers who received between $5,000 and $9,999, and 81

(14.6%) who received less than $4,999. In total, 398 (71.8%) mothers reported a gross annual income below the poverty line at baseline assessment. Demographic information for the 554 children and mothers included in the analyses of this chapter are presented in Table 4.7 (see page 131).

4.3.3 Operationalization of risk and adaptation

4.3.3.1 Operationalization of categorical risk

To investigate the resilience questions in this chapter, and to address issues of definitional clarity raised by the literature, it was important that both risk and adaptation were clearly operationalized (Luthar & Bidwell Zelazo, 2003). It was necessary for the categorical analyses to define a dichotomous risk variable indicating the presence or absence of maternal depression. A maternal depression score above the accepted cut off score at one time point was deemed insufficient in terms of representing a sufficiently severe risk, as required by the definition of resilience (Rutter, 2006). It was decided that maternal depressive symptoms above the cut off score at two time points was necessary to meet the criteria for risk severity and to try to capture a more pervasive definition of maternal depression in early childhood. In the absence of a diagnostic interview, and without information regarding important characteristics such as age of onset or chronicity, this thesis is limited in its ability to develop a more rigorous definition of maternal depression. Combining information from two time points was deemed the most appropriate strategy given the available data. The dichotomous risk variable therefore categorises the presence of risk as maternal depression scores above the accepted cut off on the CESD at both child ages 2 and 3.

4.3.3.2 Operationalization of continuous risk

For the reasons stated above, and to maintain consistency with the categorical variable analyses, maternal depression scores at child ages 2 and 3 were included in the operationalization of the continuous variable of risk. The process of determining how best to

combine continuous variables at two time points was not straightforward. It was initially considered whether maternal depression at ages 2 and 3 should be included in the regression models as two separate variables. Doing so, however, would mean that one depression time point would be predictive in the model whilst controlling for the other. Predicting child outcome at age 5, from maternal depression at age 3, controlling for maternal depression at age 2, is asking whether the change in depression from child age 2 to age 3 is predictive of child behaviour outcomes. It does not address a combined influence of levels of maternal depression over time. Further, controlling for one time point in this way does not investigate the relation between variables in a comparable manner to that of the categorical analyses.

To combine information from both time points into one continuous risk variable, the mean maternal depression score at child age 2 and age 3 was calculated. Adopting this approach has its limitations, as a certain degree of variability is lost. For example, a very low depression score at age 2, followed by a very high score at age 3, will average to a moderate score. Such variation in depression levels may be much more problematic than suggested by a moderate score. However, because including the two time points as separate variables asks a substantively different question, it was decided that despite these limitations, taking the mean score was the most satisfactory approach for combining continuous data over time in the analyses in this chapter.

4.3.3.3 Operationalization of categorical and continuous child adaptation

The operationalization of adaptation involves defining the child behaviour outcome. The aim is to investigate mechanisms that are specific to behavioural resilience in early childhood, particularly child externalising behaviours at age 5. This is to achieve a more focused approach at understanding processes of behaviour development in early childhood through until the age of school entry. Child behaviour adjustment at school entry is an important predictor of later functioning, and entering school represents a major transition in the life of the child (Mesman & Koot, 2001; Moffit & Caspi, 2001). Investigating how processes in early childhood might be

involved in promoting more adaptive behavioural outcomes at such a crucial point in child development is therefore of particular importance. Furthermore, processes involved in the promotion of more positive behaviour outcomes for children of mothers with depression may not necessarily be the same as those promoting positive outcomes in other domains of child functioning (Eisenberg et al., 2001; Elgar et al., 2007; Goodman et al., 2011). Analysing a more focused child outcome is to enable the investigation of specific mechanisms as they relate to early child externalising behaviour development, particularly for children of mothers with depression.

For the categorical variable analyses, the child behaviour outcome categorises the presence or absence of developmentally normative child externalising behaviours. Those children with externalising behaviours below the cut off score of 60 on the CBCL at age 5 are categorised as the adaptive behaviour group. Those children with externalising behaviour scores that are developmentally elevated, such that they score 60 or higher on the CBCL at age 5, are categorised as the maladaptive behaviour group. For the continuous variable analyses, the child behaviour outcome is the continuous measure of child externalising behaviours on the CBCL at age 5.

4.3.3.4 Operationalization of categorical resilience

The definition of resilience requires two conditions, the experience of a sufficiently severe risk and the presence of an adaptive outcome. In categorical variable terms, behavioural resilience in this chapter requires the presence of maternal depression in early childhood and the presence of adaptive child behaviours. The children whose mothers scored above the depression cut off score at both child ages 2 and 3, and who reported externalising behaviour scores below the developmentally normed cut-off at age 5, comprised the resilient group. Validation of the child behaviour outcome is discussed in the following section.

Table 4.1 below reports the observed counts and percentage of the total sample (N = 554) for maternal depression at child ages 2 and 3, and for adaptive child behaviour at age 5. Children were categorised into four groups, described according to terminology used in previous research (Zucker et al., 2003). Group terminology is used simply for ease of communication, bearing in the mind the criticisms of applying oversimplifying labels, particularly for young children. This point is expanded further in the following section. There were 55 children in the "resilient" group, representing 37% of the children of mothers with depression and 10% of the total sample. Children were categorised in the "vulnerable" group (n = 94; 17%) when maternal depression was present but adaptive child behaviour was absent. In the absence of maternal depression, children were in the "non-challenged" group (n = 261; 47%) if adaptive behaviour was present and in the "troubled" group (26%) if adaptive behaviour was absent. On a group-level, it is important to note that a substantial proportion of children in this sample presented with externalising behaviour problems at age 5 (n = 238; 43%). This finding is not unexpected given the recruitment strategy and inclusion criteria of the Early Steps Multisite Study. As previously discussed, the sample overall represents a higher risk group of families. The generalizability of results is discussed in Chapter Seven, as it applies to the full set of findings of this thesis.

Table 4.1 Cross-tabulation of maternal depression and child behaviours (N = 554)

		Adaptive child behaviour outcomes (age 5)		
		Absent	Present	Total
Maternal depression (age 2 and 3)	Absent	144 (26%) Troubled	261 (47%) Non-challenged	405 Non-exposed
	Present	94 (17%) Vulnerable	**55 (10%) Resilient**	149 Risk exposed
	Total	238	316	554

4.3.3.5 Operationalization of continuous resilience

In continuous variable terms, resilience is more difficult to neatly define through the use of clear groups. Rather, the relation between risk and adaptation was explored to investigate the extent to which varying levels of maternal depression influenced later levels of child externalising behaviours. Although there is no clear group of children with normative behaviours despite the risk conferred by maternal depression, the emphasis on the variability in outcome of resilience research is maintained. In a continuous variable context, this is reflected in the hypothesis that despite increased levels of maternal depression, not all children will demonstrate higher levels of externalising behaviours. The relation between risk and adaptation was explored as a continuum, as was the potential effect of different types of parenting behaviours and child inhibitory control in explaining the variation in child externalising behaviours.

4.4 Validation of early childhood behavioural resilience

At age 5, there were 55 children who met both the risk and adaptive behaviour outcome requirements and comprised the resilient group. As mentioned above, the use of the term "resilient" to identify this group is primarily for ease of communication. What is of interest is the dynamic developmental process of resilience and not a static trait-like conceptualisation. "Resilient" in the context of this study represents a specific definition of maternal depression and child behaviour, considered during a particular stage in child development. The use of the term does not presume to capture a complete understanding of additional risk factors, nor does it draw conclusions regarding inevitable trajectories of later child behaviour. Rather, the focus is on understanding processes specifically in relation to maternal depression and to promoting more positive child behaviours in early childhood. The behaviour outcome of interest was validated to address certain limitations of adopting a more narrowly focused outcome, and additional risk factors were incorporated into later stages of model testing to determine whether important processes still held in the context of increased risk (Jaffee et al.,

2007). The primary focus however is on the potential role of processes of parenting and child inhibitory control in promoting good behaviour development for children of mothers with depression, and the term "resilient" is used with this in mind.

Although the focus of this study is on child externalising behaviours in the context of maternal depression, it is important to consider whether those children of mothers with depression who demonstrate normative behaviours are functioning well in other domains. The purpose of doing so is to address a more comprehensive definition of child outcome. Prior to conducting the primary analyses of this chapter, the focal behaviour outcome was validated using a similar strategy reported by Jaffee and colleagues (2007). Within-group analyses investigated the functioning of children in the "resilient" group across additional domains of functioning. Characteristics of children in the resilient group were explored to ensure that these children demonstrated normative functioning across additional domains and did not show noteworthy deficits. The between-group analyses compared the "resilient" group with the "vulnerable" group and with the "non-exposed" group across developmentally relevant domains of functioning. The validation process therefore ensured that despite the explicit aim of investigating mechanisms that are specific to the externalising behaviours of children of mother with depression, the results have implications beyond the behaviour domain.

4.4.1 Group comparisons and correlates of behavioural resilience

To explore child functioning beyond the externalising behaviour domain and in relation to standardised developmental norms, within-group analyses were conducted of children in the "resilient" group across domains, measures, and informants. Between-group comparisons were then conducted, adopting an approach similar to that used in research by Jaffee and colleagues (2007). In the first set of between-group comparisons, children in the resilient group were compared to children in the vulnerable group. These comparisons explored the functioning of children who were similarly risk-exposed but who demonstrated notable

differences in terms of their externalising behaviours. Such comparisons questioned whether these two groups of children differed in other important ways than simply in terms of the focal behaviour outcome. In the second set of between-group analyses, children in the resilient group were compared to children whose mothers did not have depression at ages 2 and 3 (i.e., children in both the non-challenged and troubled groups). These comparisons investigated how risk-exposed but well-functioning children may or may not differ from their peers who were not exposed to maternal depression in early childhood. Such comparisons explored whether children in the resilient group were functioning just as well as their non-risk exposed peers across various domains, measures, and informants.

4.4.1.1 Within-group analyses of "resilient" children

To ensure that children in the resilient group were functioning well in the internalising domain, scores on the CBCL broadband Internalising factor were explored. Due to multiple within-group comparisons, the Bonferroni correction was applied (.05/5 comparisons = .01), such that an alpha of .01 was used to determine significance. At age 5, the 55 children in the resilient group had a mean mother-reported internalising symptoms score of 49.95 (SD = 8.42), which is significantly below the cut off score of 60 ($p < 001$). Furthermore, children also scored below the cut-off on CBCL indicators of Affective Disorder and Anxious Problems ($ps < 001$). The results suggest that children in the resilient group are functioning at developmentally normative levels in the affective and internalising symptoms domain. In the social domain, children in the resilient group scored below the cut off on the CBCL Social Problem indicator ($p < 001$), suggesting developmentally normative social functioning within this group of children as well.

To investigate whether children in the resilient group presented with developmentally normative levels of behaviour functioning across measures as well as domains, scores on the Eyberg were analysed. As detailed in Chapter Three, the focus is on the Eyberg Problem factor, which assesses the extent to which the child's behaviours are perceived as problematic by the

informant. The mean total Problem score for children in the resilient group is 53.38, which is significantly below the clinical cut off score of 60 ($p < .001$). Because the primary respondent on measures of child functioning was the mother, alternate caregiver reports were also tested for additional support. Of the 554 families at age 5, 308 (55.6%) included alternate caregiver reports, which represents a range of adults carers. The largest number of alternate caregivers was the biological father (n = 119), followed by grandmother (n = 62), aunt (n = 25), mother's boyfriend (n = 25) and step-father (n = 21). The remaining alternate caregivers included a diverse mix of family members, live-in partners, or friends. Alternate caregiver (AC) reports are presented in Table 4.2 below and corroborate mother-reported outcomes.

Table 4.2 Mother and alternate caregiver reports compared to standardised developmental norms for the resilient group (n = 55)

	Mother report			***t*-test**			**AC report**			***t*-test**		
Measure	***N***	***M***	***SD***	***t***	***df***	***Sig.***	***N***	***M***	***SD***	***t***	***df***	***Sig.***
CBCL												
Internalising	55	49.95	8.42	-8.86	54	**.000**	29	48.01	10.15	-6.33	28	**.000**
Affective Disorder	55	55.24	4.63	-7.63	54	**.000**	29	54.83	6.53	-4.27	28	**.000**
Anxious Problems	55	53.93	5.01	-8.98	54	**.000**	29	54.31	5.38	-5.70	28	**.000**
Social Problems	55	54.95	4.22	-8.88	54	**.000**	29	55.03	4.84	-5.52	28	**.000**
Eyberg												
Total Problem	55	53.38	8.99	-5.46	54	**.000**	27	50.78	10.28	-4.66	26	**.000**

To address child functioning in the cognitive domain, standardised results from the Woodcock-Johnson measure were included in the validation of behavioural resilience. Children in the Early Steps Multisite Study completed measures of Letter-Word Identification, Spelling, and Overall Academic Achievement at age 5. The mean scores and t-test results comparing scores to the standardised mean of 100 are reported in Table 4.3. No significant differences were found, providing support for the developmentally normative levels of cognitive abilities for the resilient group of children.

Table 4.3 Child-reported academic scores compared to developmentally standardised score of 100 (n = 55)

	Child report			*t*-test		
Measure	***N***	***M***	***SD***	***t***	***df***	***Sig.***
Woodcock-Johnson						
Letter-Word ID	50	100.20	12.06	.117	49	.912
Spelling	51	96.73	16.28	-1.44	50	.164
Overall Academic	50	97.34	13.36	-1.41	49	.173

Overall, the within-group analyses provide support for a more comprehensive conceptualisation of child functioning beyond the primary outcome measure of child externalising behaviours. In addition to their normative levels of externalising behaviours, the results indicate that children in the resilient group are functioning well in the internalising, affective, social, and cognitive domains, as reported by the biological mother, the child's alternative caregiver, and the child.

4.4.1.2 Between-group comparisons of "resilient" and "vulnerable" children

At both ages 2 and 3, children in the resilient and vulnerable groups were exposed to significantly elevated symptoms of depression in their mothers. At age 5 however, children in the resilient group demonstrated developmentally normative behaviour outcomes whereas children in the vulnerable group did not. The purpose of comparisons between the two groups was to identify further differences in levels of functioning, with an interest in validating the differentiation between the two groups. Testing outcomes at age 5, children in the resilient and vulnerable groups were compared on measures included in the within-group analyses. The Bonferroni correction was applied to correct for multiple comparisons (.05/9 comparisons = .005), such that an alpha of .005 was used to determine significance of mean differences. The results are presented in Table 4.4.

Compared to the resilient group, children in the vulnerable group not only exhibited significantly elevated levels of maladaptive externalising behaviours but also scored

significantly higher on CBCL measures of Internalising symptoms, Affective Disorder, and Anxious Problems (*rs* = .39 – .42; *p*s < .001). They also scored significantly higher on the CBCL measure of Social Problems (*r* = .47; *p* < .001). To consider child functioning across measures, the Eyberg Total Problem score was compared between the two groups. Results indicate that children in the vulnerable group scored significantly higher than children in the resilient group (*r* = .57; *p* < .001). Alternate caregiver reports on these measures were also compared. No significant differences were found in the pattern of results between mother and alternate caregiver reports, such that alternate caregivers of children in the vulnerable group reported significantly higher scores across domains and measures than alternate caregivers of children in the resilient group. Comparisons on the child-reported Woodcock-Johnson test are also reported in Table 4.4 below. No significant differences were found. The results support the distinction of the resilient group from the vulnerable group across domains of functioning, not only in terms of the externalising domain but the internalising, affective, anxious, and social domains as well. The academic functioning of the two groups of children, in terms of their letter-word identification, spelling, and overall academic achievement, was not significantly different at this developmental stage.

Table 4.4 Comparisons between resilient and vulnerable groups on correlates of behavioural resilience (n = 149)

	Resilient			Vulnerable			*t*-test			
Measure	***N***	***M***	***SD***	***N***	***M***	***SD***	***t***	***df***	***Sig.***	***r***
CBCL										
Externalising	55	52.04	7.31	94	67.11	5.87	-13.79	94.56	**.000**	.75
Internalising	55	49.95	8.42	94	57.93	8.96	-5.36	147.00	**.000**	.42
Social Problems	55	54.95	4.22	94	61.37	7.32	-5.95	146.99	**.000**	.47
Affective Disorder	55	55.24	4.63	94	60.72	7.49	-4.91	146.53	**.000**	.40
Anxious Problems	55	53.93	5.01	94	59.40	7.50	-4.82	144.29	**.000**	.39
Eyberg										
Total Problem	55	53.38	8.99	93	67.10	10.51	-8.08	146	**.000**	.57
Woodcock-Johnson										
Letter-Word ID	50	100.20	12.06	89	98.30	13.12	.84	137	.401	*ns*
Spelling	51	96.73	16.28	88	95.82	16.03	.32	137	.753	*ns*
Overall Academic	50	97.34	13.36	86	95.40	13.52	.81	134	.422	*ns*

Children in the resilient and vulnerable groups were compared on their levels of externalising and internalising behaviours from ages 2 to 5, to investigate whether the pattern of behaviour differences was demonstrated since early childhood. Due to multiple comparisons, the Bonferroni correction was again applied and an alpha of .006 was used (.05/8 comparisons = .0063). As reported in Table 4.5, children in the resilient group had significantly lower externalising behaviour scores than children in the vulnerable group at each time point (*p*s < .001). The externalising behaviour scores for children in the resilient group demonstrated a general pattern of decline over time, from ages 2 to 5. In the vulnerable group however, externalising behaviours were significantly elevated at age 2 and further increased at age 5. The effect size of the mean differences between the two groups increased at each time point, from *r* = .26 at age 2 to *r* = .65 at age 5.

In terms of internalising behaviours, it had been established in the validation step above that the resilient group of children did not exhibit elevated levels of internalising behaviours at age 5. It was not known however whether the vulnerable group of children exhibited elevated

levels of externalising behaviours only, or perhaps presented with difficulties in the internalising domain as well. Results indicate that children in the vulnerable group had significantly higher levels of internalising behaviours than children in the resilient group across time (see Table 4.5 below). These differences were significant at each time point from ages 2 to 5 (*p*s < .002). The effect size of the mean differences in internalising behaviours increased over time, albeit to a lesser extent than differences in externalising behaviour, from *r* = .27 at age 2 to *r* = .42 at age 5. The results suggest that children in the resilient group were functioning significantly better not only in terms of their externalising behaviours, in line with the primary focus of this study, but in the internalising domain as well. The results also suggest that the more adaptive levels of internalising symptoms at age 5 were preceded by a pattern of developmentally normative internalising symptoms from an earlier age for children in the resilient group compared to children in the vulnerable group.

Table 4.5 Comparisons across time of externalising and internalising behaviours between resilient and vulnerable groups (n = 149)

	Resilient			**Vulnerable**			***t*-test**			
Measure	***N***	***M***	***SD***	***N***	***M***	***SD***	***t***	***df***	***Sig.***	***r***
CBCL Externalising										
Age 2	55	59.07	8.72	94	63.48	7.80	-3.33	147	**.000**	.26
Age 3	55	55.07	8.72	94	63.85	8.74	-6.23	147	**.000**	.45
Age 4	55	51.38	8.09	90	62.69	9.59	-7.70	143	**.000**	.54
Age 5	55	52.04	7.32	94	67.10	10.00	-13.0	147	**.000**	.65
CBCL Internalising										
Age 2	55	56.65	8.92	94	61.23	7.42	-3.37	147	**.000**	.27
Age 3	55	56.78	8.38	94	61.40	8.77	-3.16	147	**.002**	.26
Age 4	55	53.73	9.54	90	60.24	8.72	-4.21	143	**.000**	.34
Age 5	55	49.95	8.42	94	57.93	8.96	-5.36	147	**.000**	.42

4.4.1.3 Between-group comparisons of “resilient” and “non-exposed” children

The comparison of children in the resilient group and those children who were not exposed to maternal depression (i.e., children in the non-challenged and troubled groups) explored how

well the resilient group of children were functioning in relation to their non-exposed peers. Due to multiple comparisons, the Bonferroni correction was applied and an alpha of .006 was used (.05/9 comparisons = .0056). Comparisons are reported in Table 4.6.

A comparison of age 5 externalising behaviours between the two groups was significant ($p < .006$). The results indicate that children in the resilient group were not only functioning well behaviourally at age 5, but that their externalising behaviour scores were significantly lower than their peers whose mothers did not have depression at ages 2 and 3 ($r = .23$). To compare child behaviour across measures, scores on the Eyberg Total Problem measure were also compared. Children in the resilient group scored lower than their non-exposed peers ($p < .01$), although not significantly lower than the corrected alpha level ($p < .006$). The results suggest a trend towards significance, such that mothers of children in the resilient group perceive the behaviour of their children as less problematic than mothers without depression overall. The results further support the findings from the CBCL child externalising measure. At age 5, children in the resilient group were not only developmentally normative in their behaviours, but were functioning significantly better in the behaviour domain across measures than their peers whose mothers did not have depression (see Table 4.6).

In terms of internalising behaviours, at age 5 children in the resilient group did not differ significantly from children in the non-exposed group. The non-significant results suggest that the resilient children were functioning just as well in the internalising domain as their non-exposed peers. In line with the comparisons in the previous section, the two groups were also compared on indicators in the affective, anxious, and social domains. No significant differences were found. Similarly, no significant differences were found on the cognitive abilities assessed through child report (see Table 4.6 below). These non-significant results suggest that across the internalising, affective, social, and cognitive domains, the functioning of children in the

resilient group is comparable to their peers who were not exposed to maternal depression in early childhood.

Table 4.6 Comparisons between resilient and non-exposed groups on correlates of behavioural resilience (n = 460)

	Resilient			Non-exposed			*t*-test			
Measure	***N***	***M***	***SD***	***N***	***M***	***SD***	***t***	***df***	***Sig.***	***r***
CBCL										
Externalising	55	52.04	7.31	405	56.24	10.00	3.65	458	**.003**	.23
Internalising	55	49.95	8.42	405	49.44	9.11	-.046	458	.964	*ns*
Social Problems	55	54.95	4.22	405	55.97	5.56	1.25	458	.211	*ns*
Affective Disorder	55	55.24	4.63	405	54.62	5.43	-.69	458	.493	*ns*
Anxious Problems	55	53.93	5.01	405	54.82	5.88	.81	458	.422	*ns*
Eyberg										
Total Problem	55	53.38	8.99	403	57.37	10.72	-2.64	456	.012	*ns*
Woodcock-Johnson										
Letter-Word ID	50	100.20	12.06	366	100.62	14.03	.20	414	.843	*ns*
Spelling	51	96.73	16.28	372	101.10	14.62	1.97	421	.057	*ns*
Overall Academic	50	97.34	13.36	370	98.86	15.31	.67	418	.514	*ns*

The definition of a "resilient" group in this thesis appears to be a valid categorisation of children who are generally functioning well across domains. Children in this group demonstrate developmentally normative functioning across measures and domains, notably in terms of their internalising, anxious, affective, social, and cognitive functioning. In addition, the resilient group appears to be a valid categorisation relative to the functioning of their peers, both who have and who have not been exposed to earlier maternal depression. Children in the resilient group are functioning significantly better than their peers who had similarly been exposed to maternal depression at ages 2 and 3. Furthermore, they are functioning just as well as their peers who had not been exposed to maternal depression in early childhood, and are notably functioning better than these non-exposed peers in the externalising behaviour domain.

4.4.2 Severity of risk

An important control variable in the regression analyses is the severity of maternal depressive symptoms. Prior to testing differences in child outcomes between the two groups, it was important to first consider possible differences in risk exposure. Mothers of children in the resilient and vulnerable groups all reported maternal depression scores above the cut off score of 16 at both child ages 2 and 3. Within this group of maternal depression risk, it may have been that the severity of maternal depressive symptoms was greater in the vulnerable group than in the resilient group. Particularly within the resilience research paradigm, it is important that the variation in outcome is not merely due to differences in the severity of risk exposure. If it is, then the variation in child behaviour outcome has arguably not involved processes of resilience but may be explained by differences in the extent of risk exposure (Rutter, 2006). If there is a significant group difference in the severity of risk exposure, then the severity of risk must be controlled in the appropriate analyses. Doing so ensures that the predictors of improved behaviour outcomes are predictive over and above the variation in risk exposure.

The difference in the severity of maternal depressive symptoms was therefore compared between the resilient and the vulnerable groups. A comparison of mean age 2 and age 3 maternal depression scores for the resilient and vulnerable groups was significant, $t(141) = -3.50$, $p < .01$. At the ages of 2 and 3, children in the vulnerable group were exposed to significantly higher levels of mean maternal depression than the children in the resilient group, despite both groups being “risk-exposed”.

The severity of maternal depression was therefore controlled in the analyses investigating predictors of resilience and the specificity of predictors. Controlling for the severity of risk is an important and necessary component of resilience research. It must be demonstrated that the potential predictors under investigation predict the adaptive child behaviour outcome over and above the severity of risk. Without controlling for risk severity, it is not possible to

conclude whether the variation in outcome is predicted by the predictor or if it is due to the variation in severity of risk exposure. As such, the current study controlled for the severity of maternal depressive symptoms in all regression analyses.

4.4.3 Additional risk factors

Risk factors in addition to maternal depression were compared first between the depression risk (n = 149) and the no depression (n = 405) groups, and then between the resilient (n = 55) and the vulnerable (n = 94) groups. The purpose of the first set of comparisons was to explore whether the families in the maternal depression group represented a higher risk group because of risk factors in addition to maternal depression. Maternal depression often correlates with additional factors that might also increase the risk for more maladaptive child behaviour development (Sameroff et al., 2003). The two groups were therefore compared on key indicators of risk at the child, family, and community levels. The seven risk factors at the family and community levels were those indicators included in the cumulative risk index of this thesis (see Chapter Three, Section 3.2.6). The second set of comparisons investigated differences in the same risk factors but between families in the resilient and vulnerable groups (i.e., within the depression risk group only). The purpose of the second set of comparisons was to investigate whether those children in the resilient group had potentially been exposed to significantly less risk in additional domains. These comparisons address the question of risk exposure in much the same way as depression severity was explored in the previous section, to determine whether children with more adaptive functioning had been exposed to less severe risk in early childhood.

As detailed in Chapter Three (Section 3.2.7), the additional risk factors at all three levels are dichotomous variables. Chi-square analyses were conducted to compare the significance of differences in observed and expected counts between the two groups. The Bonferroni correction was applied to correct for multiple comparisons (.05/10 comparisons = .005), such

that an alpha of .005 was used to determine significance of group differences. Table 4.7 below reports the comparisons between the depression risk group and the no depression group. At the child level, there were no significant differences between gender and race. At the level of the mother, the results indicate that mothers in the depression risk group were no more likely to have less than a high school education, nor were they more likely to be a single parent. However, there was a significant difference in drug abuse history ($p < .001$), defined as meeting at least one of the drug abuse criteria of the Early Steps research. The results indicate that approximately 20% of mothers with depression reported a history of drug abuse, whereas less than 10% of mothers without depression made such reports. At the community level, families in the depression risk group were significantly more likely to live in neighbourhoods with higher levels of dangerousness, ($p < .001$), defined as greater than 1 standard deviation above the sample mean.

Table 4.7 Risk factor comparisons between depression risk and no depression groups (N = 554)

Demographics	**Full sample (N = 554)**	**Depression risk (n = 149)**	**No depression (n = 405)**	**χ^2 *Sig.***
Child	n (%)	n (%)	n (%)	
Gender	277 (50.0)	73 (49.0)	204 (50.4)	.853
Race	154 (27.8)	49 (32.9)	105 (25.9)	.114
Mother				
Less than high school	121 (21.8)	37 (24.8)	84 (20.7)	.302
Drug abuse history	66 (11.9)	31 (20.8)	35 (8.6)	**.001**
Single parent in home	145 (26.2)	45 (30.2)	100 (24.7)	.193
Family/Community				
Below poverty line	398 (71.8)	117 (78.5)	281 (69.4)	.051
Overcrowding in home	142 (25.6)	31 (20.8)	111 (27.4)	.134
Conviction in home	148 (26.7)	45 (30.2)	103 (25.4)	.282
Neighbourhood danger	96 (17.3)	43 (28.9)	53 (13.1)	**.001**
Intervention	270 (48.7)	74 (49.7)	196 (48.4)	.852

The results suggest that the maternal depression risk group likely represents a somewhat higher risk group of families more generally. The differences in community-level factors suggest that the neighbourhoods in which these families live appear to be less safe and trend towards the experience of more severe financial constraints. Such constraints are likely to be accompanied by additional standard of living concerns and increased levels of stress. Furthermore, in addition to mental health-related challenges, the results suggest that mothers with depression were also more likely to have experienced drug-related difficulties, which would further increase the level of risk within the family for both the mother as well as for the child.

Table 4.8 presents the results of the risk factor comparisons between the resilient and vulnerable groups. Particularly given the significant differences in the previous set of comparisons, it was important to explore whether the rates of additional risk factors varied between the children who did and did not present with normative behaviour development. As highlighted earlier, it may be that those children with more adaptive behaviour outcomes were exposed to significantly less risk in early childhood, which may at least partially account for the variation in outcome. The Bonferroni correction was applied to address issues of multiple comparisons (.05/10 = .005).

The results from the chi-square analyses indicate that there were no significant differences between the resilient and vulnerable groups across the additional risk factors. It would therefore seem that, although overall these families represent a high risk group due to the presence of maternal depression at child ages 2 and 3, there were no significant differences in early socio-demographic risk exposure between children who developed adaptive behaviours and those who did not. The results further support the importance of the resilience approach by highlighting that the variation in child behaviour outcome was not simply due to variation in risk exposure (Rutter, 2006). Across child, mother and community-level risk factors, children

with adaptive behaviour outcomes were not simply exposed to significantly less risk. Furthermore, they were no more likely to have received the intervention than children who did not present with adaptive behaviours. The focus then is on the potential processes that might be involved in explaining this variation in adaptive behaviour outcomes despite the experience of early maternal depression.

Table 4.8 Risk factor comparisons between resilient and vulnerable groups (n = 149)

Demographics	**Depression risk**			χ^2 ***Sig.***
	Total (n = 149)	Resilient (n = 55)	Vulnerable (n = 94)	
Child	n (%)	n (%)	n (%)	
Gender (girls)	73 (49.0)	26 (47.3)	47 (50.0)	.752
Race (African American)	49 (32.9)	18 (32.7)	31 (33.0)	.981
Mother				
Less than high school	37 (24.8)	14 (25.5)	23 (24.5)	.893
Drug abuse history	31 (20.8)	10 (18.2)	21 (22.3)	.554
Single parent in home	45 (30.2)	15 (27.3)	30 (31.9)	.552
Family/Community				
Below poverty line	117 (78.5)	43 (78.2)	74 (78.7)	.903
Overcrowding in home	31 (20.8)	9 (16.4)	22 (23.4)	.312
Conviction in home	45 (30.2)	20 (36.4)	25 (26.6)	.234
Neighbourhood danger	43 (28.9)	16 (29.1)	27 (28.7)	.993
Intervention	74 (49.7)	30 (54.5)	44 (46.8)	.362

4.5 Analytic strategy

4.5.1 Measures

The analyses in this chapter test the following variables:

(1) Risk: Maternal depression (ages 2 and 3)

Categorical: Dichotomous variable of self-reported maternal depression; 1 = scores above 16 on the CESD at both ages 2 and 3

Continuous: Mean self-reported maternal depression scores on the CESD across ages 2 and 3

(2) *Adaptation: Child externalising behaviour (age 5)*

Categorical: Dichotomous variable of primary caregiver-reported externalising behaviours; 0 = scores below 60 on the CBCL at age 5

Continuous: Primary caregiver-reported externalising behaviours on the CBCL at age 5

(3) *Predictor 1: Positive parenting (age 3)*

Observed composite measure including RPC coded duration proportion of behaviour, HOME items and coder impressions items at age 3

(4) *Predictor 2: Harsh parenting (age 3)*

Observed composite measure including RPC coded duration proportions of behaviour and coder impression items at age 3

(5) *Predictor 3: Child inhibitory control (age 3)*

Alternate caregiver reports on the CBQ scale of the inhibitory control dimension, which is part of the broader Effortful Control factor

(6) *Cumulative risk (age 2)*

Composite score including 7 dichotomous indicators of risk: maternal education, maternal history of substance abuse, caregiver is single adult in the home, household overcrowding, conviction of a household member, neighbourhood danger, and poverty

(7) Covariates (age 2)

Intervention (0 = control), maternal education (1 = less than high school education), poverty (1 = below the poverty line), child gender (0 = boy), and child race (1 = African American)

4.5.2 Analytic procedure

The results are presented for positive parenting, harsh parenting, and child inhibitory control as potential predictors of early childhood behavioural resilience for children of mothers with depression. Binary logistic regressions were conducted to test the categorical variable outcome and linear regressions were conducted to test the continuous variable outcome of child externalising behaviours. All analyses controlled for intervention status, poverty, maternal education, child race, and child gender. The second and third set of analyses, testing positive parenting, harsh parenting, and child inhibitory control as predictors of behavioural resilience, also controlled for the severity of maternal depression. Controlling for maternal depression was to ensure that parent- and child-level factors were predictive over and above the severity of risk. The final model for each set of analyses included all relevant predictors in one regression analysis to assess the relative predictive effects of positive parenting, harsh parenting, and child inhibitory control. The composite variable of cumulative risk was also included in the final model to evaluate whether the predictors remained significant when accounting for the possibility of additional risk. Cumulative risk was tested using two analytic approaches; first, by including each risk factor in the model as an individual variable to test for the contribution of each factor, and second, as a single composite variable of cumulative risk. No significant differences were found between the two methods. Results for the composite variable of cumulative risk are reported for conciseness and to maintain consistency with previously published Early Steps research (Trentacosta et al., 2008). All analyses reported in this chapter were conducted using SPSS 19 for Windows.

4.5.3 Summary of research questions and hypotheses

4.5.3.1 Maternal depression and child behavioural resilience

Question: Is maternal depression at child ages 2 and 3 a risk factor for the development of child externalising behaviours at age 5, and to what extent do children display developmentally normative externalising behaviours at age 5 despite the early experience of maternal depression?

Hypothesis: The experience of maternal depression at ages 2 and 3 will significantly increase the risk for child externalising behaviours at age 5. However, a significant minority of children exposed to maternal depression will show developmentally normative levels of child externalising behaviours despite this early experience of risk.

4.5.3.2 Predictors of child behavioural resilience

Question: Are positive parenting, harsh parenting, and child inhibitory control predictors of child externalising behaviours at age 5 for children of mothers with depression?

Hypothesis 1: Positive parenting and child inhibitory control will predict behavioural resilience for children of mothers with depression. Higher levels of positive parenting and higher levels of child inhibitory control will predict the absence of child externalising behaviours in the categorical analyses and lower levels of child externalising behaviours in the continuous variable analyses.

Hypothesis 2: Harsh parenting will predict behavioural resilience for children of mothers with depression. Decreased harsh parenting will predict the absence of child externalising behaviours in the categorical variable analyses and lower levels of child externalising behaviours in the continuous variable analyses.

4.5.3.3 General or risk-specific predictors

Question: Are positive parenting, harsh parenting, and child inhibitory control predictors of child externalising behaviours at age 5 for children in general, and if so, do these factors operate as general predictors of child behaviour or are they differentially predictive for children of mothers with depression?

Hypothesis 1: Positive parenting and child inhibitory control will operate as general predictors of child externalising behaviour, such that they will have a significant main effect in the full sample but will not interact with maternal depression.

Hypothesis 2: Harsh parenting will operate as a risk-specific predictor and significantly interact with maternal depression, such that lower levels of harsh parenting will predict decreased externalising behaviours particularly for children of mothers with depression.

4.6 Results

4.6.1 Maternal depression and child behavioural resilience

4.6.1.1 Categorical: Maternal depression predicting child behaviour (N = 554)

A chi-square analysis was first conducted to test the difference between the observed and expected counts of maternal depression and child externalising behaviour, and to calculate the odds ratio of child externalising behaviour given the presence of maternal depression. The results were significant [χ^2 (1) = 33.7, $p < .001$], indicating a significant difference in the observed and expected counts for the dichotomous variables of maternal depression (ages 2 and 3) and child externalising behaviour (age 5). The odds ratio was calculated by dividing the odds of a child showing no externalising behaviours when the mother did not have depression, by the odds of a child showing no externalising behaviours when the mother did have depression. The odds ratio was 3.10, suggesting that children of mothers with depression in early childhood have approximately 3 times the odds of developing externalising behaviour problems by age 5.

A binary logistic regression was conducted, with the dichotomous maternal depression risk variable (0 = no depression, 1 = depression at both ages 2 and 3) predicting the dichotomous child externalising behaviour variable (0 = no externalising behaviours, 1 = externalising behaviours at age 5), controlling for intervention, poverty, maternal education, child gender, and child race. The results are presented in the Table 4.9 below.

Table 4.9 Binary logistic regression with categorical maternal depression predicting child externalising behaviour (N = 554)

Variable	**β**	**SE**	***B***	***Sig.***
Covariates(age 2)				
Intervention	-.27	.18	.76	.133
Poverty	.23	.21	.79	.270
Mom education	.36	.22	1.43	.104
Child gender	-.23	.18	.79	.195
Child race	.14	.20	1.15	.495
Risk (age 2 & 3)				
Maternal depression	1.13	.20	3.12	**.000**

The results from the binary logistic regression indicate that the dichotomous maternal depression risk variable significantly predicts the odds of maladaptive child externalising behaviours at age 5 ($p < .001$). The positive beta coefficient is interpreted as indicating that children of mothers with depression have higher odds of showing developmentally maladaptive externalising behaviours at age 5 compared to children of mothers without depression.

A second binary logistic regression was conducted, testing the continuous risk variable of mean maternal depressive symptoms at child ages 2 and 3. The significant positive beta coefficient ($p < .01$) again indicates that children of mothers with elevated depressive symptoms in early childhood are at a greater risk for showing maladaptive externalising behaviours at age 5 (see Table 4.10).

Table 4.10 Binary logistic regression with continuous maternal depression predicting child externalising behaviour (N = 554)

Variable	β	SE	*B*	*Sig.*
Covariates(age 2)				
Intervention	-.24	.18	.79	.187
Poverty	.12	.21	1.13	.575
Mom education	.34	.22	1.40	.134
Child gender	-.28	.18	.76	.132
Child race	.17	.20	1.18	.413
Risk (age 2 & 3)				
Maternal depression	.07	.01	1.07	**.000**

4.6.1.2 Continuous: Maternal depression predicting child behaviour (N = 554)

Two linear regressions were conducted to test the relation between maternal depression at ages 2 and 3, and the continuous measure of child externalising behaviours at age 5. The first linear regression tested the categorical variable of risk and the second linear regression tested the continuous variable of risk. The control variables were entered in the first step of the regression and the risk variable of maternal depression was entered in the second step. The two-step approach was used to determine the proportion of variance in child externalising behaviours accounted for by maternal depression over and above the covariates. The tables below report the proportion of variance accounted for by each of the two steps and the significance of the F-change statistic. The coefficients and their significance reported in the tables are reported from the full regression model.

The results of the first linear regression indicate that the presence of maternal depression at ages 2 and 3 significantly predicts higher levels of child externalising behaviours at age 5 [R^2 = .064, F(1, 540) = 37.36, p <.01]. The results suggest that maternal depression in early childhood accounts for approximately 6.4% of the variation in child externalising behaviours. Conversely, the combined effect of the intervention, poverty, maternal education, child gender, and child

race accounts for a non-significant proportion of the variance in child externalising behaviours (see Table 4.11).

Table 4.11 Linear regression with categorical maternal depression predicting child externalising behaviours (N = 554)

Variable	β	SE	*B*	*t*	*Sig.*	R^2 Δ	F Δ	*df1*	*df2*	*Sig.*
Covariates (age 2)										
Intervention	-.74	.68	-.05	-1.09	.281					
Poverty	-.15	.78	-.01	-.20	.853					
Mom education	1.30	.83	.07	1.57	.121					
Child gender	-1.34	.68	-.08	-1.98	**.049**					
Child race	.66	.77	.04	.86	.391	.016	1.80	5	541	.112
Risk (age 2 & 3)										
Mom depression	4.67	.76	.25	6.11	**.001**	.064	37.37	1	540	**.000**
Model adjusted R^2 = .070										

R^2 Δ = R^2 change, F Δ = F change

The results of the second linear regression indicate that higher mean maternal depressive symptoms at ages 2 and 3 significantly predict higher levels of child externalising behaviours at age 5 [R^2 = .094, F(1, 540) = 57.09, p <.001]. The results suggest that, over and above the effect of the covariates, maternal depressive symptoms when the child was aged 2 and 3 accounts for approximately 9.4% of the variation in child externalising behaviours at age 5. The combined effect of the covariates accounts for a non-significant proportion of the variance in child externalising behaviours (see Table 4.12). By comparison, the significant effect of mean maternal depressive symptoms on child externalising behaviours accounts for 9.4% of the total 10.1% accounted for by the full model. The results of both linear regressions suggest the relative importance of maternal depression in early childhood as a particularly crucial risk factor that increases the likelihood of maladaptive child behaviours at age 5.

Table 4.12 Linear regression with continuous maternal depression predicting child externalising behaviours (N = 554)

Variable	β	SE	*B*	*t*	*Sig.*	$R^2 \Delta$	F Δ	*df1*	*df2*	*Sig.*
Covariates (age 2)										
Intervention	-.59	.67	-.04	-.88	.377					
Poverty	-.62	.77	-.03	-.81	.420					
Mom education	1.16	.82	.06	1.42	.156					
Child gender	-1.49	.67	-.09	-2.24	**.026**					
Child race	.77	.75	.04	1.02	.307	.016	1.80	5	541	.112
Risk severity (age 2 & 3)										
Depressive symptoms	.28	.037	.31	7.56	**.001**	.094	57.09	1	540	**.000**
Model adjusted R^2 = .101										

$R^2 \Delta$ = R^2 change, F Δ = F change

4.6.2 Predictors of child behavioural resilience

4.6.2.1 Categorical: Parenting and child inhibitory control predicting behaviour for children of mothers with depression only (n = 149)

The first binary logistic regression testing positive parenting as a predictor of child externalising behaviour was non-significant (p = .08). The null result suggests that for this group of children of mothers with depression, higher levels of positive parenting at age 3 do not significantly predict the odds of adaptive child behaviours at age 5.

The second binary logistic regression testing harsh parenting as a predictor of child externalising behaviour was also non-significant (p = .27). The results suggest that over and above the severity of maternal depressive symptoms, decreased levels of harsh parenting at age 3 by mothers with depression do not predict the odds of adaptive child behaviours at age 5.

The third binary logistic regression testing child inhibitory control as a predictor of child behavioural resilience was significant (β= -.86, SE = .36, p < .05). The results are presented in Table 4.13. The negative beta coefficient indicates that as child inhibitory control at age 3

increases, the odds of maladaptive child externalising behaviour at age 5 decreases. The effect of child inhibitory control is significant over and above the effects of baseline covariates and severity of maternal depression at ages 2 and 3. Primary caregiver reports corroborate the alternate caregiver reports of child inhibitory control.

Table 4.13 Binary logistic regression with child inhibitory control predicting child externalising behaviour (n = 149)

Variable	β	SE	*B*	*Sig.*
Covariates (age 2)				
Intervention	-.61	.51	.54	.232
Poverty	-.47	.67	.63	.481
Mom education	-.32	.61	.72	.601
Child gender	-.07	.51	.94	.904
Child race	.86	.59	2.37	.153
Risk severity (age 2 & 3)				
Depressive symptoms	.10	.04	1.10	**.028**
Child self-regulation (age 3)				
Inhibitory control	-.86	.36	.42	**.017**

A fourth binary logistic regression was conducted to test a full model that included the three predictors of behavioural resilience and cumulative risk. The results indicate that child inhibitory control is the only significant predictor of adaptive behaviours for children of mothers with depression. Child inhibitory control remains a significant predictor of the presence of developmentally normative externalising behaviours over and above the effects of maternal depression severity, positive parenting, harsh parenting, and cumulative risk (see Table 4.14). Of these, only the severity of maternal depression predicts the odds of maladaptive child behaviour. The results highlight the relative importance of child inhibitory control as a significant predictor of increased behavioural resilience for children of mothers with depression. It is important to note that the effect of maternal depression severity remains significant in the full model. Although child inhibitory control is an important predictor of

developmentally normative child behaviours, the results indicate that the severity of risk continues to have an impact on child behaviour development.

Table 4.14 Full binary logistic regression with all predictors and cumulative risk predicting child externalising behaviour (n = 149)

Variable	β	SE	*B*	*Sig.*
Covariates (age 2)				
Intervention	-.59	.53	.55	.261
Child gender	.08	.53	1.08	.882
Child race	.46	.69	1.59	.513
Cumulative risk (age 2)				
7 Indicators	-.03	.20	.97	.897
Risk severity (age 2 & 3)				
Depressive symptoms	.09	.05	1.09	**.039**
Parenting (age 3)				
Positive parenting	-.17	.41	.84	.667
Harsh parenting	.21	.32	1.23	.509
Child self-regulation (age 3)				
Inhibitory control	-.80	.38	.45	**.033**

4.6.2.2 Continuous: Parenting and child inhibitory control predicting behaviour for children of mothers with depression only (n = 149)

The first linear regression testing positive parenting as a predictor of the variance in child externalising behaviours was non-significant. The results support the findings from the binary logistic regression testing positive parenting in the previous set of analyses. Within this group of mothers with depression, positive parenting at age 3 does not appear to predict the presence of normative child behaviour nor does it predict the variability in child externalising behaviours at age 5.

The second linear regression testing harsh parenting was significant. The results are presented in Table 4.15 and indicate that over and above the effect of maternal depression severity, lower levels of harsh parenting of mothers with depression at age 3 predict decreased child

externalising behaviours at age 5 [R^2 = .068, F(1, 126) = 11.12, *p* <.001]. The full model accounts for 18.3% of the variance in child externalising behaviours, of which harsh parenting accounts for 6.8%. The severity of maternal depressive symptoms accounts for 12.0% of the variance, again highlighting the importance of acknowledging the continued impact of risk severity.

Table 4.15 Linear regression with harsh parenting predicting child externalising behaviours (n = 149)

Variable	**β**	**SE**	***B***	***t***	***Sig.***	**R^2 Δ**	**F Δ**	***df1***	***df2***	***Sig.***
Covariates (age 2)										
Intervention	-2.07	1.43	-.114	-1.44	.153					
Poverty	-1.90	1.76	-.087	-1.08	.281					
Mom education	-1.44	1.83	-.064	-.79	.432					
Child gender	-1.50	1.45	-.082	-1.04	.301					
Child race	1.75	1.54	.090	1.14	.264					
Risk Severity (age 2 & 3)										
Depressive symptoms	.46	.10	.35	4.41	**.000**	.120	18.34	1	127	**.000**
Parenting (age 3)										
Harsh parenting	2.77	.83	.26	3.33	**.001**	.068	11.12	1	126	**.001**
Model adjusted R^2 = .183										

R^2 Δ = R^2 change, F Δ = F change

The third linear regression tested child inhibitory control and found a significant effect on child externalising behaviours [R^2 = .077, F(1, 85) = 57.09, *p* <.001]. The results are presented in Table 4.16 and indicate that child inhibitory control at age 3 accounts for 7.7% of the variance in externalising behaviours at age 5 for children of mothers with depression.

Table 4.16 Linear regression with child inhibitory control predicting child externalising behaviours (n = 149)

Variable	β	SE	*B*	*t*	*Sig.*	$R^2 \Delta$	F Δ	*df1*	*df2*	*Sig.*
Covariates (age 2)										
Intervention	-1.95	1.70	-.11	-1.14	.263					
Poverty	-3.69	2.24	-.16	-1.65	.102					
Mom education	-2.26	2.01	-.11	-1.12	.273					
Child gender	-.67	1.70	-.04	-.39	.699					
Child race	4.04	1.91	.21	2.12	**.043**					
Risk Severity (age 2 & 3)										
Depressive symptoms	.40	.13	.31	3.14	**.002**	.143	15.03	1	86	**.000**
Child self-regulation										
Inhibitory control	-3.24	1.09	-.30	-2.97	**.004**	.077	8.82	1	85	**.004**
Model adjusted R^2 = .198										

R^2 Δ = R^2 change, F Δ = F change

The fourth linear regression tested the full model with the three key predictors and cumulative risk. Predictors were entered into separate blocks to determine the proportion of variance contributed by each variable. The coefficients reported in the table below are those for the final step of the regression with all variables included. As Table 4.17 indicates, harsh parenting and child inhibitory control at age 3 were significant predictors of child externalising behaviours at age 5, controlling for the covariates, maternal depression severity, positive parenting, and each other. Increased harsh parenting at age 3 predicts significantly higher child externalising behaviours at age 5 [R^2 = .092, F(1, 77) = 9.87, *p* <.01], accounting for 9.2% of the variance. Increased child inhibitory control at age 3 predicts significantly lower child externalising behaviours at age 5 [R^2 = .043, F(1, 76) = 4.88, p <.05], accounting for 4.3% of the variance. The full model accounts for 25.9% of the variance in child externalising behaviours at age 5, of which 14.4% is accounted for by the severity of maternal depressive symptoms at age 2 and 3. The 7 indicator composite measure of cumulative risk at age 2 did not account for a significant proportion of the variance in child externalising behaviours at age 5.

Table 4.17 Full linear regression with all predictors and cumulative risk predicting child externalising behaviours (n = 149)

Variable	β	SE	*B*	*t*	*Sig.*	$R^2\Delta$	F Δ	*df1*	*df2*	*Sig.*
Covariates (age 2)										
Intervention	-2.87	1.77	-.16	-1.62	.112					
Child gender	-.21	1.77	-.01	-.12	.908					
Child race	2.26	2.26	.13	1.18	.241					
Cumulative risk (age 2)										
7 Indicators	-.71	.67	-.11	-1.07	.211					
Risk severity (age 2 & 3)										
Depressive symptoms	.35	.13	.28	2.79	**.007**	.142	13.59	1	79	**.001**
Parenting (age 3)										
Positive parenting	-.31	1.34	-.03	-.23	.821					
Harsh parenting	3.12	1.07	.30	2.90	**.005**	.092	9.87	1	77	**.002**
Child self-regulation										
Inhibitory control	-2.53	1.15	-.23	-2.21	**.033**	.043	4.88	1	76	**.030**
Model adjusted R^2 = .198										

$R^2\Delta$ = R^2 change, F Δ = F change

The results point to the impact of the severity of maternal depressive symptoms on the externalising behaviour development of children of mothers with depression. The results highlight the importance of low levels of harsh parenting by mothers with depression in increasing the likelihood of more adaptive child behaviours along the continuum of externalising behaviours. Child inhibitory control also contributes to the promotion of more adaptive child behaviour development, in terms of both lower levels of externalising behaviours as well as the absence of maladaptive externalising behaviour.

4.6.3 General or risk-specific predictors

4.6.3.1 Categorical: Parenting and child inhibitory control predicting behaviour for all children (N = 554)

In line with the previous set of analyses, the binary logistic regressions tested each individual predictor controlling for the severity of maternal depressive symptoms at age 2 and 3. The first binary logistic regression tested positive parenting as a predictor of child externalising

behaviour for the full sample of 554 children. The results are presented in Table 4.18 and indicate that higher levels of positive parenting at age 3 significantly increases the odds of adaptive child behaviour at age 5 for children overall (β = -.32, SE = .14, $p < .05$). These results suggest that although positive parenting does not predict behavioural resilience specifically for children of mothers with depression, positive parenting does predict the presence of developmentally normative behaviours for young children in general.

Table 4.18 Binary logistic regression with positive parenting predicting child externalising behaviour (N = 554)

Variable	β	SE	*B*	*Sig.*
Covariates (age 2)				
Intervention	-.23	.19	.80	.219
Poverty	.08	.22	1.08	.722
Mom education	.28	.23	1.32	.232
Child gender	-.26	.19	.77	.157
Child race	.01	.22	1.01	.961
Risk severity (age 2 & 3)				
Depressive symptoms	.07	.01	1.07	**.001**
Parenting (age 3)				
Positive parenting	-.32	.14	.73	**.021**

The second binary logistic regression tested harsh parenting as a predictor of child externalising behaviour. The results were not significant, suggesting that harsh parenting does not predict the odds of adaptive child behaviour for children in general.

Child inhibitory control was tested as a predictor of child externalising behaviours in the third binary logistic regression. The results are shown in Table 4.19 and indicate that increased levels of child inhibitory control at age 3 significantly increases the odds of adaptive child behaviour at age 5 (β =- .21, SE = .16, $p < .05$). Considering the previous set of analyses, these results suggest that child inhibitory control increases the odds of positive behaviour development for children of mothers with depression as well as for children more generally.

Table 4.19 Binary logistic regression with child inhibitory control predicting child externalising behaviour (N = 554)

Variable	β	SE	*B*	*Sig.*
Covariates (age 2)				
Intervention	-.28	.23	.76	.229
Poverty	.09	.27	1.09	.753
Mom education	.56	.28	1.76	**.047**
Child gender	-.01	.24	1.00	.981
Child race	.16	.27	1.17	.564
Risk severity (age 2 & 3)				
Depressive symptoms	.07	.01	1.08	**.001**
Child self-regulation (age 3)				
Inhibitory control	-.21	.16	.68	**.013**

A fourth binary logistic regression was conducted to test the three predictors of interest in the same regression model, controlling for the severity of maternal depressive symptoms and cumulative risk. The results are shown in Table 4.20, and suggest that positive parenting (β= -.35, SE = .17, $p < .05$) and child inhibitory control (β= -.51, SE = .21, $p < .05$) at age 3 each significantly predict higher odds of developmentally normative externalising behaviours at age 5 for children in the full sample. The effect of each predictor on externalising behaviour is significant over and above the effect of maternal depression severity, cumulative risk, harsh parenting, and each other. The results suggest that positive parenting and child inhibitory control each contribute significant and unique predictive power to increasing the odds of normative behaviour development for children in general.

Table 4.20 Full binary logistic regression with all predictors and cumulative risk predicting child externalising behaviour (N = 554)

Variable	β	SE	*B*	*Sig.*
Covariates				
Intervention	-.25	.25	.78	.321
Child gender	.11	.25	1.12	.652
Child race	-.42	.32	.65	.194
Cumulative risk				
7 Indicators	.28	.10	1.32	**.007**
Risk severity (ages 2&3)				
Depressive symptoms	.06	.01	1.06	**.000**
Parenting (age 3)				
Positive parenting	-.51	.21	.60	**.014**
Harsh parenting	.03	.16	1.03	.851
Child self-regulation (age 3)				
Inhibitory control	-.35	.17	.70	**.033**

Interaction effects with maternal depression were then tested for each predictor. Given the conceptualisation of maternal depression as either a categorical or a continuous risk variable, possible interaction effects with both conceptualisations of risk were investigated for each predictor. Thus, the total number of interaction effects tested was six: positive parenting interacting with maternal depression (categorical and continuous), harsh parenting interacting with maternal depression (categorical and continuous), and child inhibitory control interacting with maternal depression (categorical and continuous).

All six possible interaction effects were non-significant. Neither positive parenting, nor harsh parenting, nor child inhibitory control significantly interacted with either the presence of maternal depression or mean depressive symptoms to significantly predict the odds of adaptive child externalising behaviours at age 5. The results suggest that positive parenting and child inhibitory predict increased odds of adaptive behaviour for children in general but not more specifically for children of mothers with depression. Harsh parenting does not

predict the odds of externalising behaviours for children in general nor more specifically for children of mothers with depression.

4.6.3.2 Continuous: Parenting and child inhibitory control predicting behaviour for all children (N = 554)

The following series of linear regressions were conducted according to the analytic procedures of the binary logistic regressions in the previous section. Linear regressions first tested positive parenting, harsh parenting, and child inhibitory control as general predictors of the continuous measure of child externalising behaviours. These analyses were then followed up with tests for possible interaction effects between each predictor and maternal depression as both a categorical and continuous variable of risk.

The first linear regression tested positive parenting at age 3 as a predictor of child externalising behaviours at age 5 for children in general. The results approached significance (p = .056), although the proportion of variance accounted for by positive parenting was small 5 [R^2 = .006, F(1, 533) = 3.67, p =.056]. The severity of depressive symptoms accounted for 9.3% of the variance (see Table 4.21). The results suggest that although positive parenting trends towards statistical significance, the extent to which it explains the variation in child externalising behaviours is minimal, particularly in relation to the effect of maternal depressive symptoms. The results of the linear regression contrast the significant results of the binary logistic regression from the previous set of analyses (see Table 4.18). Taken together, the findings suggest that although positive parenting at age 3 increases the odds of normative behaviour at age 5 for children in general, it does not provide explanatory power in terms of the variance in child externalising behaviours.

Table 4.21 Linear regression with positive parenting predicting child externalising behaviours (N = 554)

Variable	β	SE	*B*	*t*	*Sig.*	$R^2 \Delta$	F Δ	*df1*	*df2*	*Sig.*
Covariates (age 2)										
Intervention	-.55	.67	-.03	-.82	.412					
Poverty	-.75	.78	-.04	-.97	.333					
Mom education	1.01	.84	.05	1.19	.231					
Child gender	-1.38	.67	-.08	-2.06	**.039**					
Child race	.26	.79	.01	.33	.744					
Risk severity(age 2 & 3)										
Depressive symptoms	.27	.04	.30	7.25	**.001**	.093	55.68	1	534	**.001**
Parenting (age 3)										
Positive parenting	-.97	.50	-.09	-1.92	.056	.006	3.67	1	533	.056
Model adjusted R^2 = .104										

R^2 Δ = R^2 change, F Δ = F change

The second linear regression investigating harsh parenting was significant [R^2 = .022, F(1, 481) = 12.39, *p* <.001], indicating that harsh parenting at age 3 accounts for a significant (albeit small) proportion of the variance in child externalising behaviours at age 5 (see Table 4.22). The results suggest that lower levels of harsh parenting predict lower levels of child externalising behaviours for children in general. Although harsh parenting at age 3 did not predict the odds of developmentally normative behaviour at age 5 (i.e., externalising behaviours below the cut off score), the linear regression results highlight that harsh parenting is a significant predictor of lower externalising behaviours for children in general.

Table 4.22 Linear regression with harsh parenting predicting child externalising behaviours (N = 554)

Variable	β	SE	*B*	*t*	*Sig.*	$R^2 \Delta$	F Δ	*df1*	*df2*	*Sig.*
Covariates (age 2)										
Intervention	-1.02	.70	-.06	-1.47	.142					
Poverty	-1.13	.80	-.06	-1.41	.163					
Mom education	2.18	.90	.10	2.43	**.016**					
Child gender	-.94	.70	-.06	-1.34	.181					
Child race	.01	.78	.01	.010	.991					
Risk severity (age 2 & 3)										
Depressive symptoms	.27	.04	.30	7.04	**.001**	.095	51.86	1	482	**.001**
Parenting (age 3)										
Harsh parenting	.24	.07	.15	3.52	**.001**	.022	12.39	1	481	**.001**
Model adjusted R^2 = .126										

R^2 Δ = R^2 change, F Δ = F change

The third linear regression testing child inhibitory control was significant [R^2 = .042, F(1, 347) = 17.39, *p* <.001], with child inhibitory control explaining 4.2% of the variance in child externalising behaviours at age 5 (see Table 4.23). The results indicate that higher levels of alternate-caregiver reported child inhibitory control at age 3 predict lower levels of mother-reported child externalising behaviours at age 5. These results are in line with those from the previous set of analyses (see Table 4.19), suggesting that higher levels of child inhibitory control at age 3 not only increase the odds of normative child behaviour at age 5, but also predict the variance in these behaviours for children in the full sample.

Table 4.23 Linear regression with child inhibitory control predicting child externalising behaviours (N = 554)

Variable	β	SE	*B*	*t*	*Sig.*	$R^2\Delta$	F Δ	*df1*	*df2*	*Sig.*
Covariates (age 2)										
Intervention	-.67	.79	-.04	-.85	.402					
Poverty	-1.23	.92	-.07	-1.34	.183					
Mom education	1.92	.97	.10	1.97	.050					
Child gender	-.35	.80	-.02	-.44	.663					
Child race	.40	.93	.02	.43	.682					
Risk severity (age 2 & 3)										
Depressive symptoms	.27	.04	.31	6.26	**.001**	.109	43.40	1	348	**.001**
Child self-regulation (age 3)										
Inhibitory control	-2.18	.52	-.21	-4.17	**.001**	.042	17.39	1	347	**.001**
Model adjusted R^2 = .153										

$R^2\Delta$ = R^2 change, F Δ = F change

A fourth linear regression was conducted to test positive parenting, harsh parenting, and child inhibitory control as potential predictors of child externalising behaviour in the context of both maternal depression and cumulative risk. The results are presented in Table 4.24, and indicate that when each predictor is tested controlling for the baseline covariates, cumulative risk, maternal depressive symptoms, and each other, only child inhibitory control at age 3 is a significant predictor of child externalising behaviours at age 5. The full regression model highlights that although harsh parenting significantly predicts child externalising behaviours as an independent predictor, this effect becomes statistically non-significant once accounting for the effect of child inhibitory control. Furthermore, the main effect of positive parenting no longer approaches significance. The results point to the relative importance of child inhibitory control at age 3 as a predictor of the variance in child externalising behaviours at age 5 for children overall. The results also seem to suggest that the effects of parenting behaviours are lessened given the extent of the child's capacity to self-regulate. It is important to note, however, the significant main effect of maternal depressive symptoms and be mindful that maternal depression in early childhood continues to predict child externalising behaviours at age 5 even when accounting for the effects of parenting and child inhibitory control.

Table 4.24 Full linear regression with all predictors and cumulative risk predicting child externalising behaviour (N = 554)

Variable	β	SE	*B*	*t*	*Sig.*	$R^2 \Delta$	F Δ	*df1*	*df2*	*Sig.*
Covariates (age 2)										
Intervention	-.65	.83	-.04	-.78	.432					
Child gender	.06	.83	.01	.08	.943					
Child race	-1.27	1.07	-.07	-1.18	.241					
Cumulative risk										
7 Indicators	.44	.34	.07	1.30	.191					
Risk severity (age 2 & 3)										
Depressive symptoms	.23	.05	.27	5.13	**.001**	.088	32.36	1	323	**.001**
Parenting (age 3)										
Positive parenting	-1.07	.68	-.09	-1.56	.121					
Harsh parenting	.95	.53	.10	1.80	.073					
Child self-regulation (age 3)										
Inhibitory control	-1.77	.55	-.17	-3.22	**.001**	.026	10.34	1	320	**.001**
Model adjusted R^2 = .160										

$R^2 \Delta$ = R^2 change, F Δ = F change

Six linear regressions were then conducted to test for possible interaction effects between the three key predictors and maternal depression measured both categorically and continuously. The purpose of testing interaction effects was to investigate whether any of these predictors of child externalising behaviour might be differentially predictive for children of mothers with depression.

The first two sets of analyses testing for an interaction effect between positive parenting and maternal depression were not significant. The results suggest that an effect of positive parenting on later child externalising behaviours does not vary as a function of maternal depression or maternal depressive symptoms. In terms of predicting the continuum of child externalising behaviours at age 5, positive parenting at age 3 therefore appears to be neither a general nor a risk-specific predictor.

In the second set of linear regressions, the interaction between harsh parenting and the categorical variable of maternal depression was first analysed. The interaction effect was

significant [*B* = .12, *t*(480) = 2.28, *p* < .05]. The significant interaction effect was then tested in a full regression model that included positive parenting, child inhibitory control, and cumulative risk. The interaction effect remained significant [*B* = .18, *t*(480) = 3.01, *p* < .01], and accounted for 2.3% of the variance in child externalising behaviours [R^2 = .023, F(1, 319) = 9.05, *p* <.01]. The results indicate that the effect of harsh parenting at age 3 on child externalising behaviours at age 5 varies as a function of whether the mother is depressed or not at ages 2 and 3. Harsh parenting therefore appears to operate as a risk-specific predictor of child externalising behaviour, with lower levels decreasing the likelihood of externalising behaviours particularly for children of mothers with depression. The results from the full regression are presented in Table 4.25 below.

Table 4.25 Full linear regression with all predictors, cumulative risk, and interaction between harsh parenting and categorical maternal depression predicting child externalising behaviours (N = 554)

Variable	**β**	**SE**	***B***	***t***	***Sig.***	**R^2 Δ**	**F Δ**	***df1***	***df2***	***Sig.***
Covariates (age 2)										
Intervention	-.68	.83	-.04	-.82	.411					
Child gender	.22	.83	.01	.27	.792					
Child race	-1.55	1.07	-.08	-1.46	.152					
Cumulative risk (age 2)										
7 Indicators	.64	.33	.11	1.91	.058					
Risk severity (age 2 & 3)										
Depressive symptoms	4.03	.96	.22	4.18	**.001**	.065	23.35	1	323	**.001**
Parenting (age 3)										
Positive parenting	-1.42	.68	-.12	-2.08	**.038**	.025	9.15	1	322	**.003**
Harsh parenting	.01	.61	.01	.01	.994					
Child self-regulation (age 3)										
Inhibitory control	-1.85	.55	-.18	-3.40	**.001**	.031	12.03	1	320	**.001**
Interaction										
Depression x Harsh	2.79	.93	.18	3.01	**.003**	.023	9.05	1	319	**.003**
Model adjusted R^2 = .198										

R^2 Δ = R^2 change, F Δ = F change

The coefficient of the interaction term provides the difference between the group of mothers with depression and the group of mothers without depression in the extent to which their

harsh parenting at age 3 affects child externalising behaviours at age 5. The effect of harsh parenting on child externalising behaviour in the group of mothers with depression compared to the group of mothers without depression can be calculated as follows:

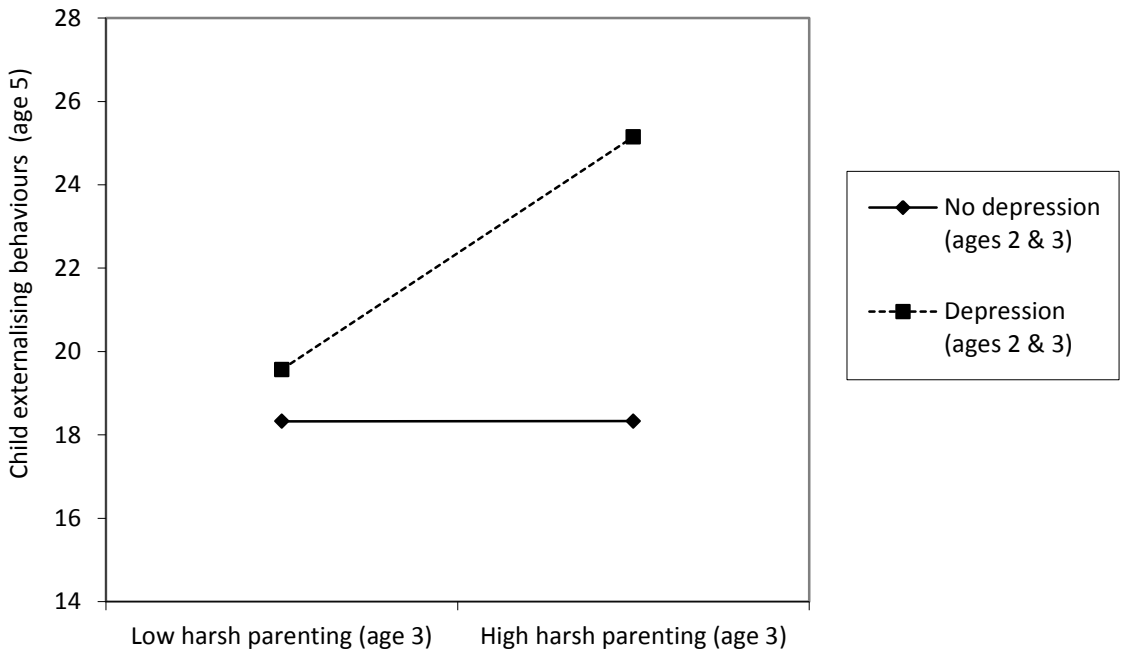
Coefficient of Depression + (Coefficient of Interaction x Coefficient of Harsh Parenting)

219 + (.182 x .01) = .22082

A one standard deviation increase in harsh parenting is associated with a .22 standard deviation increase in child externalising behaviours for children of mothers with depression compared to children of mothers without depression. One standard deviation is 10.19 on the t-score measure of child externalising behaviour. A .22 standard deviation decrease therefore represents approximately a 2 point decrease on the CBCL measure of child externalising behaviours. The results indicate that the effect of a one standard deviation decrease in harsh parenting predicts a two point decrease in child externalising behaviours for children of mothers with depression compared to children of mothers without depression.

The significant interaction between harsh parenting and maternal depression as a categorical risk variable is represented in Figure 4.1. The figure highlights the differential effect of harsh parenting at age 3 on child externalising behaviour at age 5 as a function of maternal depression at ages 2 and 3. More specifically, the impact of harsh parenting on child externalising behaviours decreases as levels of harsh parenting decrease in the depressed group, whereas the impact of harsh parenting is consistent across levels of harsh parenting in the no depression group. The results suggest that high levels of harsh parenting at age 3 are particularly predictive of child externalising behaviours at age 5 in the context of a mother with depression. As demonstrated in Figure 4.1, levels of externalising behaviour of children of mothers with depression are most similar to that of their non-exposed peers at low levels of harsh parenting. Given the significant interactive effect, these results argue for the need to reduce harsh parenting behaviours particularly for mothers with depression.

Figure 4.1 Interaction between harsh parenting and categorical maternal depression predicting continuous child externalising behaviours (N = 554)



The interaction between harsh parenting and mean maternal depressive symptoms was then investigated. The purpose was to determine whether harsh parenting interacts not only with the presence or absence of maternal depression but with the severity of depressive symptoms as well. Similar to the set of analyses above, the interaction effect was first tested in a linear regression without accounting for the other predictors of interest. The results of the initial regression were significant [B = .16, t(480) = 3.71, p < .001]. The interaction effect was then tested in a full regression model including positive parenting, child inhibitory control, and cumulative risk. The interaction effect remained significant, [B = .17, t(480) = 3.41, p < .001], with the interaction between harsh parenting at age 3 and maternal depressive symptoms at age 2 and 3 accounting for 2.9% of the variance in child externalising behaviours at age 5 [R^2 = .029, F(1, 319) = 11.62, p <.01]. The results are presented in Table 4.26.

Table 4.26 Full linear regression with all predictors, cumulative risk, and interaction between harsh parenting and continuous maternal depression predicting child externalising behaviours (N = 554)

Variable	β	SE	*B*	*t*	*Sig.*	$R^2 \Delta$	F Δ	*df1*	*df2*	*Sig.*
Covariates (age 2)										
Intervention	-.63	.82	-.04	-.77	.441					
Child gender	.12	.82	.01	.14	.891					
Child race	-1.25	1.05	-.07	-1.19	.242					
Cumulative risk (age 2)										
7 Indicators	.52	.34	.09	1.56	.121					
Risk severity (ages 2 & 3)										
Depressives symptoms	1.87	.41	.24	4.59	**.001**	.088	32.36	1	323	**.001**
Parenting (age 3)										
Positive parenting	-1.19	.67	-.11	-1.77	.078	.025	9.15	1	322	**.003**
Harsh parenting	.75	.45	.09	1.67	.096					
Child regulation (age 3)										
Inhibitory control	-1.73	.54	-.17	-3.20	**.002**	.026	10.34	1	320	**.001**
Interaction										
Symptoms x Harsh	1.24	.37	.17	3.41	**.001**	.029	11.62	1	319	**.001**
Model adjusted R^2 =.187										

R^2 Δ = R^2 change, F Δ = F change

The significant interaction between harsh parenting and maternal depressive symptoms provides further support for harsh parenting as a risk-specific predictor of child externalising behaviours. The results indicate that the negative impact of harsh parenting on the development of child externalising behaviours varies as a function of the severity of the mother's depressive symptoms. Harsh parenting therefore appears to increase the likelihood of higher levels of externalising behaviours particularly in the context of elevated maternal depressive symptoms. Considering the significant interaction between harsh parenting and maternal depression as both a categorical and continuous variable of risk, the results indicate that harsh parenting interacts not only with depression above a certain threshold but with the continuum of depressive symptoms. This finding suggests that the extent to which maternal depression impacts the effect of harsh parenting on child behaviour development likely varies within the group of depressed mothers. Not only does the presence of maternal depression

influence the effect of harsh parenting, but the continuous range of depressive symptoms even within that group may influence the effect as well.

To determine the difference in the effect of harsh parenting on child externalising behaviours given the severity of maternal depressive symptoms, the calculations are as follows:

Coefficient of Depression + (Coefficient of Interaction x Coefficient of Harsh Parenting)

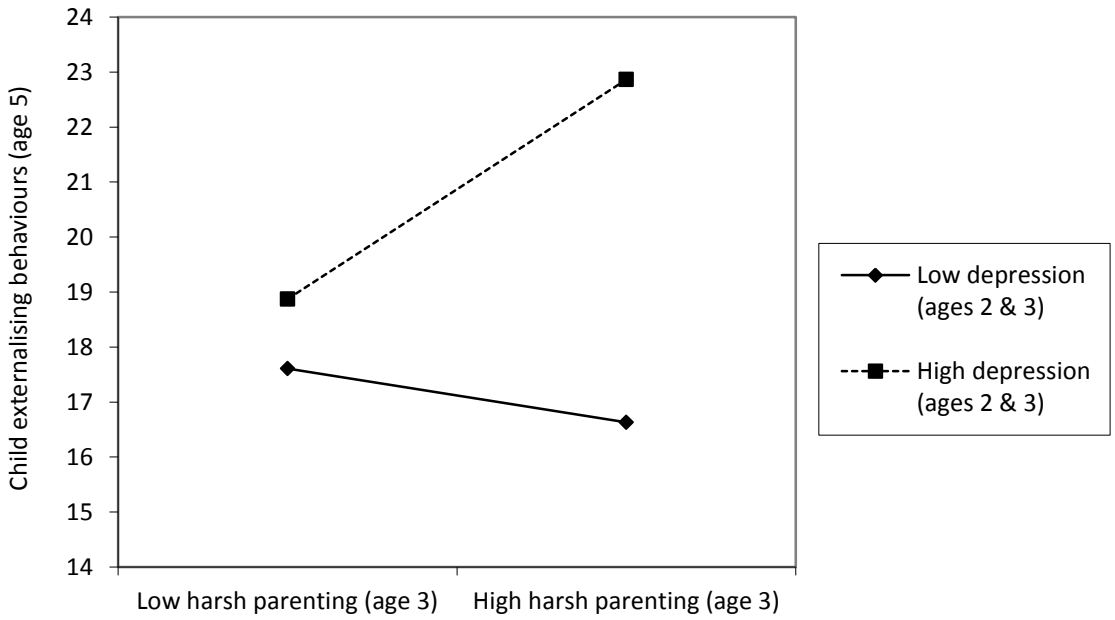
.243 + (.173 x .094) = .28926

A one standard deviation increase in harsh parenting at age 3 is associated with a .29 standard deviation increase in externalising behaviours at age 5 for children of mothers with high depressive symptoms compared to children of mothers with low depressive symptoms. A .29 standard deviation increase represents approximately a 3 point increase on the CBCL measure of child externalising behaviour. The effect of a one standard deviation increase in harsh parenting predicts a three point increase in child externalising behaviours for children of mothers with high depressive symptoms compared to children of mothers with low depressive symptoms.

The differential effect of harsh parenting at age 3 on child externalising behaviour at age 5 is represented in Figure 4.2. The figure illustrates that as levels of harsh parenting decrease, the impact on child externalising behaviours decreases when depressive symptoms are high and is consistent when depressive symptoms are low. Simple slopes analyses were conducted to test the difference in the slopes at specified values of maternal depressive symptoms. Because 16 is the cut off score on the depression measure, and one standard deviation in mean maternal depressive symptoms is approximately 10, the values selected were: 6, 16, 26, and 46. The value of 46 was selected as a score at the upper limit, representing approximately 3 standard deviations above the cut off and approaching the maximum mean depressive symptom score of 49.50. At each specified value of maternal depressive symptoms, the simple slopes analysis was significant (*p*s <.001). The results indicate that the slopes of the effect of harsh parenting

on child externalising behaviour for low compared to high depressive symptoms are significantly different across the range of depressive symptom scores. At the highest levels of harsh parenting, the differential impact on child externalising behaviours as a function of maternal depression severity is most pronounced. The greatest vulnerability for the development of externalising behaviours is for children whose mothers engage in high levels of harsh parenting and who concurrently have high levels of depressive symptoms. Figure 4.2 below highlights these mothers and their children as particularly in need of targeted intervention efforts to reduce both maternal depressive symptoms and the use of harsh parenting to promote more adaptive child behaviours.

Figure 4.2 Interaction between harsh parenting and continuous maternal depression predicting continuous child externalising behaviours (N = 554)



The final two linear regressions tested for possible interaction effects between child inhibitory control and maternal depression measured categorically and continuously. The results for both analyses were non-significant. The non-significant interaction effects suggest that child inhibitory control operates as a general predictor of child externalising behaviour. The impact of child inhibitory control at age 3 on child externalising behaviours at age 5 does not appear

to vary according to whether the child has a mother with or without depression in early childhood. It would seem then that higher levels of child inhibitory control promote lower levels of child externalising behaviour and that this main predictive effect is similar for children across the range of risk conferred by maternal depression and maternal depressive symptoms.

4.7 Discussion

The results of this chapter contribute to the substantial body of evidence in support of the potential adverse effects of maternal depression on child behaviour development in early childhood (e.g. Avenevoli & Merikangas, 2006; Beardslee et al., 1998; Brennan et al., 2000; Hammen, 2003b). The results also support the resilience perspective given that not all children of mothers with depression presented with maladaptive behaviours despite the increased risk (Luthar, 2003; Rutter, 2007). To improve the likelihood of more positive behaviour development for these children, there was evidence indicating the role of harsh parenting and child inhibitory control. Harsh parenting was a risk-specific predictor of child behaviour, such that higher levels of harsh parenting predicted increased externalising behaviours only for children of mothers with depression. At low levels of harsh parenting, levels of externalising behaviours of children of mothers with and without depression were most similar. Child inhibitory control was a general predictor of externalising behaviours as it promoted more positive behaviour for children whose mothers had depression as well as for children whose mothers did not. These findings serve to inform early intervention and prevention efforts targeting the behaviour development of young children of mothers with depression. The emphasis is on the need to specifically reduce harsh parenting behaviours and more generally promote more effective child self-regulation, with a continued effort to reduce the rate of maternal depression.

Maternal depression at child ages 2 and 3 significantly increased the risk for child externalising behaviours at age 5. This finding is in line with a substantial body of empirical evidence

indicating the potential negative impact that maternal depression can have on behaviour development of children in the externalising domain (Ashman et al., 2008; Goodman et al., 2011). Adopting the resilience perspective draws attention to the finding that there was, however, significant variation in child outcome. The results indicate that there was a substantial minority of children who demonstrated developmentally normative levels of externalising behaviours despite the risk conferred by the early experience of maternal depression. Although maternal depression increased the odds of problem behaviours by a factor of 3, approximately a third of the children of mothers with depression at ages 2 and 3 were nevertheless functioning well in the behaviour domain at age 5. Recent meta-analytic findings indicate the significant association between maternal depression and child externalising behaviours, but similarly highlight the substantial variability in child behaviour outcomes (Connell & Goodman, 2002; Goodman et al., 2011). Across the included studies, effect sizes were significant but small, similar to the results of this thesis. Maternal depression predicted child externalising behaviours over and above the effects of poverty, maternal education, child gender, and child race, accounting for a significant but small proportion of the variance. The results of this thesis are therefore in line with the existing evidence, indicating the significant impact of maternal depression on child development, whilst also highlighting the variability in child outcome and the proportion of this variability that is explained by factors other than maternal depression.

The second set of analyses was interested in positive parenting, harsh parenting, and child inhibitory control as predictors of behavioural resilience specifically for children of mothers with depression. In contrast to the hypotheses, neither positive parenting nor harsh parenting predicted the presence or absence of adaptive behaviours for this group of risk-exposed children. In terms of predicting the categorical definition of child behaviour outcome, only the child-level predictor of inhibitory control significantly predicted the odds of adaptive child behaviours. As early as 3 years of age, alternate caregiver reports of child inhibitory control

appear to be a salient predictor of externalising behaviour at age 5 for children of mothers with depression. Bearing in mind that the categorical definition of behavioural resilience captures a more comprehensive definition of child functioning, the importance of child self-regulation as a predictor of adaptive functioning in early childhood is likely to extend beyond strictly the externalising behaviour domain.

The significant result for child inhibitory control is supported by the existing empirical evidence, in terms of the predictive effect of individual differences in early self-regulation on later child outcomes. Children who are capable of more effectively managing and inhibiting their behaviours in response to cues and stimuli from their environment have been found to present with lower levels of externalising behaviours throughout childhood (Calkins et al., 2007; Eisenberg, Smith, et al., 2004; Snyder et al., 2005). The results of this thesis provide general support for the positive effect of child self-regulation in early childhood, in terms of the significant main effect of child inhibitory control at age 3 that was found in the full sample of children at age 5. Furthermore, additional support is provided for the positive effect of child self-regulation on adaptive behaviour development particularly within a group of children of mothers with depression. This thesis is therefore consistent with the literature and highlights that the positive effect of child self-regulation similarly holds for a group of young children whose mothers have depression.

The inclusion of the continuous variable approach helped to better understand the variation in outcome along the continuum of externalising behaviours for children of mothers with depression. Had only the categorical definition been analysed, the influence of harsh parenting on the full range in child externalising behaviours would not have been found. Although harsh parenting at age 3 did not significantly predict the odds of adaptive behaviour outcomes at age 5, it did explain a significant proportion of the variance in child externalising behaviours. As previously emphasised, resilience research focuses on explaining the variation in outcome

despite the experience of risk (Luthar et al., 2000a; Rutter, 2006; Seifer, 2003). Although this is most often understood and researched in categorical terms (e.g., Brennan et al., 2003; Jaffee et al., 2007), the continuous variable analyses in this thesis enabled the exploration of "variation" in a dimensional sense. It is not possible to state in clear, categorical terms that mothers with depression who engaged in lower levels of harsh parenting increased the odds of adaptive behaviour outcomes for their children. However, the conclusion can be drawn that the harsh parenting of mothers with depression explained a significant proportion of the variability in child externalising behaviours, such that lower levels of harsh parenting at age 3 predicted decreased child externalising behaviours at age 5.

Recent research supports the role of negative parenting behaviours in predicting child behaviour, such that lower rates of harsh and rejecting parenting behaviours predicted decreasing trajectories of child externalising behaviours and lower levels of child aggression (Nagin & Tremblay, 2001; Shaw et al., 2003; Tremblay et al., 2004). Furthermore, meta-analytic findings also provide support for the stronger association between maternal depression and negative parenting behaviours compared to positive parenting behaviours (Lovejoy et al., 2000). Given the significant results for harsh parenting within the group of mothers with depression, this thesis contributes to the existing body of evidence in terms of supporting the predictive effect of more overtly harsh and critical parenting on externalising behaviours within a group of young children of mothers with depression.

The results for predictors of behavioural resilience for children of mothers with depression argue most strongly in favour of reducing the use of harsh parenting behaviours and supporting the early development of child self-regulation. Previous evidence supports the role of both these factors in terms of promoting more positive development across domains of functioning and over an extended period of time for children in general (Gilliom et al., 2002; Mischel & Shoda, 1998; Shaw et al., 2001).The findings in this thesis highlight that for a group

of young children whose mothers have depression, more effective child inhibitory control is an important individual resource in terms of predicting the odds of adaptive behaviour outcomes at age 5. Furthermore, in terms of explaining the full spectrum of child externalising behaviours, the results also argue in favour of decreased engagement in harsh parenting behaviours by mothers with depression.

Although positive parenting did not predict child behaviour outcomes for children of mothers with depression, it did predict developmentally normative behaviour for the full sample of children. Positive parenting predicted the presence of developmentally normative externalising behaviours and approached significance in terms of explaining the variation along the full continuum of externalising behaviours. These results are in line with previous research providing support for positive parenting as a general predictor of positive behaviour development in early childhood (e.g. Dishion et al., 2008; F. Gardner et al., 2007).

The absence of an interactive effect between positive parenting and maternal depression is in contrast to the significant interaction effect found in an adolescent sample, in which higher levels of maternal warmth interacted with maternal depression to predict resilient adolescent mental health (Brennan et al., 2003). There are notable differences between this thesis and the study by Brennan and colleagues. This thesis analyses externalising behaviours in early childhood within a longitudinal research design, whereas the research by Brennan et al. (2003) investigated mental health outcomes of adolescents in a cross-sectional study. The differences tentatively suggest that more positive parenting behaviours might be differentially predictive for offspring of mothers with depression in terms of functioning within the mental health domain, as opposed to the behaviour domain, and during a later developmental stage. Future research however would need to address the potential risk-specific effect of positive parenting through to adolescence, to consider the possibility that the differentially predictive effect on child externalising behaviours might similarly emerge later in development. There is also a

need to corroborate previous research findings regarding risk-specificity of positive parenting behaviours in the mental health domain within a longitudinal design.

In contrast to the general effects for positive parenting and child inhibitory control, there was support for the specificity of harsh parenting for mothers with depression. The results revealed that harsh parenting operated as a risk-specific predictor of child externalising behaviours, such that it had a significantly greater effect on externalising behaviours for children of mothers with depression compared to children of mothers without depression. The interaction between maternal depression and harsh parenting continued to predict child externalising behaviours over and above the effects of positive parenting, child inhibitory control, and cumulative risk. The results support the robustness of harsh parenting as a risk-specific predictor of behavioural resilience within this sample of young children. The positive effect of low levels of harsh parenting that has previously been found (e.g., Shaw et al., 2003; Tremblay et al., 2004) appears to be all the more predictive of positive child behaviour development in the context of maternal depression. A more detailed investigation of the nature of the relations between maternal depression, harsh parenting, and child externalising behaviours is included in a set of exploratory follow-up analyses in Appendix C.

This thesis is specifically interested in promoting more positive child behaviour outcomes given the experience of early maternal depression (Rutter, 2006). With this focus in mind, the results support the importance of harsh parenting behaviours. For mothers with depression, the results argue for the need to reduce parenting behaviours, such as blaming and criticizing the child, actively rejecting the child, and displaying anger and annoyance, in an effort to promote more adaptive externalising behaviours for young children. Increasing use of parenting behaviours such as these appears to have a negative impact on the behaviour development particularly for children of mothers with depression. From a resilience perspective, the significant interaction effect highlights the factors that are of particular importance for

promoting positive child behaviour development for children of mothers with depression compared to other children (Roosa, 2000; Rutter, 2006). The results point to the need for reduced harsh parenting behaviours particularly for mothers with depression who have young children.

The purpose of these analyses was not only to try to better understand certain key predictors of resilience in early childhood but also to inform intervention and early prevention efforts (Luthar et al., 2000a). Given the intervention approach, significant main effects within the risk-group also highlight factors that promote more positive behaviour development for children of mothers with depression (Luthar et al., 2000b). The results therefore indicate that at the family- and child-level, lower levels of harsh parenting as well as higher levels of child inhibitory control are two processes that enable the more successful management of the risk conferred by maternal depression. From the intervention perspective, the results emphasise that particularly for mothers with depression who have young children, there is a need to reduce harsh parenting behaviours to promote more positive child development. For young children in general, including those who have mothers with depression, the results also argue in favour of supporting the effective development of the child's capacity for self-regulation. Both parenting and child self-regulation have been shown to be amenable to change through intervention efforts (e.g. Dishion et al., 2008; C. E. Izard et al., 2004; Webster-Stratton et al., 2008). In terms of better supporting mothers of young children with depression, the evidence from this thesis indicates that early intervention and prevention efforts need to focus specifically on the reduction of harsh parenting behaviours by these mothers and on the improvement of early self-regulation of their children.

The explicit focus of this thesis is on the disruptive or problematic child behaviours known as externalising behaviours. In early childhood, the broad-band Externalising factor on the CBCL includes attention problems and oppositional or aggressive behaviours, as well as the

corresponding disorders of Attention-Deficit Hyperactivity Disorder (ADHD) and Oppositional Defiant Disorder (ODD) (Achenbach & Rescorla, 2000; F. Gardner & Shaw, 2008; Lahey et al., 1992). At age 5, measurement of the broad-band Externalising factor also includes rule-breaking behaviours (Achenbach et al., 1991). With regards to the predictive validity of child inhibitory control on later child externalising behaviours, there was concern that perhaps the two constructs did not represent sufficiently distinct constructs, particularly at such an early developmental stage. As detailed in Chapter Three, this thesis measures child inhibitory control using the Child Behaviour Questionnaire (CBQ; Rothbart et al., 2001) and focuses particularly on child inhibitory control as part of the broader domain of effortful control. According to Rothbart, effortful control is defined as ‘‘the ability to inhibit a dominant response to perform a subdominant response’’(Rothbart & Bates, 2007, p. 137), and includes attentional control and activation or inhibitory control.

Conceptually the most significant overlap between inhibitory control and externalising behaviours is in the attention domain. However, only one item from the CBCL attention domain (“Can’t sit still or restless “) coincides with an item from the CBQ Inhibitory Control subscale (“Has trouble sitting still when s/he is told to”). As a point of distinction, the theoretical importance of the child appropriately managing behaviours in response to instructions is apparent in the inhibitory control item given the inclusion of the phrase “when s/he is told to”. The additional four attention items from the CBCL (“Can’t concentrate, can’t pay attention for long”, “Poorly coordinated or clumsy”, “Quickly shifts from one activity to another”, and “Wanders away from home”) are theoretically distinct from the inhibitory control items (e.g., “Can easily stop an activity when s/he is told “no””, “Is usually able to resist temptation when told s/he is not supposed to do something”, “Can wait before entering into new activities if s/he is asked to”). Of the 24 items included in the CBCL broad-band child Externalising factor, 19 items address aggressive, oppositional, or rule-breaking behaviours (e.g., “Temper tantrums or hot temper”, “Uncooperative”, “Defiant”, “Destroys things

belonging to his/her family and other children", "Disobedient"). The majority of items on the measure of externalising behaviours are therefore concerned with distinctly different child behaviours than the inhibitory control subscale. Not only were the constructs in the analyses of this chapter reported at different time points and by different informants, but a review of the measurement items supports the theoretical differences between the two constructs in early childhood.

It is worth noting that the investigation of both categorical and continuous variable analyses was important in terms of highlighting the effect of harsh parenting on the range in child externalising behaviours. Strictly adopting a more "traditional" resilience approach, with only a categorical definition of adaptive outcome, would have missed the main effect of harsh parenting on the variation in child externalising behaviours for children of mothers with depression. Most importantly, the interaction effect between harsh parenting and depression in predicting the variance in child externalising behaviours would have been overlooked. Although harsh parenting and maternal depression do not interact to predict the presence or absence of child externalising behaviours, they do interact in a robust manner to predict the continuum of child externalising behaviours. Given the reliability of child externalising behaviour as a predictor of later child functioning across domains, a reduction in the levels of externalising behaviours is important in terms of promoting more positive trajectories of child development.

The difference in results between the two analytic approaches highlights that there is a need for greater consideration and clarity regarding the selection of analytic strategy in resilience research. On the one hand, the categorical variable approach in this thesis supports the robustness of child inhibitory control as a predictor of a validated definition of early childhood resilience in the context of maternal depression. On the other, the results reveal the differential impact of harsh parenting on the spectrum of child externalising behaviours given

both the presence and severity of maternal depression. Each approach advances the understanding of the relations between key constructs but with evidence of a different kind. Combining both perspectives within the same set of analyses provides a more comprehensive set of results and is also useful in terms of understanding more clearly the nature of information provided by each approach. The selection of only one analytic method, as is more conventionally the case, would have provided only part of this set of results. Future research could benefit from a more explicit discussion of the methods and justification for the selection of analytic approach.

The inclusion of both the categorical and the continuous variable approaches to resilience research made it clearer that there are strengths and limitations to each. Compared to the analysis of continuous variables, the categorical variable approach is more readily conducive to the communication of resilience. With clearly defined groups that distinguish “risk-exposed” from “non-exposed” children, and “adaptive” from “maladaptive” child outcomes, it is possible to communicate in more clear and simple terms about those children who are doing well despite the experience of risk. The strength of the categorical variable approach was particularly apparent in the validation section. Because the inference of resilience was represented within a particular group of children, in terms of those who had been exposed to the defined risk and who met the criteria for a sufficiently good outcome, it was possible to further explore the validity of this definition. The validation process provided a more thorough and comprehensive understanding of the functioning of these children and the means to justify that this was a theoretically meaningful distinction. This strength of the categorical variable approach is an important limitation of the continuous variable approach, which is not capable of validating an operationalized definition of resilience.

A limitation of the categorical variable approach however is the requirement for meeting specified criteria on measures of both risk and adaptation, resulting in the exclusion of

participants with missing data. Although comparisons revealed no significant differences between those who were included and those who were excluded, information is lost and there is a resulting decrease in statistical power. The most notable limitation of the categorical variable analyses was the inability to detect the dynamic interplay between maternal depression and harsh parenting in predicting child behaviour. Although the lack of significant interaction indicates that the impact of harsh parenting on the validated child outcome does not vary depending on maternal depression, the continuous variable analyses reveal that there is a dynamic effect of harsh parenting as a function of maternal depression on the continuum of child externalising behaviours. The limitation of the categorical variable approach is therefore balanced in this thesis by the increased explanatory power and results provided by the continuous variable approach.

The continuous variable approach arguably represents a more broad understanding of risk and outcome. Considering the impact of the full range of risk severity on the full spectrum of outcome takes a dimensional approach to the concept of "variability" that is emphasised in resilience research. The conclusions that can be drawn from this approach are arguably more nuanced, as they provide information about the proportion of variance in the outcome that can be accounted for by the risk. From this perspective, the results of this thesis emphasise the role of harsh parenting in terms of explaining a significant proportion of the variance in the full spectrum of child externalising behaviours. What is arguably a more nuanced understanding of the dynamic interplay between the variation of risk and adaptation can also, however, be considered as a limitation. As previously argued, the categorical variable approach lends itself to a more clear communication of resilience. These are therefore strengths and limitations of both approaches. On the one hand, the categorical variable approach is clearer but does not capture the full spectrum of variability. On the other, the continuous variable approach accounts for the full spectrum of risk and adaptation, but in doing so makes it more difficult to clearly place the results within a resilience framework.

Future resilience research should provide greater rationale for the selection of analytic approach based on the intended aims of the study. There also needs to be a more explicit, on-going dialogue regarding the importance of the operationalisation of risk and adaptation, and the strengths and limitations of defining these constructs either categorically or continuously. In this thesis, although the categorical approach provides evidence in support of child self-regulation, it is the continuous variable approach that highlights harsh parenting as a risk-specific predictor. Although resilience research most often adopts the categorical variable approach, these results indicate that there is much to be learned from moving beyond the strictly categorical "presence/absence" understanding of risk and adaptive outcomes. By considering these constructs dimensionally, it is possible to explore how the full range in risk severity impacts the full spectrum of observed variability in child outcome.

The concept of resilience is implied through the presence of normative child behaviours despite the early experience of risk conferred by maternal depression (Luthar & Bidwell Zelazo, 2003; Rutter, 2012). The validity of this definition was demonstrated in the analyses in Section 4.4, replicating the analytic strategy of earlier work and highlighting that despite the focus on child externalising behaviours, the categorical definition of adaptation represented a more comprehensive look at children who were "doing well" (Jaffee et al., 2007; Masten, 2001). The categorical variable analyses revealed that these children were drawing on the normative functioning of the developmentally salient capacity of self-regulation from as early as 3 years of age. The continuous variable analyses highlighted that the harsh parenting behaviours of mothers at age 3 also helped to explain the variability in child externalising behaviours at age 5, particularly for children of mothers with depression. The results should not fail to acknowledge however that throughout the analyses the severity of maternal depression at ages 2 and 3 continued to negatively impact child behaviours despite the effects of the key predictors. The argument is therefore in favour of promoting improved child self-regulation

and reducing harsh parenting behaviours, in the context of supporting improved maternal mental health.

Chapter 5: Mediation, Moderated Mediation, and Competing Bidirectional Effects

5.1 Introduction

The analyses in Chapter Five build on those from the preceding chapter to explore child- and family-level mechanisms as mediators and moderators of the relation between maternal depression and child externalising behaviours. Chapter Four investigated these mechanisms as general or risk-specific predictors of behavioural resilience; Chapter Five investigates whether these predictors operate as processes through which maternal depression influences child behaviour. Positive parenting and harsh parenting are tested as potential mediators of the relation between maternal depression and child externalising behaviours, and child inhibitory control is then tested as a potential moderator of this indirect effect. The purpose is to contribute to the understanding of family-level processes through which maternal depression might influence child behaviour development in early childhood, and how these specific mechanisms of risk transmission might be attenuated by an important child-level resource. The aim is to more effectively target key processes that support the promotion of adaptive behaviour development for children of mothers with depression, to increase the likelihood of positive child outcomes despite the experience of risk in early childhood.

Potential mediating variables are the mechanisms through which maternal depression might influence child functioning (Ashman et al., 2008; Radke-Yarrow & Klimes-Dougan, 2002; Shrout & Bolger, 2002). In this chapter, the focus is on differences in parenting behaviours that are linked to maternal depression and that might explain the variability in child externalising behaviours. Mothers with depression tend to display more irritable and intrusive behaviours during their interactions with their children, and are also more likely to use harsh and punitive disciplining strategies (Brennan et al., 2003; Goodman & Gotlib, 1999). Findings from a meta-analytic review suggest that the largest effects for maternal depression on parenting

behaviours are in terms of negative and coercive behaviours (Lovejoy et al., 2000). It is well-established that such harsh and negative parenting behaviours are significantly associated with child externalising problems (Acker & O'Leary, 1996; August et al., 1999; Kim et al., 2003). Given the links between maternal depression and increased harsh parenting, and the effect of harsh parenting on child externalising behaviours, the analyses in this chapter test the hypothesis that harsh parenting will mediate the relation between maternal depression and child externalising behaviours. The potential mediating role of positive parenting is also explored, although a significant indirect effect is not hypothesised. The primary focus is therefore on the potential mediating role of harsh parenting.

Current evidence provides preliminary support for the potential mediating role of parenting behaviours in the relation between parental depression and child outcome. Support was found for indirect effects of parental rejection in the association between parental depressive symptoms and externalising behaviours in offspring aged 10 to 15 years (Elgar et al., 2007). Parenting behaviours were measured in terms of child perceptions of parenting, using questions developed specifically for the purposes of the study, with varying degrees of internal consistency for the parenting scales. Assessments were also only completed at two time points, such that parenting behaviours and child externalising behaviours were assessed at the same time point in the mediation models. More recently, support was found for the mediating effect of family environmental factors, including parenting behaviours measured more generally, as well as for genetic factors in the association between parental depression and adolescent conduct problems (Silberg, Maes, & Eaves, 2010). Preliminary support is also provided for the potential mediating role of parenting behaviours in predicting child mental health outcomes (Johnson, Cohen, Kasen, Smailes, & Brook, 2001). A dichotomous measure of maladaptive parenting mediated the relation between parental and offspring psychiatric symptoms in adolescence and early adulthood.

Overall, the evidence specifically supporting negative and harsh parenting behaviours as a process through which maternal depression might influence child externalising behaviours in early childhood is limited. The few studies that have been conducted thus far are limited by the lack of discrete time points in their mediation models and the use of non-validated measures of parenting and child outcome (Bifulco et al., 2002; Elgar et al., 2007; Johnson et al., 2001). Furthermore, studies investigating child behaviours include adolescent samples and have yet to test indirect effects of parenting from an earlier developmental stage. The analyses of this chapter aim to address these limitations with the use of well-validated, standardised measures of maternal depression and child externalising behaviours, an observed measure of harsh parenting behaviours, and discrete time points testing mediation models using path analysis from early childhood.

Those variables that potentially moderate the relation are those for which the effects of maternal depression on parenting and child behaviour differ according to varying levels or categories of that variable (Brennan et al., 2003; Goodman & Gotlib, 1999). In this chapter, the focus is on the potential moderating effect of child inhibitory control on the indirect effect of parenting. Empirical evidence supports the role of inhibitory control in early childhood in promoting more competent functioning across domains and over time (e.g. S. W. Baron, 2003; Gilliom et al., 2002; Lengua, 2003). Children who more effectively manage their behaviours in response to cues and stimuli from their environment demonstrate better compliance (Kopp, 1989; Stifter, Spinrad, & Braungart-Rieker, 1999), fewer conduct problems (Eisenberg, Smith, et al., 2004; Snyder et al., 2005), improved theory of mind (Carlson, Moses, & Claxton, 2004), and improved academic performance (Blair & Razza, 2007; McClelland et al., 2007). Furthermore, there is also a strong association between parenting behaviours and child self-regulation, with a detrimental impact of more negative parenting styles on self-regulatory skills (Karreman et al., 2006; Piotrowski et al., 2012). Conversely, low levels of physical discipline and

high levels of maternal warmth predicted more effective child self-regulation from ages 4 to 8 (Colman et al., 2006).

The literature provides evidence for links between different types of parenting behaviours, child externalising behaviours, and child self-regulation, and points to the importance of effective self-regulation from early in child development. The analyses in this chapter test the hypothesis that the potential mediating effect of parenting, particularly harsh parenting, in the relation between maternal depression and child externalising behaviour might differ depending on the child's level of inhibitory control. Mediation analyses are first conducted followed by moderated mediation analyses. The capacity to more effectively self-regulate is expected to operate as a protective resource that will attenuate the indirect effect of harsh parenting.

The mechanisms linking maternal depression and child outcomes, and the variety of potential interactive effects and bidirectional influences, points to the complexity of trying to better understand these processes (Gross et al., 2009; Hammen et al., 1990). As a final step to the series of models in this chapter, competing bidirectional models are conducted to test the association of direct and indirect effects specified in the opposite direction. This is to assess the relative strength of associations specified in both directions between mother and child, acknowledging that effects do not operate strictly in one direction. Chapter Five tests separate mediating models during two time periods, from ages 2 to 4 and from ages 4 to 7.5. Chapter Six then builds on these analyses by conducting longitudinal analyses that combine both parenting processes and reciprocal effects into unified models from ages 2 to 8.

The general aim of this thesis is to better understand how the key constructs of maternal depression, positive parenting, harsh parenting, child inhibitory control, and child externalising behaviours might be related from early childhood. Processes through which maternal depression confers risk on child behaviour development are explored to investigate potential

causal links between risk and the variability in child outcome. Moderating effects are then tested to investigate how processes of risk transmission might be mitigated. The overarching resilience perspective emphasises the need to investigate mechanisms that might explain the variability in child outcome despite the experience of early risk (Rutter, 2006; Seifer, 2003), and which could be targeted in an effort to promote more positive behaviour development for young children of mothers with depression (Luthar et al., 2000b; Masten & Powell, 2003). The purpose of Chapter Five is to move beyond testing direct predictive effects, to investigate parenting behaviours as potential processes through which risk might be transmitted, and to test child self-regulation as a potential factor that might moderate this transmission of risk. In doing so, these analyses test specific, theoretically-driven hypotheses concerning the nature of how these constructs might be associated over time.

5.2 Aims

(1) Investigate positive parenting as a potential mediator of maternal depression and child externalising behaviour in early childhood (Section 5.4.1.1) and in middle childhood (Section 5.4.1.4)

(2) Investigate harsh parenting as a potential mediator of maternal depression and child externalising behaviour in early childhood (Section 5.4.2.1) and in middle childhood (Section 5.4.2.4)

(3) Test child self-regulation as a potential moderator of the mediation of positive parenting in early childhood (Section 5.4.1.2) and in middle childhood (Section 5.4.1.5), and of harsh parenting in early childhood (Section 5.4.2.2) and in middle childhood (Section 5.4.2.5)

(4) Examine bidirectional effects, from child externalising behaviour to maternal depression, with positive parenting in early childhood (Section 5.4.1.3) and in middle childhood (Section

5.4.1.6), and with harsh parenting in early childhood (Section 5.4.2.3) and in middle childhood (Section 5.4.2.6)

5.3 Methods

5.3.1 Inclusion criteria

Chapter Five tests a series of three models: mediation, moderated mediation, and competing bidirectional effects. In line with the theoretical rationale of the study outlined in Chapter Four (see section 4.3.1), only biological mothers at the depression and parenting time points are included. In the early childhood models (ages 2 to 4), primary caregivers other than the biological mother at ages 2 and 3 are excluded, resulting in a sample of n = 601. For the middle childhood models (ages 4 to 7.5), primary caregivers other than biological mothers at ages 4 and 5 are excluded, resulting in a sample of n = 543. No significant differences were found between the included and excluded families on measures of depression, child externalising behaviour, poverty, maternal education, child gender, or child race. There were also no significant differences on the demographic variables reported in Chapter Four, between the sample in Chapter Four (n = 554) and either the early childhood sample (n = 601) or the middle childhood sample (n = 543) in this chapter.

5.3.2 Measures

The analyses in this chapter test the following variables:

(1) *Risk: Maternal depression (age 2, age 4, age 7.5)*

Categorical risk: Dichotomous variable of self-reported depression on the CESD (1 = scores above 16) at age 2 and age 4

Continuous risk: Self-reported depressive symptoms score on the CESD at age 2 and age 4

Competing effects models: Self-reported depressive symptoms score on the CESD at age 4 and age 7.5

(2) *Outcome: Child externalising behaviours (age 2, age 4, age 7.5)*

Primary caregiver-reported child externalising behaviours on the CBCL at age 2, age 4, and age 7.5

(3) *Mediator 1: Positive parenting (age 3, age 5)*

Observed composite measure including coded duration proportion of behaviour, items from the HOME, and coder impressions items at age 3 (RPC coding) and age 5 (RACS coding)

(4) *Mediator 2: Harsh parenting (age 3, age 5)*

Observed composite measure including coded duration proportions of behaviour and coder impression items at age 3 (RPC coding) and age 5 (RACS coding)

(5) *Moderator 1: Child inhibitory control (age 2, age 4)*

Alternate caregiver reports on the CBQ scale of the inhibitory control dimension, which is part of the broader Effortful Control factor, at age 2 and age 4

(6) *Covariates (age 2, age 4)*

All analyses: Intervention (0 = control), maternal education (1 = less than high school education), poverty (1 = below the poverty line), child gender (0 = boy), and child race (1 = African American)

Mediation models: Primary caregiver-reported externalising behaviour on the CBCL at age 2 and age 4

Competing effects models: Self-reported maternal depression on the CESD at age 2 and age 4

5.3.3 Analytic strategy

Although the analyses build on those from the preceding chapter, there are important differences to note. The analyses in this chapter test maternal depression at a single time point rather than a combined variable of depression at ages 2 and 3. The decision to do so was to test relations between the variables at discrete time points in a more rigorous analysis of mediating effects. The maternal depression risk variable from Chapter Four partially overlaps in time with the mediating mechanisms of parenting at age 3. At the time of data analysis, parenting variables at age 4 were not available. It was thus not possible to test a model of maternal depression at ages 2 and 3, predicting child externalising behaviour at age 5, through the processes of parenting at age 4. The decision was therefore made to analyse a single time point of maternal depression at age 2, predicting child externalising at age 4, through parenting processes at age 3. Doing so enabled the development of a cleaner set of models that test relations between discrete time points. It also more readily facilitated analyses at a subsequent set of time points, as the observed parenting data was available for age 5. The mediation, moderated mediation, and competing bidirectional effects models were first tested from ages 2 to 4, and then the same analytic strategy was applied to test relations from ages 4 to 7.5. The purpose was to extend the prediction of child behaviour functioning and to investigate whether there might be differences between the two time periods in terms of how the constructs might be related. The literature highlights the salience of effects of maternal depression and parenting behaviours on child development particularly in early childhood (Ashman et al., 2008; Del Vecchio & Rhoades, 2010; Lovejoy et al., 2000). It is therefore hypothesised that constructs will be more strongly associated between the ages of 2 and 4 compared to between the ages of 4 and 7.5.

The analyses are particularly focused on the potential indirect effect of positive parenting and harsh parenting. Three sets of path analyses are conducted separately for each parenting mechanism, with the results for positive parenting presented first followed by the results for harsh parenting. The analyses conducted are: mediation (Shrout & Bolger, 2002), moderated mediation (Preacher et al., 2007), and competing effects (Kline, 2010). These three sets of path analyses are conducted first from ages 2 to 4 ("early childhood") and second from ages 4 to 7.5 ("middle childhood"). First, the mediation models test the indirect effect of parenting in the relation between maternal depression (categorical and continuous) and child externalising behaviours. Second, a moderated mediation analysis is conducted to investigate whether the associations between maternal depression and parenting, and between parenting and child externalising behaviour, vary as a function of the child's level of inhibitory control. Third, a competing bidirectional model is conducted to test for possible effects in the alternate direction, from child externalising behaviour to parenting and maternal depression. The purpose of the competing effects analyses is to address the possibility that the direction of influence is not uniquely from mother to child.

All models control for intervention, poverty, maternal education, child gender, and child race. Earlier child externalising behaviour is controlled in the mediation and moderated mediation analyses, at age 2 in early childhood and age 4 in middle childhood (i.e., at the same time point as the independent variable of maternal depression). Maternal depression is controlled for in the competing effects analyses, at age 2 in early childhood and age 4 in middle childhood (i.e., at the same time point as the independent variable of child externalising behaviour). All analyses are path models conducted in Mplus version 6.

5.3.4 Summary of research questions and hypotheses

5.3.4.1 Positive parenting

Question 1: Does positive parenting mediate the relation between maternal depression and child externalising behaviours, and does this indirect effect vary depending on the child's level of inhibitory control?

Hypothesis 1: Positive parenting will not significantly mediate the relation between maternal depression and child externalising behaviour, neither from ages 2 to 4 nor from ages 4 to 7.5. There are no specific hypotheses regarding the potential moderating effect of child inhibitory control.

5.3.4.2 Harsh parenting

Question 2: Does harsh parenting mediate the relation between maternal depression and child externalising behaviours, and does this indirect effect vary depending on the child's capacity for inhibitory control?

Hypothesis 2: Harsh parenting will significantly mediate the relation between maternal depression and child externalising behaviour, with a stronger indirect effect of harsh parenting from ages of 2 to 4 than from ages of 4 to 7.5.

Hypothesis 3: Child inhibitory control will moderate the mediation effect of harsh parenting in the relation between maternal depression and child externalising behaviour. The effect of maternal depression on harsh parenting, and the effect of harsh parenting on child externalising behaviour, will be weaker for children who have higher levels of inhibitory control compared to children have lower levels of inhibitory control.

5.4 Results

5.4.1 Positive parenting

5.4.1.1 Mediation: Ages 2 to 4

The first two mediation models tested positive parenting at age 3 as a potential process through which maternal depression at age 2 might influence child externalising behaviour at age 4. The indirect effect of the first mediation model testing the categorical variable of maternal depression was not significant. The direct effect of maternal depression at age 2 on child externalising behaviours at age 4 was significant (B = .13, SE = .04, p < .01), and the effect of maternal depression at age 2 on positive parenting at age 3 was also significant (B = -.11, SE = .04, p < .01). Positive parenting at age 3 did not however significantly predict child externalising behaviours at age 4.

Testing for a possible mediation effect between the continuous variable of maternal depression and child externalising behaviours was also non-significant. In this second mediation model, the only significant relation was the direct effect of maternal depressive symptoms at age 2 on child externalising behaviour at age 4 (B = .15, SE= .04, p < .001). In contrast to the previous mediation model, the continuous variable of maternal depression at age 2 did not significantly predict positive parenting at age 3 (B = -.07, SE = .04, p =.107). The difference in the association between maternal depression and positive parenting between the two models suggests the importance of the presence of maternal depression at age 2 in terms of predicting positive parenting behaviours the following year. The association between positive parenting and child externalising behaviours was again non-significant. The results are clear in terms of indicating that maternal depression at age 2 does not influence child externalising behaviour at age 4 through the mechanism of positive parenting at age 3. Instead, support is provided for a direct effect of maternal depression at age 2 on child externalising behaviours at age 4.

5.4.1.2 Moderated mediation: Ages 2 to 4

Moderated mediation analyses were conducted to investigate whether the associations between maternal depression, positive parenting, and child externalising behaviours varied as a function of the child's baseline levels of alternate caregiver-reported inhibitory control. The interaction effect between child inhibitory control and maternal depression, measured either categorically or continuously, predicting positive parenting was non-significant. The results indicate that the effect of maternal depression at age 2 on positive parenting at age 3 does not differ in relation to levels of child inhibitory control. These results are corroborated with mother-reported child inhibitory control.

Conversely, the effect of positive parenting at age 3 on child externalising behaviour at age 4 does appear to vary as a function of child inhibitory control. The interaction effect between positive parenting and child inhibitory control was marginally significant in the categorical maternal depression model (*B* = .10, SE = .05, *p* =.053) and approached significance in the continuous maternal depression model (*B* = .10, SE = .05, *p* =.056). It is important to note that the significant interaction effect between positive parenting and baseline child inhibitory control is significant over and above the effects of baseline child externalising behaviours and also accounts for the effects of baseline maternal depression. The interaction effect is corroborated by mother-reported child inhibitory control. The results of the moderated mediation analyses are presented in Table 5.1 below.

Table 5.1 Moderated mediation with child inhibitory control and positive parenting in the relation between maternal depression and child externalising (N = 601)

Variable	*B*	SE	*Sig.*	*B*	SE	*Sig.*
	Categorical risk			***Continuous risk***		
Regression 1: *Externalising (age 4)*						
Intervention	-.069	.055	.211	-.064	.056	.250
Poverty	-.106	.053	**.047**	-.120	.055	**.029**
Mom education	.101	.057	.074	.083	.055	.129
Child gender	-.131	.052	**.011**	-.132	.052	**.012**
Child race	.070	.062	.264	.079	.061	.193
Externalising (age 2)	.416	.061	**.001**	.422	.060	**.001**
Depression (age 2)	.158	.054	**.003**	.144	.058	**.013**
Positive parenting (age 3)	-.046	.054	.392	-.062	.054	.249
Inhibitory control (age 2)	-.103	.056	.067	-.111	.055	**.046**
Positive x Inhibitory	.102	.053	**.053**	.099	.052	.056
Model adjusted R^2	.314		**.000**	.311		**.000**
Regression 2: *Positive parenting (age 3)*						
Intervention	.078	.061	.200	.073	.060	.227
Poverty	-.098	.059	.098	-.092	.060	.127
Mom education	-.162	.060	**.007**	-.151	.059	**.011**
Child gender	-.006	.059	.914	-.001	.060	.985
Child race	-.268	.061	**.000**	-.295	.060	**.000**
Externalising (age 2)	-.026	.054	.637	-.038	.056	.489
Depression (age 2)	-.163	.059	**.006**	-.086	.058	.136
Inhibitory control (age 2)	.087	.075	.243	.077	.067	.247
Depression x Inhibitory	-.014	.095	.880	.061	.071	.386
Model adjusted R^2	.186		**.000**	.171		**.000**
Indirect effect	.008	.009	.416	.005	.006	.374

B = standardized beta coefficient

To further explore the nature of the interaction between positive parenting and child inhibitory control, the significant moderation effect is represented in Figure 5.1 below and the interaction effect is illustrated in Figure 5.2. Interaction effects in this chapter are illustrated using the online resource provided by Dr Jeremy Dawson (http://www.jeremydawson.co.uk/slopes.htm). Both figures present results for the categorical

depression analyses. Figure 5.1 highlights that the effect of positive parenting at age 3 on child externalising behaviour at age 4 varies as a function of the child's baseline capacity for inhibitory control. More specifically, Figure 5.2 illustrates that the impact of low levels of positive parenting on child externalising behaviours is far greater for children who are low on inhibitory control compared to children who are high on inhibitory control. At high levels of positive parenting, the effect of positive parenting on child externalising behaviour no longer varies according to baseline child inhibitory control. The results suggest that higher levels of child inhibitory control are particularly important for promoting more positive behaviour development for children of mothers who are low on positive parenting when accounting for maternal depression.

Figure 5.1 Moderation effect of child inhibitory control on the relation between positive parenting and child externalising behaviours with categorical depression (ages 2 to 4)

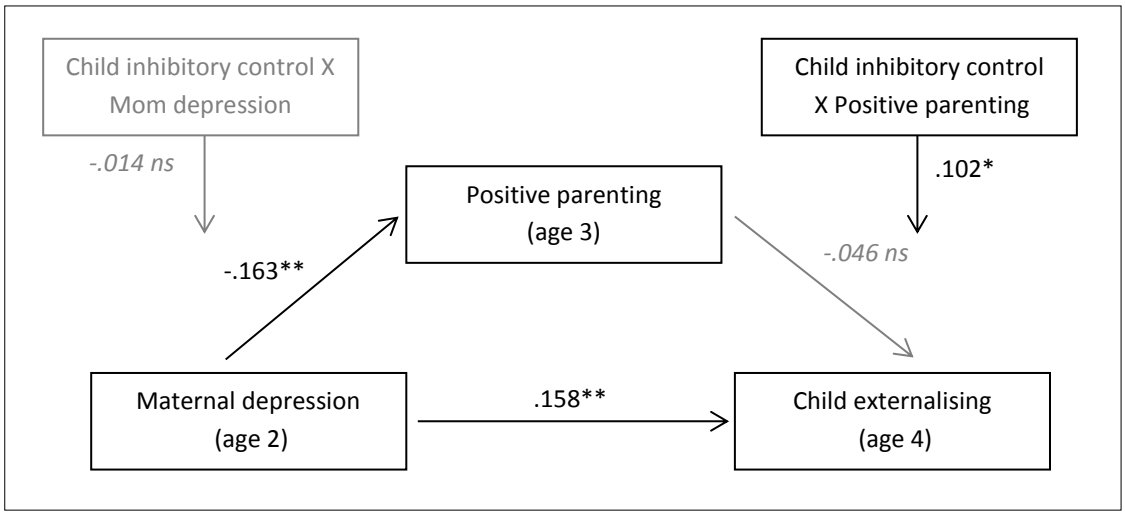
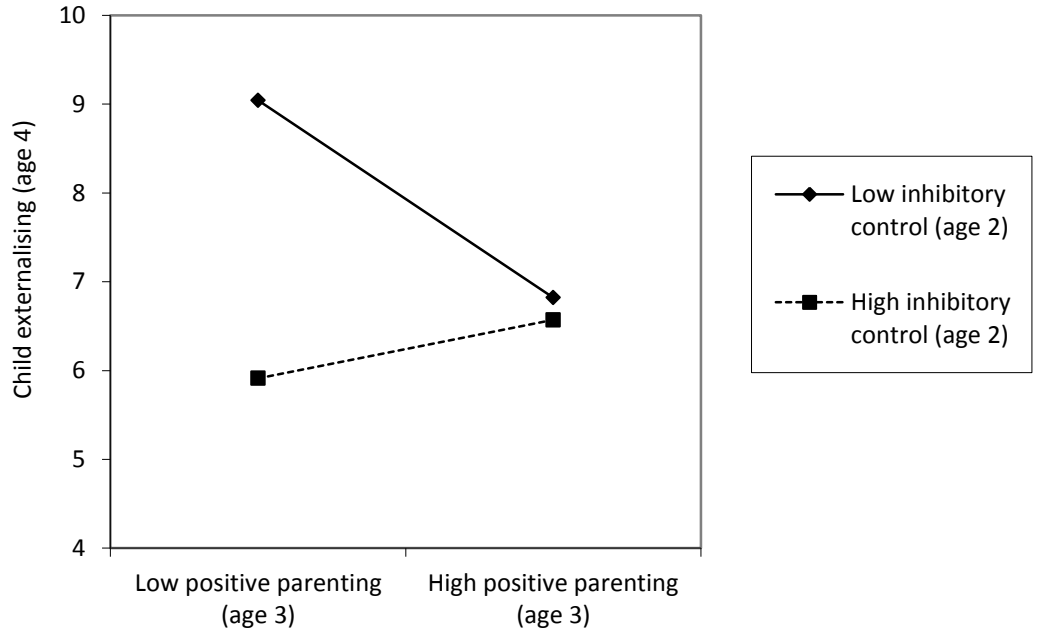


Figure 5.2 Interaction effect between positive parenting and child inhibitory control on externalising behaviours (ages 2 to 4)



Although the mediation models were non-significant, the moderated mediation model was an informative analytic step. By including the moderation effect, the model highlights that the non-significant main effect of positive parenting on child externalising behaviour could be better understood by accounting for differences in child inhibitory control. At a group level, positive parenting at age 3 may not predict child externalising behaviours at age 4. As a function of the child's level of inhibitory control however, the differential predictability of positive parenting becomes apparent. Accounting for maternal depression, the moderated mediation analysis emphasises that for mothers who rarely engage in positive parenting behaviours, child behaviour development will be less affected if the child has a higher capacity for inhibitory control. The analyses also highlight that higher levels of positive parenting are especially important for supporting the behaviour development of those children who are less capable of inhibitory control.

5.4.1.3 Competing bidirectional effects: Ages 2 to 4

To investigate the direction of effects from child to mother, a path analysis was conducted testing the effect of child externalising behaviour at age 2 on positive parenting at age 3 and on maternal depression at age 4, as well as the effect of positive parenting at age 3 on maternal depression at age 4. Although it was not hypothesised that child externalising behaviour would influence maternal depression indirectly through positive parenting, the significance of the associations between variables was of interest. The purpose of the competing model was to examine whether there might also be a significant effect of child externalising behaviour at age 2 on both the positive parenting of the mother at age 3 and on the severity of her depression at age 4.

The indirect effect of the competing mediation model was not significant. There was a significant main effect of child externalising behaviour at age 2 on maternal depression at age 4 (B = .11, SE = .05, p <.05). Child externalising behaviour at age 2 did not significantly predict positive parenting at age 3, and positive parenting at age 3 did not significantly predict maternal depression at age 4. In this early childhood model of competing effects, the main effect from child to mother appears to be uniquely in terms of a direct effect in which lower levels of child externalising behaviours at age 2 predict lower levels of maternal depressive symptoms at age 4.

5.4.1.4 Mediation: Ages 4 to 7.5

The following mediation models build on the previous set of analyses by investigating positive parenting at age 5 as a potential mechanism through which maternal depression at age 4 might influence child externalising behaviour at age 7.5. Two mediation models were conducted, first with the categorical variable of maternal depression and second with the continuous variable of maternal depression. The indirect effect in both models was non-significant, and the pattern of associations between the two models was identical. In both the

categorical and the continuous risk models there was a significant main effect of maternal depression at age 4 on positive parenting at age 5 (*B* =- .10, SE= .05, *p* <.05; *B* = -.14, SE = .05, *p* <.01). There was also a significant main effect of maternal depression at age 4 on child externalising behaviour at age 7.5 (*B* = .15, SE = .05, *p* <.001; *B* = .16, SE = .05, *p* <.001). In neither model did positive parenting at age 5 predict child externalising behaviour at age 7.5.

5.4.1.5 Moderated mediation: Ages 4 to 7

Moderated mediation analyses were conducted to investigate whether the relations between maternal depression at age 4, positive parenting at age 5, and child externalising behaviour at age 7.5 varied as a function of child inhibitory control at age 4. The moderation effects were non-significant. Neither the effect of maternal depression on positive parenting nor of positive parenting on child externalising behaviour differed depending on levels of child inhibitory control. Whereas in early childhood, there was a differential effect of positive parenting on child externalising behaviours according to child inhibitory control, in middle childhood no significant interaction effect was found.

5.4.1.6 Competing bidirectional effects: Ages 4 to 7

The competing mediation model investigated the possibility that child externalising behaviour might influence later levels of positive parenting and maternal depression. The model found a significant effect of child externalising behaviours at age 4 on maternal depression at age 7, controlling for maternal depression at age 4 (*B* = .12, SE = .05, *p* <.05). There was also a significant effect of child externalising at age 4 on positive parenting at age 5 (*B* = -.11, SE = .05, *p* <.05). Positive parenting at age 5 did not significantly predict maternal depression at age 7. In line with the competing model in early childhood, the middle childhood model provides support for a continued reciprocal effect of child externalising behaviours on maternal depression over time. In contrast to the early childhood model, a significant effect emerges in middle childhood of child externalising behaviour on levels of positive parenting. Whereas

from age 2 to 3 the relation was non-significant, it would appear that in subsequent years, from ages 4 to 5, higher levels of child externalising behaviours predict lower levels of positive parenting.

5.4.2 Harsh parenting

5.4.2.1 Mediation: Ages 2 to 4

The second set of early childhood mediation models tested harsh parenting as the mechanism through which maternal depression might influence child externalising behaviours. The mediation model first tested the effect of the categorical risk variable of maternal depression at age 2, on child externalising behaviour at age 4, through the mechanism of harsh parenting at age 3. The results of the indirect effect were significant (p <.05). The second mediation model testing the indirect effect of harsh parenting at age 3 in the relation between the continuous measure of maternal depression at age 2 predicting child externalising behaviour at age 4 was non-significant. The results for the regression analyses for both mediation models are shown in Table 5.2.

Table 5.2 Indirect effect of harsh parenting in the relation between maternal depression and child externalising (n = 601)

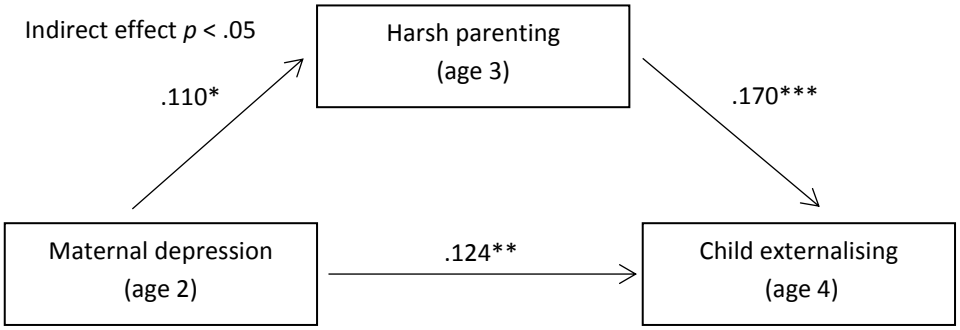
Variable	*B*	SE	*Sig.*	*B*	SE	*Sig.*
	Categorical risk			***Continuous risk***		
Regression 1: *Externalising (age 4)*						
Intervention	-.109	.040	**.007**	-.103	.040	**.010**
Poverty	-.101	.038	**.008**	-.113	.038	**.001**
Mom education	.104	.043	**.015**	.097	.042	**.021**
Child gender	-.083	.040	**.038**	-.085	.040	**.033**
Child race	.013	.041	.756	.017	.040	.669
Externalising (age 2)	.443	.038	**.001**	.440	.038	**.001**
Harsh parenting (age 3)	.170	.044	**.001**	.176	.044	**.001**
Depression (age 2)	.124	.040	**.002**	.149	.041	**.001**
Model adjusted R^2	.314		**.000**	.316		**.000**
Regression 2: *Harsh parenting (age 3)*						
Intervention	.064	.046	.159	.070	.046	.274
Poverty	.120	.047	**.010**	.119	.047	**.012**
Mom education	.047	.047	.315	.043	.047	.367
Child gender	-.114	.045	**.012**	-.116	.046	**.011**
Child race	.088	.046	.056	.098	.046	**.032**
Externalising (age 2)	.054	.050	.281	.064	.049	.195
Depression (age 2)	.110	.047	**.020**	.051	.047	.247
Model adjusted R^2	.071		**.002**	.057	.	**.006**
Indirect effect	.019	.009	**.046**	.009	.008	.288

B = standardized beta coefficient

The results indicate that harsh parenting partially mediates the relation between the dichotomous variable of maternal depression at age 2 and child externalising behaviours at age 4 (*B* = .02, SE= .01, *p* <.05). The standardised estimate of the indirect effect can be interpreted as a measure of effect size according to the guidelines of Cohen (1988): .01 = small, .09 = medium, and .25 = large. The estimate of the indirect effect in this model therefore represents a small effect. The model accounts for 7.1% of the variance in harsh parenting (R^2 = .071, *p* <.01) and 31.4% of the variance in child externalising behaviour (R^2 = .314 *p* <.001). The

significant partial mediation by harsh parenting at age 3 in the relation between the categorical variable of maternal depression at age 2 and child externalising behaviours at age 4 is represented in Figure 5.3 below.

Figure 5.3 Partial indirect effect of harsh parenting between categorical maternal depression and child externalising behaviours (ages 2 to 4)



The second mediation model testing the indirect effect of harsh parenting at age 3 in the relation between the continuous measure of maternal depression at age 2 and child externalising behaviour at age 4 was non-significant. As a continuum of depressive symptoms at age 2, maternal depression no longer significantly predicts harsh parenting at age 3. These results are in line with the results from the previous set of mediation analyses testing positive parenting. Maternal depression at age 2 seems to predict parenting behaviour at age 3 only when depression is measured as a dichotomous variable of risk. The presence of depressive symptoms above the validated cut off therefore seems to be important in terms of predicting both positive and harsh parenting behaviours the following year.

5.4.2.2 Moderated mediation: Ages 2 to 4

The harsh parenting mediation models were then followed up with a test for the possible moderating effect of child inhibitory control. The hypothesis was that the significant associations between maternal depression, harsh parenting, and child externalising behaviours would vary depending on the child's initial capacity to self-regulate. More specifically, the hypothesis was that there would be stronger effects for those children who were lower on

inhibitory control, whereas the processes would be less likely to develop if the child was initially higher on inhibitory control. The mediation models found a significant moderation effect of child inhibitory control on the association between both the categorical and continuous risk variable of maternal depression at age 2 and harsh parenting at age 3. The previously significant mediation effect between the dichotomous variable of maternal depression became non-significant (p = .091). The effect is not corroborated with mother-reported child inhibitory control. The association between harsh parenting at age 3 and child externalising behaviour at age 4 was not significantly moderated by child inhibitory control. The results for the moderated mediations including the categorical and continuous risk variables of maternal depression are shown in Table 5.3.

Table 5.3 Moderated mediation with child inhibitory control and harsh parenting in the relation between maternal depression and child externalising (n = 601)

Variable	*B*	SE	*Sig.*	*B*	SE	*Sig.*
	Categorical risk			***Continuous risk***		
Regression 1: *Externalising (age 4)*						
Intervention	-.143	.053	**.007**	-.101	.055	.066
Poverty	-.147	.053	**.005**	-.159	.054	**.003**
Mom education	.139	.053	**.009**	.124	.052	**.017**
Child gender	-.099	.053	.063	-.098	.054	.068
Child race	.022	.057	.703	.036	.056	.527
Externalising (age 2)	.391	.058	**.000**	.396	.057	**.000**
Depression (age 2)	.143	.053	**.007**	.134	.058	**.020**
Harsh parenting (age 3)	.239	.061	**.000**	.245	.060	**.000**
Inhibitory control (age 2)	-.104	.058	.074	-.114	.058	**.052**
Harsh x Inhibitory	-.015	.063	.813	-.018	.061	.770
Model adjusted R^2	.377		**.000**	.375		**.000**
Regression 2: *Harsh parenting (age 3)*						
Intervention	.089	.063	.154	.104	.069	.130
Poverty	.169	.066	**.010**	.169	.066	**.010**
Mom education	.013	.068	.852	.005	.070	.946
Child gender	-.094	.064	.145	-.098	.065	.133
Child race	.061	.070	.380	.076	.067	.260
Externalising (age 2)	.093	.070	.187	.104	.069	.130
Depression (age 2)	.122	.064	.057	.066	.069	.336
Inhibitory control (age 2)	-.277	.082	**.001**	-.171	.056	**.002**
Depression x Inhibitory	.162	.084	**.053**	.117	.057	**.041**
Model adjusted R^2	.133		**.001**	.129		**.001**
Indirect effect	.029	.017	.091	.016	.017	.348

B = standardized beta coefficient

The significant moderation effect of child inhibitory control on the relation between categorical maternal depression and harsh parenting is illustrated in Figure 5.4 below. A visual representation of the interaction between a dichotomous variable and a continuous variable treats the dichotomous variable, in this case maternal depression, as the moderator. The effect of child inhibitory control at age 2 on harsh parenting at age 3, as a function of the presence or absence of maternal depression at age 2, is represented in Figure 5.5. Considered in this way, the nature of the interaction effect between maternal depression and child inhibitory control becomes clearer. Figure 5.5 illustrates that low levels of child inhibitory control predict high levels of harsh parenting regardless of whether the mother is depressed or not. As child inhibitory control increases however, the effect on harsh parenting decreases only in the group of children whose mothers are not depressed, whereas the effect remains consistently high in the group of mothers with depression.

Figure 5.4 Moderation effect of child inhibitory control on the relation between categorical maternal depression and harsh parenting (ages 2 to 4)

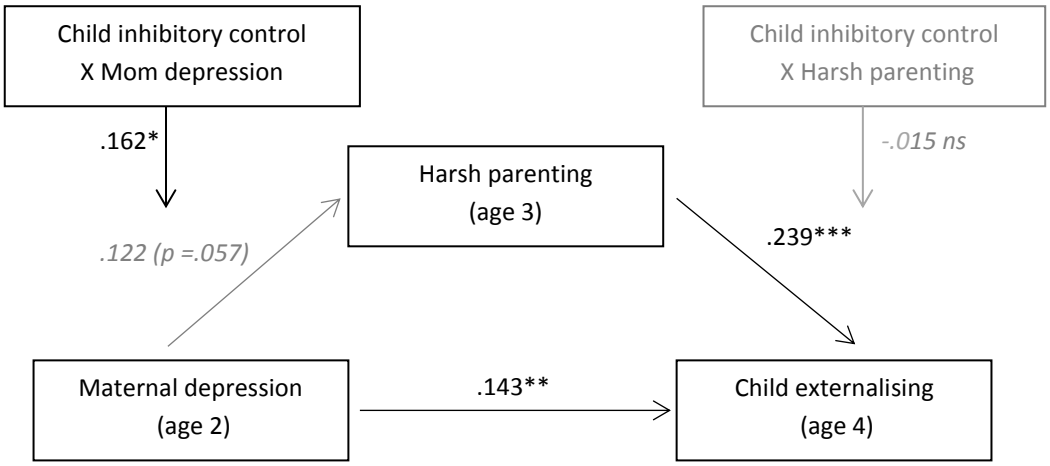
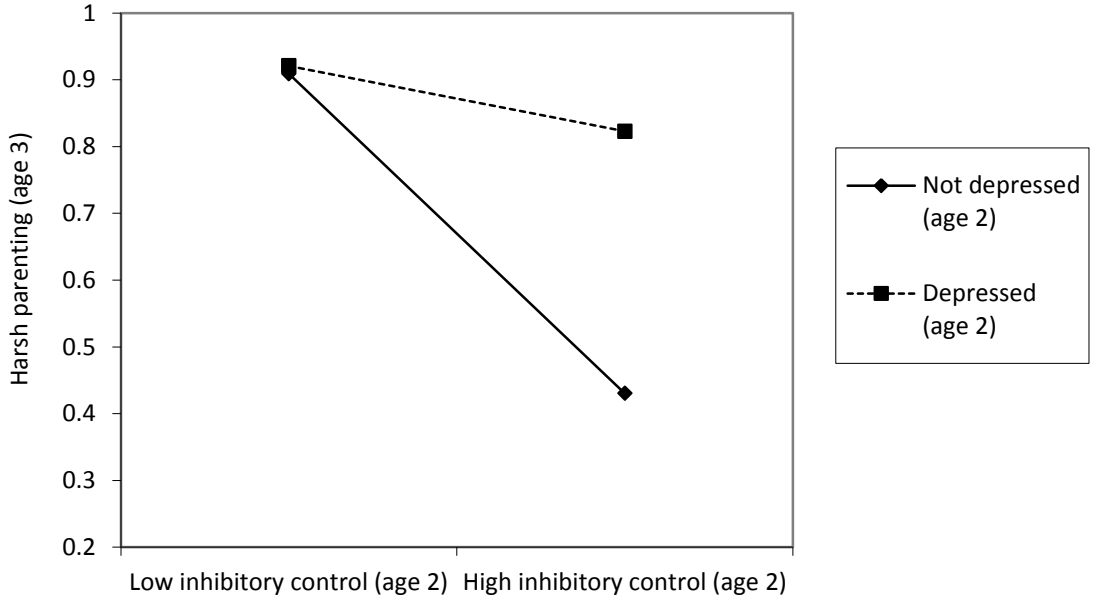


Figure 5.5 Interaction effect between categorical maternal depression and child inhibitory control on harsh parenting (ages 2 to 4)



5.4.2.3 Competing bidirectional effects: Ages 2 to 4

A competing mediation model was conducted to test for the possibility of effects in the alternate direction, from child externalising behaviour at age 2 to maternal depression at age 4, with harsh parenting at age 3. As with the positive parenting analyses, the hypothesis was not that child externalising behaviour would influence maternal depression indirectly through harsh parenting. However, it was hypothesised that there would be a significant main effect of child externalising behaviour on maternal depression, with higher levels of child externalising behaviour at age 2 predicting more elevated maternal depressive symptoms at age 4. It was also hypothesised that child externalising behaviour age 2 would have a main effect on harsh parenting at age 3, such that higher levels of externalising behaviours would predict higher levels of harsh parenting. The results of the competing mediation model did not find a significant indirect effect of harsh parenting on the relation between child externalising behaviour and maternal depression. There was a significant direct effect of child externalising behaviours at age 2 on maternal depression at age 4 (B = .10, SE = .05, p <.05). There was also

a significant main effect of harsh parenting at age 3 on maternal depression at age 4 (*B* = .10, SE = .05, *p* <.05). Higher levels of both child externalising behaviour at age 2 and harsh parenting at age 3 predict higher levels of maternal depression at age 4. There was no significant main effect of child externalising behaviour at age 2 on harsh parenting at age 3.

Results coincide with the results from the positive parenting analyses and provide support for the bidirectional effect of child externalising behaviour and maternal depression. Although maternal depression increases the risk for later child externalising behaviours, the direction of influence is not solely from mother to child. In these analyses, a direct effect from child externalising behaviour to maternal depression is supported, but not from child externalising behaviour to the mother's parenting behaviour. Considered within a developmental context, it may be that it is too early of a stage for child externalising behaviour to yet influence parenting behaviour. The following middle childhood models will address this possibility by investigating the dynamic interplay between maternal depression, parenting, and child externalising behaviour in the following years, from ages 4 to 7.5.

5.4.2.4 Mediation: Ages 4 to 7.5

Two mediation models were conducted to test the possible indirect effect of maternal depression on child externalising behaviours through harsh parenting. The first model tested the categorical variable of maternal depression and the second model tested the continuous variable of maternal depression. The results of both models did not find a significant indirect effect of harsh parenting. From the ages of 4 to 7.5, harsh parenting does not appear to operate as a process through which maternal depression influences child externalising behaviours. The pattern of effects between the two models was similar, indicating that neither the presence of maternal depression nor the continuum of depressive symptoms at age 4 predicts levels of harsh parenting at age 5. In contrast to the earlier childhood model, even the more "pathological" definition of maternal depression does not appear to account for a

significant proportion of the variance in harsh parenting behaviours the following year. The two mediation models highlight that the direct effect of maternal depression on child externalising behaviours continues to be significant, over and above child externalising behaviours at age 4 (*B* = .14, SE = .04, *p* <.01; *B* = .16, SE = .05, *p* <.001). In contrast to the earlier childhood models, the effect of harsh parenting on child externalising behaviours is non-significant (*p* = .087; *p* = .127).

5.4.2.5 Moderated mediation: Ages 4 to 7.5

Moderated mediation models were conducted to investigate whether the associations between maternal depression, harsh parenting, and child externalising behaviour varied according to levels of alternate caregiver-reported child inhibitory control. In line with the previous analyses, two moderated mediation models were conducted, first testing the categorical variable of maternal depression and second the continuous variable of maternal depression. The results from both models did not find a significant moderating effect of child inhibitory control. In contrast to the early childhood model, the effect of maternal depression at age 4 on harsh parenting at age 5 did not significantly differ as a function of child inhibitory control at age 4. The non-significant effect of harsh parenting at age 5 on child externalising behaviour at age 7.5 also did not significantly vary depending on levels of child inhibitory control at age 4. The results therefore provide clear evidence of a direct effect of maternal depression at age 4 on child externalising behaviour at age 7.5. There is no evidence however to support a mediational path through harsh parenting at age 5, or more specifically a mediational path through harsh parenting that varies as a function of the child's capacity for inhibitory control.

5.4.2.6 Competing bidirectional effects: Ages 4 to 7.5

The final mediation model investigated the effect of child externalising behaviour at age 4 on harsh parenting at age 5 and maternal depression at age 7.5. The results indicate a significant

direct effect of child externalising behaviour at age 4 on maternal depression at age 7.5, controlling for maternal depression at age 4 (B = .11, SE = .05, p <.05). There was also a significant effect of child externalising behaviour at age 4 on harsh parenting at age 5 (B = .14, SE = .05, p <.01). In contrast to the early childhood model, there was no significant effect of harsh parenting at age 5 on maternal depression at age 7.5.

5.5 Discussion

Observed harsh parenting in early childhood partially mediated the relation between the presence of maternal depression and child externalising behaviours. During neither time period was positive parenting a significant mediator, and in contrast to previous research, the indirect effect of harsh parenting became non-significant at a later developmental stage (Elgar et al., 2007; Silberg et al., 2010). Both the significant and non-significant paths in the models are informative in terms of trying to understand the nature of how these constructs might be related over time. Supported by substantial empirical evidence, the findings of this thesis suggest the developmental salience of parenting processes between the ages of 2 and 4, and emphasise the importance of the caregiver-child relationship especially during these years (Del Vecchio & Rhoades, 2010; Goodman & Gotlib, 1999; Shaw et al., 2003). Similarly, the results are in line with meta-analytic findings emphasising that child self-regulation is an important child capacity and individual-level resource that influences these dynamics in early childhood (Kiff et al., 2011; Piotrowski et al., 2012). The competing models provide support for a generally consistent bi-directional relation between maternal depression and child externalising behaviours from early through to middle childhood (Pardini, 2008; Shaw, Gross, et al., 2009).

In line with the hypothesis of this thesis, positive parenting at age 3 did not significantly mediate the relation between maternal depression at age 2 and child externalising behaviours at age 4. The non-significant result indicates that the positive parenting of mothers in this

sample was not a process through which the severity of their depression influenced the behaviour development of their child. This was true in early childhood as well as in middle childhood, as the indirect effect of positive parenting at age 5 was also non-significant. The findings suggest that from the age of 2 through to 7.5, the risk conferred by maternal depression on child behaviour development does not operate through processes of positive parenting. Previous research with older children has found support for the mediating role of parental nurturance. However, this significant finding was in terms of child perceptions of nurturance measured at the same time point as child externalising behaviours and with a lack of well-validated measures (Elgar et al., 2007). With the use of well-validated measures of maternal depression and child externalising behaviours, an observed measure of positive parenting behaviours, a younger sample of children, and discrete time points in the mediation model, this thesis did not find an indirect effect of positive parenting behaviours.

During both time periods, there was no mediation effect of positive parenting regardless of whether the analyses tested the categorical or continuous measure of maternal depression. In the absence of a diagnostic interview, the categorical measure of depression was analysed in an effort to provide a cautious estimate of the presence of depression risk. In early childhood, only the categorical measure of maternal depression predicted positive parenting the following year; the continuum of depressive symptoms was not significantly predictive. The difference in the association between maternal depression and positive parenting between the two models suggests that positive parenting in early childhood may not necessarily be compromised by the range of depressive symptoms. Rather, it may only be once depressive symptoms are above a validated threshold of severity that a negative impact on positive parenting will be observed.

In contrast, in middle childhood both the presence of maternal depression and higher levels of depressive symptoms predicted lower levels of positive parenting. Although a more severe

criterion was necessary in early childhood, in later years positive parenting was more susceptible to the influence of the full continuum of depressive symptoms. It is important to note however that in this thesis, the interpretation of the results is limited by differences in coding of the observed parenting variables between the ages of 3 and 5. As detailed in Chapter Three (see Section 3.2.4), data coding and variable construction utilising the newly implemented coding system was not complete for age 3 parenting variables at the time of data analysis. Although it may be that the impact of maternal depression on positive parenting changes over time, this thesis is limited in its ability to draw such conclusions given the measurement differences between time points.

In the mediation models testing positive parenting in both early and middle childhood, positive parenting did not significantly predict child externalising behaviours. In contrast to the harsh parenting models, when accounting for maternal depression, the extent to which the mother engaged in more proactive strategies of positive behaviour management did not explain the reported variability in child behaviour. The middle childhood analyses are limited by the inconsistent measurement time points, which result in a two and a half year lapse between positive parenting and child externalising behaviours from age 5 to 7.5. It is therefore difficult to interpret whether the effect of positive parenting on child externalising behaviour is similarly weak in middle childhood, or if the effect operates only more proximally in time. Nevertheless, the significant predictive effect of harsh parenting on child externalising behaviours despite this more extended time period contrasts the non-significant effect of positive parenting. In terms of explaining the variability in child externalising behaviours, maternal depression consistently has a strong main effect and harsh parenting is also a strong predictor, whereas positive parenting does not have a significant main effect either in early or middle childhood.

The results of the moderated mediation analyses indicate, however, that the effect of positive parenting on child externalising behaviours depended on the child's level of inhibitory control. For children who had high baseline levels of inhibitory control, the effect of positive parenting on child externalising behaviours was consistent across levels of positive parenting. Even at low levels of positive parenting, there was minimal effect on child externalising behaviours if the child was better able to self-regulate. For children who had low levels of inhibitory control however, low levels of positive parenting had a strong effect on externalising behaviours. Although the results do not provide support for a significant main effect of positive parenting on child externalising behaviour in early childhood, the inclusion of the moderation analyses highlight the differential effect of positive parenting as a function of child inhibitory control. Low levels of positive parenting appear to have a deleterious effect on externalising behaviour development in early childhood particularly for children who are low on inhibitory control. The early capacity to self-regulate, from as early as age 2, is generally predictive of more positive behaviour development (Eisenberg, Smith, et al., 2004; Zhou et al., 2007) and in this instance was also specifically beneficial in the context of low levels of positive parenting behaviour. The analysis of moderated mediation models offers a unique approach to understanding how the effects of maternal depression, positive parenting, and child externalising behaviours might vary depending on a particular individual child-level capacity. Given the lack of previous research in support of a similar effect, further research is required to corroborate and strengthen this finding.

In contrast to positive parenting, preliminary support was provided for harsh parenting as a potential process through which maternal depression influences child externalising behaviours in early childhood. Consistent with the results from the positive parenting mediation, the continuum of maternal depressive symptoms at age 2 did not have a significant effect on harsh parenting at age 3. However, depressive symptoms above the cut-off significantly predicted higher levels of harsh parenting the following year. In this categorical risk model, the indirect

effect of harsh parenting was significant. The results indicate that the impact of maternal depression on child externalising behaviours is partially mediated through an increase in harsh parenting. Additional support is provided for the importance of risk severity and preliminary support for a partial mediating role of harsh parenting in the transmission of risk. Previous research by Elgar and colleagues (2007) found a mediating effect of rejecting parenting for children aged 10 to 15 in the relation between maternal depressive symptoms and child conduct problems. As previously discussed, there are noteworthy measurement and analytic limitations in their study. With the inclusion of strong measures and analytic strategies, the results of this thesis contribute to the currently minimal but potentially emerging evidence in support of harsh parenting as a process through which maternal depression influences child behaviour outcomes in early childhood.

The moderated mediation analyses did not find a significant modulating effect of child inhibitory control on both indirect paths of harsh parenting. However, the analyses did specifically find that the effect of maternal depression at age 2, on harsh parenting at age 3, varied as a function of the child's baseline levels of inhibitory control. For children who were low on inhibitory control, harsh parenting levels were consistently elevated across levels of maternal depression. For children who were high on inhibitory control, harsh parenting levels were only elevated when the mother was also depressed. Children who are higher on inhibitory control from early in development seem to experience more harsh parenting behaviours only if their mothers also have high levels of depression. Conversely, children who are low on inhibitory control seem to experience elevated levels of harsh parenting behaviours regardless of the severity of maternal depression. In a recent review of the evidence between parenting, child temperament, and child adjustment problems, it was found that children who were low on effortful control were more vulnerable to the effects of negative parenting (Kiff et al., 2011). Furthermore, these children were also more likely to elicit such negative parenting behaviours, which further contributed to child maladjustment. The child's ability to self-

regulate from as early as two years of age appears to be an important individual-level factor specifically associated with negative parenting behaviours, such that children with a poorer capacity to manage and inhibit their behaviours in response to their environment will experience significantly more harsh parenting behaviours.

The significant interaction effect reported in this thesis highlights the influence of individual differences in child self-regulation on harsh parenting more specifically in the context of maternal depression. The results point to the dynamic nature of the relation between maternal depression and child self-regulation from as early as age 2 and the impact that this interaction has on harsh parenting behaviours at age 3. Early in child development, maternal depression increases the likelihood of engaging in harsh parenting behaviours the following year, regardless of levels of inhibitory control. As suggested by the review of Kiff and colleagues (2011), the most likely scenario for decreasing the rate of harsh parenting behaviours is if the child is more capable of self-regulating. As suggested more specifically by this thesis however, child self-regulation may influence harsh parenting only if the mother is not also depressed.

The inclusion of the competing effects models served as an important reminder of the bidirectional nature of the relation between child externalising behaviours and maternal depression. The literature consistently supports and emphasises that the direction of effects is not simply from mother to child (Del Vecchio & Rhoades, 2010; Pardini, 2008; Scaramella & Leve, 2004). Given the focus on investigating the mechanisms that link maternal depression and child externalising behaviour, it is necessary to acknowledge that processes will be operating in both directions. As these processes are being investigated over time, it is important to address that the risk of maternal depression is not a static, isolated construct that will remain unaffected by the child. Rather, as is well-supported by the literature, the child is an active agent whose behaviours are likely to play an active role in influencing not just the

dynamics of the mother-child relationship but also the depressive symptoms of the mother as well (Downey & Coyne, 1990; Gross et al., 2009; Pardini et al., 2008). The results of the competing bidirectional effect models provide consistent support for the significant main effect of child externalising behaviours on maternal depression. Support is therefore provided for both the effect of maternal depression on child externalising behaviours and for child externalising behaviours on maternal depression. In this chapter, these effects are tested in separate models but the following chapter builds on these analyses to test reciprocal effects within the framework of a single longitudinal model from age 2 to 8.

With regards to positive parenting, support was not provided for this type of parenting behaviour as a mechanism through which maternal depression influences child behaviour development. Although positive parenting is not a process through which maternal depression confers risk on child behaviours, the significant associations and interactions do provide useful information regarding the nature of relations between the constructs. The findings highlight that the impact of positive parenting on child externalising behaviour in early childhood depends on the level of child inhibitory control. In line with previous research, the results emphasise the importance of these processes in early childhood (e.g., Owens & Shaw, 2003; Shaw et al., 2000), and more specifically the need to address positive parenting behaviours for those children who are poorly regulated. Furthermore, the reduction of maternal depressive symptoms during early childhood might influence later positive parenting. The effect of maternal depression on positive parenting became more robust in middle childhood, suggesting the need to reduce depressive symptoms in early childhood to reduce the risk for compromised levels of positive parenting behaviours in subsequent years.

With regards to harsh parenting, the findings provide preliminary support for the mediating role of these overtly harsh and critical parenting behaviours. The hypotheses predicted a stronger indirect effect of harsh parenting in early childhood compared to middle childhood;

the results found a partial mediation effect only in early childhood and only for the categorical variable of risk severity. The developmental salience of these processes between the years of two and four is emphasised, as is the importance of risk severity. These findings are in line with evidence in the literature, suggesting the importance of early parenting behaviours (Darling & Steinberg, 1993; F. Gardner et al., 2007; Snyder et al., 2005), the early emergence of the capacity for self-regulation (Kochanska, Coy, & Murray, 2001; Moilanen, Shaw, Dishion, et al., 2010), and the impact of maternal depression on them both (Brennan et al., 2003; Lovejoy et al., 2000; A. Maughan et al., 2007). In contrast to the currently limited evidence (Elgar et al., 2007; Johnson et al., 2001; Silberg et al., 2010), the findings also suggest that the dynamic nature in which these constructs relate in a mediating model seems to operate primarily during an earlier developmental stage. In terms of better understanding the transmission of risk, the findings suggest that maternal depression influences child externalising behaviours at least in part through increased levels of harsh parenting.

Overall, the results provide further support for the importance of self-regulation in early childhood. There is strong evidence indicating that self-regulation is a capacity that emerges early in childhood and consistently predicts future outcomes across domains (Gilliom et al., 2002; Mischel & Shoda, 1998; Moilanen, Shaw, Dishion, et al., 2010). The results from the moderated mediation models highlight that child self-regulation is also an important resource in relation to both positive parenting and harsh parenting. A greater capacity for inhibitory control at age 2 appears to buffer child externalising behaviour development from the effects of low levels of positive parenting at age 3. These findings suggest that a mother who does not often engage in positive parenting behaviours will have less of a negative impact on the behaviour development of her child if the child is well-regulated. High levels of maternal depression also have somewhat less of an impact on harsh parenting behaviours when the child is well-regulated. However, the more striking finding is that when child self-regulation is low, harsh parenting behaviours are high regardless of maternal depression. This finding is in

line with recent research suggesting that poorly regulated children can elicit more negative and harsh behaviours from their parents (Bridgett et al., 2009; Kiff et al., 2011). The child's capacity for self-regulation as early as age 2 therefore seems to play an important role in influencing harsh parenting behaviours the following year. Acknowledging the need for future replication, these findings suggest the need to target harsh parenting behaviours and child self-regulation from as early as age 2, prior to the dynamics between mother and child becoming entrenched over time. Furthermore, it appears to be particularly important to provide such targeted intervention efforts to mothers with more elevated symptoms of depression.

The results of this thesis are limited by certain inconsistencies between this chapter and the analyses of Chapter Four. As mentioned at the beginning of this chapter, it was not possible to test mediation models with discrete time points and the same maternal depression and child externalising variables as Chapter Four due to the unavailability of parenting variables at age 4. It was therefore not possible to test mediation models with the more severe definition of maternal depression from ages 2 and 3 or the validated definition of behavioural resilience from Chapter Four. The mediation models in this chapter are conducted in a robust analytical manner with the separation of time points to enable the exploration of causal effects; however, it is important to note that there are differences in the operationalization of key constructs. The overarching resilience framework is consistent throughout this thesis, in terms of exploring early childhood processes that might explain the variation in child behaviour outcome, but the specific methodology varies. Despite this limitation, the analysis of discrete time points provides more clear models and facilitates the analysis of longitudinal models with reciprocal effects in the following chapter (Kline, 2010; Wu & Zumbo, 2008).

Significant results in the early childhood models point to the dynamic nature of relations between maternal depression, harsh parenting, positive parenting, child self-regulation, and

child externalising behaviours for young children. The findings highlight the complexity of effects and the challenges in trying to investigate the ways in which they are related. In the context of previous research, the nature of the associations between the constructs appears to change over time, although certain measurement constraints limit the ability to draw more clear conclusions (Bifulco et al., 2002; Elgar et al., 2007). The main points that emerge specifically from the findings of this chapter are the particular importance of harsh parenting and child self-regulation between 2 and 4 years of age. Preliminary support is provided for harsh parenting as a process through which maternal depression at least partially influences child externalising behaviours during these years. The main effect of maternal depression on harsh parenting behaviour also seems to vary depending on the child's ability to self-regulate at the age of 2. Given these findings, early intervention and prevention efforts should target the promotion of improved self-regulation from early in child development for children in general. Doing so would help to predict improved behaviour functioning, reduce the likelihood of mothers engaging in harsh parenting behaviours, and would serve as an important resource in the potential context of low positive parenting behaviour.

As the results in the previous chapter emphasised, the need to reduce harsh parenting behaviours of mothers with depression is of significant practical importance. By reducing these behaviours, a process that also seems to play a role in linking maternal depression and child externalising would be disrupted. Although improved child self-regulation could play a role in doing so, providing better support to reduce the mother's depressive symptoms would have a valuable impact. Especially between the ages of 2 and 4, children and mothers with depression are a vulnerable group in need of well-targeted intervention strategies. Programmes that particularly focus on the reduction of depressive symptoms, decreasing the use of harsh parenting behaviours, and improving the capacity for child self-regulation appear to be of utmost importance.

Chapter 6: Reciprocal Effects

6.1 Introduction

The ecological perspective emphasises the need to investigate process-oriented models of theorised relations between distal factors, more proximal processes and child functioning (Bronfenbrenner & Morris, 1998). The purpose of Chapter Six is to investigate a theorised model of more proximal transactional processes that might help to explain the relation between maternal depression and child externalising behaviour. The focus is on bidirectional associations between risk and adaptation, in terms of the mutually influential nature of maternal depression and child externalising behaviours over time. Furthermore, parenting behaviours are explored as a potential mechanism through which maternal depression might influence child externalising behaviours, and which child externalising behaviours might also in turn influence. The conceptualisation of resilience as a dynamic process that reflects more than just the individual provides the framework for these models (Luthar & Bidwell Zelazo, 2003; Masten, 2001). Understood in this way, the resilience research approach is applied to the investigation of bidirectional processes within the mother-child relationship that might explain why some children of mothers with depression demonstrate more adaptive behaviour development despite the early experience of risk.

There is extensive evidence in support of the association between parenting and child externalising behaviour. A history of responsive and supportive caregiving predicts more adaptive child behaviour development (Shaw et al., 2003), and seems to operate as a self-righting resource during periods of maladaptive behaviour (Yates et al., 2003). In contrast, higher levels of harsh parenting are associated with child externalising problems and predict an increase in such behaviours over time (e.g., Acker & O'Leary, 1996; Kim et al., 2003). A decrease in the use of harsh parenting behaviours also predicts a decrease in child externalising behaviours (e.g., August et al., 1999). The effects of negative parenting on child

behaviour extend beyond the home environment, and have been found to influence child conduct problems at school indirectly through child behaviour in the home. Ineffective and irritable parenting predicted changes in child conduct problems in kindergarten and the first grade, and these changes in child conduct problems at home predicted changes in teacher reports of child conduct problems at school (Snyder et al., 2005). Child behaviour in the school environment is an important predictor of later child functioning, with teacher reports of child conduct problems at age 8 independently predicting externalising behaviours at age 16 (Sourander & Helstelä, 2005). Early effects of parenting on child behaviour therefore have a long-term impact, influencing child behaviour in the home, through to the school environment, and into later adolescence.

Evidence supports the central role of parenting behaviours and the caregiver-child relationship in promoting more adaptive child behaviour development from infancy (Beardslee et al., 1998; Goodman & Gotlib, 1999; Shaw et al., 2000). Specific processes may be particularly predictive in the context of maternal depression. Depression can negatively impact a woman in her role as a mother, such that mothers with depression tend to display more irritable and intrusive behaviours and are more likely to engage in harsh and punitive disciplining strategies (Brennan et al., 2003; Goodman et al., 2011; Weissman, Paykel, & Klerman, 1972). Meta-analytic findings support a stronger association between depression and negative maternal behaviours compared to maternal warmth (Lovejoy et al., 2000). It may be that mothers with depression who less frequently engage in harsh parenting behaviours are particularly supportive of more adaptive behaviour development for their children by influencing the dynamic nature of how child-caregiver processes unfold over time. Furthermore, depending upon their ability to self-regulate, certain children might be more or less likely to elicit negative parenting behaviours from mothers with depression (Kiff et al., 2011).

The literature has long supported the mutually influential nature of the caregiver-child relationship (Bell, 1968; Belsky, 1984; Patterson, 1982). Empirical evidence indicates that children actively influence their caregivers' behaviour (Dumas et al., 1995; Lytton, 1990; Patterson et al., 1990), as well as caregivers' depressive symptoms (Elgar et al., 2004; Shaw, Gross, et al., 2009). Noncompliant and more aggressive child behaviours predict poor parental monitoring, ineffective disciplining strategies, and increased depressive symptoms (Patterson et al., 1990; Pettit et al., 2001; Shaw, Gross, et al., 2009). The processes through which such transactional effects might be occurring are difficult to disentangle. The suggestion is that bidirectional effects on parenting are potentially an important mechanism through which the parent and child are mutually influential (Goodman & Gotlib, 1999; Shaw, Gross, et al., 2009). The aim is to better understand how patterns of maladaptive mother-child interactions are established and the ways through which such negatively reinforcing cycles can be avoided to promote a more positive and health-promoting mother-child relationship.

In line with the literature, the results of this thesis provide support for a stronger impact of harsh parenting compared to positive parenting on the behaviour development of children of mothers with depression (e.g., Acker & O'Leary, 1996; Brennan et al., 2003; Lovejoy et al., 2000; Radke-Yarrow & Klimes-Dougan, 2002). In Chapter Four, harsh parenting was differentially predictive in the context of maternal depression, whereas the main effect of positive parenting was weaker and not risk-specific. In Chapter Five, harsh parenting was a process through which maternal depression partially influenced child externalising behaviours in early childhood, whereas positive parenting was not predictive during either time period. Overall, the results point to the salience of harsh parenting compared to positive parenting in predicting externalising behaviours for children of mothers with depression. The models in this chapter are interested in analysing a process model of maternal depression, parenting, and child externalising behaviour, accounting for both positive and harsh parenting behaviours in

the same model. Bidirectional effects are tested, and the potential moderating effect of initial levels of child inhibitory control is analysed.

The path models analysed in this chapter build on the models from Chapter Five in a number of important ways. First, the early and middle childhood time periods are combined to assess one longitudinal model from ages 2 to 7.5. The models are further extended to include teacher reports of child externalising behaviour at age 8, to incorporate reports of child behaviour from an additional informant and to assess the predictability of child behaviour across environments. It may be that processes are not only relevant in the home but are also predictive of child behaviour functioning at school (Snyder et al., 2005), which plays an important role in influencing behaviours in adolescence (Sourander & Helstelä, 2005).

Whereas Chapter Five tested separate models for the effects of positive parenting and harsh parenting, this chapter investigates effects of both types of parenting behaviours in the same models. The literature supports that positive parenting and harsh parenting are not two opposite ends of a spectrum (Darling & Steinberg, 1993). A mother who is low on harsh parenting is not necessarily high on positive parenting, and high levels of harsh parenting are not necessarily occurring in the absence of positive parenting behaviours (e.g., Downey & Coyne, 1990; Lovejoy et al., 2000). Both types of parenting behaviours can therefore occur to varying degrees and are not necessarily mutually dependent. To better understand the complexities of how maternal depression, positive parenting, harsh parenting, and child externalising behaviour are related, it is important to test the nature of associations accounting for both type of parenting behaviour. Furthermore, including both types of parenting behaviours in the same model enables the investigation of their relative predictive strength and possible associations between them.

An important development of prior models in this thesis is the investigation of reciprocal effects. By combining the two time periods into one longitudinal model, it is possible to test

cross-lagged effects between maternal depression, each type of parenting behaviour, and child externalising behaviours. In Chapter Five, separate models were conducted to test the effects from mother-to-child and from child-to-mother. This chapter builds on those models and contributes to the current literature on reciprocal relations by analysing the bidirectional nature of effects between maternal depression, parenting behaviours, and child externalising behaviour from infancy through to age 8.

As a second step to the models of reciprocal influence, potential moderating effects of child inhibitory control are investigated. The interaction effects that were found in Chapter Five are included to test their significance when the two effects are analysed in the same model and accounting for bidirectional effects. The moderation of child inhibitory control on the relation between maternal depression at age 2 and harsh parenting at age 3, and between positive parenting at age 3 and child externalising at age 4, are investigated. By analysing these moderation effects within the same model, it is possible to test the relative strength of the moderating effects of child inhibitory control on the two types of parenting behaviours.

The theorised pattern of associations is one in which there is a dynamic interplay between maternal depression, harsh parenting, and child externalising behaviours (Pardini et al., 2008; Patterson et al., 1990; Shaw, Gross, et al., 2009). Maternal depression is hypothesised to predict an increase in harsh parenting, which will predict higher levels of child externalising behaviours. Elevated child externalising behaviours are theorised to then influence future parenting behaviours by predicting a further increase in harsh parenting behaviours, reinforcing the development of maladaptive child behaviour over time and into the school setting (Pardini et al., 2008; Snyder et al., 2005). The contribution of positive parenting behaviours within this set of processes is explored to determine if the mutually reinforcing effects of harsh parenting and child externalising behaviour might be somewhat mitigated by higher levels of positive parenting behaviours.

As a follow-up analysis, child inhibitory control is included in the models to determine if accounting for the child's initial capacity to self-regulate has an impact on how maternal depression influences parenting behaviours, as well as the subsequent pattern of associations. Recent evidence provides support for the association between child self-regulation and negative parenting behaviours, with children who are low on self-regulation eliciting more negative parenting behaviours and also being more susceptible to their adverse effects (Kiff et al., 2011). It is hypothesised that maternal depression will differentially predict harsh parenting behaviours in relation to child inhibitory control, such that mothers with depression will engage in fewer harsh parenting behaviours if the child is better able to self-regulate. The significant moderating effect of child inhibitory control on the association between positive parenting at age 3 and child externalising behaviour at age 4 found in the preceding chapter is also analysed. The purpose is to explore whether the differential effect of child inhibitory control on positive parenting remains significant in a model that also accounts for the effects of harsh parenting. Given the relative strength of associations between maternal depression, harsh parenting, and child externalising behaviours, a significant moderating effect on positive parenting is not hypothesized.

6.2 Aims

Each model analysed in this chapter addresses the following aims:

(1) Investigate associations between maternal depression, positive parenting, harsh parenting, and child externalising behaviour in a single longitudinal model from ages 2 to 7.5 by combining the two time periods previously analysed in separate models in Chapter Five

(2) Test the prediction of child externalising behaviour across domains and informants by including teacher reports of child externalising behaviour at age 8

(3) Analyse positive parenting and harsh parenting within the same model to test the relative predictive strength of different parenting behaviours as well as associations between them from ages 3 to 5

(4) Investigate reciprocal effects between mother and child within a cross-lagged model, specifically testing for bidirectional effects between maternal depression and child externalising behaviours, and between parenting and child externalising behaviours

To investigate early risk severity, the same pattern of bidirectional associations is tested in two separate models, testing first categorical and then continuous baseline variables. The first model tests the suggested presence of more severe risk by analysing maternal depression and child externalising problems as categorical variables at age 2. The second model tests the continuum of depressive symptoms and child externalising behaviours by analysing these as continuous variables at age 2. The purpose is to investigate whether the presence of more severe risk has a greater effect than the continuum of risk at age 2 on parenting behaviours at age 3.

The categorical and continuous baseline variable models are then repeated with the inclusion of a potential moderating effect of baseline child inhibitory control. Building on the analyses from Chapter Five, a moderating effect of child inhibitory control is tested on the relation between maternal depression at age 2 and harsh parenting at age 3, and on the relation between positive parenting at age 3 and child externalising behaviour at age 4. A total of four models with cross-lagged effects are therefore tested from ages 2 through 8.

6.3 Methods

6.3.1 Inclusion criteria

This chapter combines the mediation and competing bidirectional models from the preceding chapter into one longitudinal model from ages 2 to 7.5, predicting teacher reports of child

externalising behaviour at age 8. In line with the theoretical rationale of this thesis (detailed in Section 4.3.1), only biological mothers at the depression and parenting time points are included in the analyses. In the preceding chapter, the models from ages 2 to 4 included a sample of 601 biological mothers. The models from ages 4 to 7.5 included a sample of 543 biological mothers. As previously noted, no significant differences were found between the included and excluded families (i.e., those with primary caregivers other than biological mother) on measures of caregiver depression, child externalising behaviour, poverty, maternal education, child gender, or child race. There were also no significant differences on the demographic variables between the sample in Chapter Four (n = 554) and either the early childhood sample (n = 601) or the middle childhood sample (n = 543) analysed in Chapter Five.

To test the predicted associations within a single longitudinal model, the two samples of biological mothers from the early and middle childhood models from the preceding chapter are combined. Families that were included in either the early or middle childhood models are included in the analyses of this chapter with missing data. The inclusion of only those families analysed in both time periods would have resulted in a decreased sample size that would have excluded a substantial proportion of data and underpowered the analyses. The resulting sample size for the analyses in this chapter is thus n = 641. The models were also tested with the full Early Steps dataset (N = 731) to corroborate the results with a more powered sample size. No differences between patterns of significant results were found.

6.3.2 Measures

The analyses in this chapter test the following variables:

(1) *Maternal depression (age 2, age 4, age 7.5)*

Categorical baseline measure: Dichotomous variable of self-reported depression on the CESD (1 = scores above 16) at age 2

Continuous measure: Self-reported depressive symptoms on the CESD at ages 2, 4, 7.5

(2) *Child externalising behaviour (age 2, age 4, age 7.5, age 8)*

Categorical baseline measure: Dichotomous variable of primary caregiver-reported child externalising behaviour on the CBCL (1 = t-scores above 60) at age 2

Continuous measure: Primary caregiver-reported child externalising behaviours on the CBCL at ages 2, 4, and 7.5; teacher-reported child externalising behaviours on the CBCL (teacher version) at age 8

(3) *Positive parenting (age 3, age 5)*

Observed composite measure including coded duration proportions of behaviour, items from the HOME, and coder impressions items at age 3 (RPC coding) and age 5 (RACS coding)

(4) *Harsh parenting (age 3, age 5)*

Observed composite measure including coded duration proportions of behaviour and coder impression items at age 3 (RPC coding) and age 5 (RACS coding)

(5) *Child inhibitory control (age 2)*

Alternate caregiver reports on the CBQ scale of the inhibitory control dimension, which is part of the broader Effortful Control factor, at age 2

(6) *Covariates (age 2)*

Intervention (0 = control), maternal education (1 = less than high school education), poverty (1 = below the poverty line), child gender (0 = boy), and child race (1 = African American)

6.3.3 Analytic procedure

The analyses build on those from the preceding chapter by testing positive and harsh parenting variables over the course of both time periods within a single model. In doing so, it is possible to test for the relative predictive strength of each type of parenting behaviour accounting for the other and to investigate the associations between them. Combining the two time periods also enables the investigation of reciprocal effects within a single cross-lagged model, which builds on the separate models of competing effects tested in the previous chapter. Within a single model, it is therefore possible to test effects of maternal depression on positive parenting, harsh parenting, and child externalising behaviour, as well as effects of child externalising behaviour on maternal depression, positive parenting and harsh parenting. Teacher reports of child externalising behaviour are predicted at age 8 to investigate effects of parenting and depression on child behaviour as reported by an informant other than the biological mother and within the school environment.

Two path models are conducted, testing baseline measures of maternal depression and child externalising behaviour first categorically and then continuously. The purpose of conducting both sets of analyses is to continue to explore the importance of risk severity in early childhood. Given the investigation of reciprocal effects, both maternal depression and child externalising behaviour at age 2 are tested as categorical and continuous predictors. Each path model tests bidirectional effects between maternal depression and child externalising behaviour. Bidirectional effects are also tested between each parenting behaviour and child externalising behaviour. Although effects are not hypothesised, paths are included from positive and harsh parenting to maternal depression. Concurrent variables are correlated in time, such that maternal depression and child externalising behaviour are correlated, and positive parenting and harsh parenting are correlated.

In the model, later time points are regressed on variables immediately preceding in time but not on all variables in the model. For example, positive parenting at age 5 is regressed on maternal depression at age 4 but is not also regressed on maternal depression at age 2. Including maternal depression at age 2 would test the effect of maternal depression at age 4 on positive parenting at age 5 controlling for the effect of maternal depression at age 2. To conduct the path models with all possible paths between variables would address questions concerning the extent to which predictors are significant over and above earlier levels of that predictor. Given this is not the aim of these analyses, earlier predictor variables are not included in the models.

A test for an indirect effect of harsh parenting is specified between maternal depression at age 2 and child externalising behaviour at age 4 through harsh parenting at age 3. The mediation analysis investigates whether harsh parenting at age 3 operates as an intermediary process through which some of the effect of maternal depression at age 2, on child externalising behaviour at age 4, is transmitted.

Specified paths are then analysed with the inclusion of baseline child inhibitory control. Between the ages of 2 and 4, interaction effects are tested between child inhibitory control and maternal depression predicting harsh parenting, and between child inhibitory control and positive parenting predicting child externalising behaviour. In line with the previous analyses in this thesis, path models control for intervention, poverty, maternal education, child gender, and child race. Path models are conducted using maximum likelihood estimation with robust standard errors (MLR) in Mplus Version 6. Using this method, path coefficients are statistical estimates of the direct effects in the model and are interpreted as regression coefficients in multiple regression.

6.3.4 Research questions and hypotheses

Research questions and hypotheses are drawn from the literature and empirical evidence, and build on results from preceding chapters of this thesis.

Question 1: Are there direct reciprocal effects between maternal depression and child externalising behaviour from ages 2 to 7.5?

Hypothesis 1: There will be a direct effect of maternal depression on child externalising behaviour, such that increased maternal depression at age 2 and age 4 will predict higher levels of child externalising behaviour at age 4 and age 7.5 respectively. There will be a direct effect of child externalising behaviour on maternal depression, such that increased child externalising behaviour at age 2 and age 4 will predict higher levels of maternal depression at age 4 and age 7.5 respectively.

Question 2: Is harsh parenting a more salient predictor of child externalising behaviours than positive parenting when both types of parenting behaviours are tested in the same model?

Hypothesis 2: Increased harsh parenting at age 3 and at age 5 will predict higher levels of child externalising behaviour at age 4 and at ages 7.5 and 8 respectively. Positive parenting at age 3 and at age 5 will not significantly predict later child externalising behaviour.

Question 3: Are there effects of child externalising behaviours at age 2 and age 4 on positive parenting and harsh parenting at age 3 and age 5 respectively?

Hypothesis 3: Increased levels of child externalising behaviour at age 4 will predict lower levels of positive parenting and higher levels of harsh parenting at age 5. Increased levels of child externalising behaviour at age 2 are not hypothesised to predict either positive or harsh parenting at age 3 (based on results from Chapter 5).

Question 4: Does harsh parenting at age 3 partially mediate the relation between maternal depression at age 2 and child externalising behaviours at age 4 when also accounting for the effects of positive parenting and reciprocal influence?

Hypothesis 4: Harsh parenting at age 3 will partially mediate the relation between categorical maternal depression at age 2 and child externalising behaviour at age 4. Harsh parenting at age 5 is not hypothesised to mediate the relation between maternal depression at age 4 and child externalising behaviour at age 7.5.

Question 5: Is there an effect of risk severity at age 2 on positive and harsh parenting at age 3, such that differences are found between the presence/absence of maternal depression and child externalising behaviour at age 2 compared to the continuum of these two predictors?

Hypothesis 5: Maternal depression above the validated cut off score at age 2 will predict higher levels of harsh parenting at age 3. The continuum of maternal depressive symptoms at age 2 will not predict harsh parenting at age 3. Due to the stronger association between maternal depression and harsh parenting, neither the categorical nor the continuous measure of maternal depression at age 2 will predict positive parenting at age 3. No specific differences are hypothesised between the categorical and continuous measures of child externalising behaviours.

Question 6: Does child inhibitory control at age 2 moderate the effect of maternal depression at age 2 on harsh parenting at age 3, and the effect of positive parenting at age 3 on child externalising behaviour at age 4?

Hypothesis 6: There will be a significant moderation effect of child inhibitory control on maternal depression predicting harsh parenting, such that maternal depression at age 2 will predict increased harsh parenting at age 3 particularly for children who are low on inhibitory control. Given the salience of effects between maternal depression and harsh parenting, the

previously significant moderation effect of child inhibitory control on the relation between positive parenting at age 3 and child externalising behaviour at age 4 from Chapter Five is not expected to be significant.

6.4 Results

The first path model tested the specified bidirectional associations with categorical baseline variables of maternal depression and child externalising behaviour. Given that both predictors are dichotomous variables, maternal depression and child externalising behaviour are not correlated in the model at age 2. Results are presented in Table 6.1 and significant associations are illustrated in Figure 6.1 below. In Figure 6.1, the solid lines shown in the model are significant paths, with lines bolded to highlight important hypotheses. The dashed line shown in the figure of child externalising at age 4 predicting maternal depression at age 7.5 approaches significance (p = .068).

Figure 6.1 Reciprocal effects with categorical baseline maternal depression and child externalising behaviour

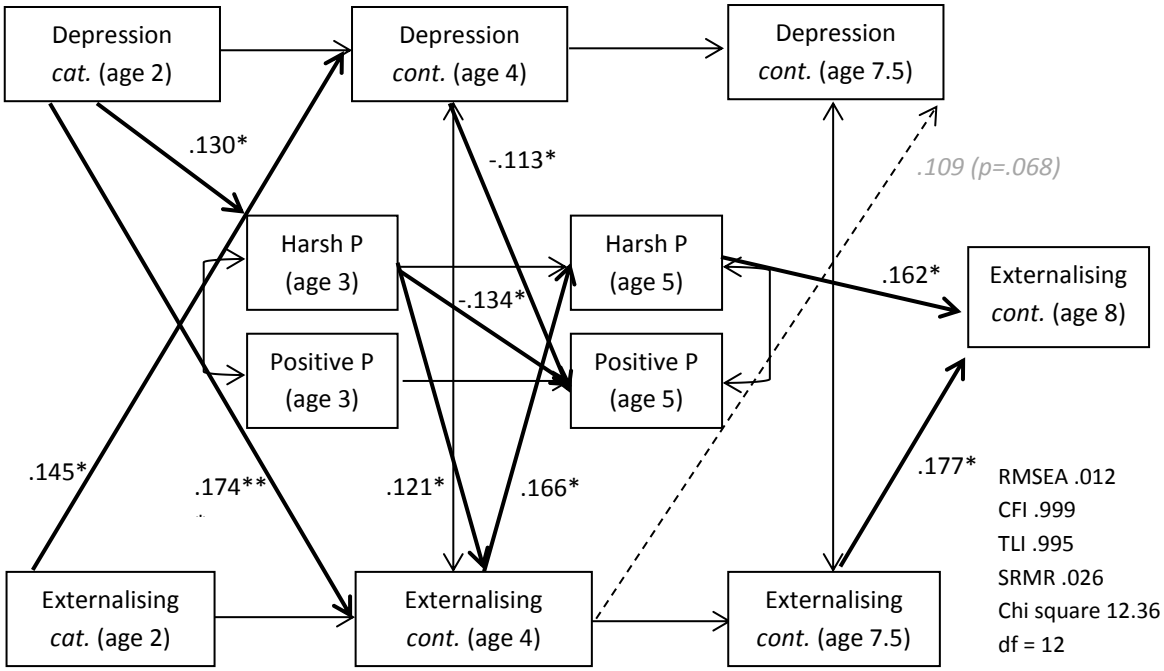


Table 6.1 Path coefficients for categorical and continuous baseline variable models (n = 641)

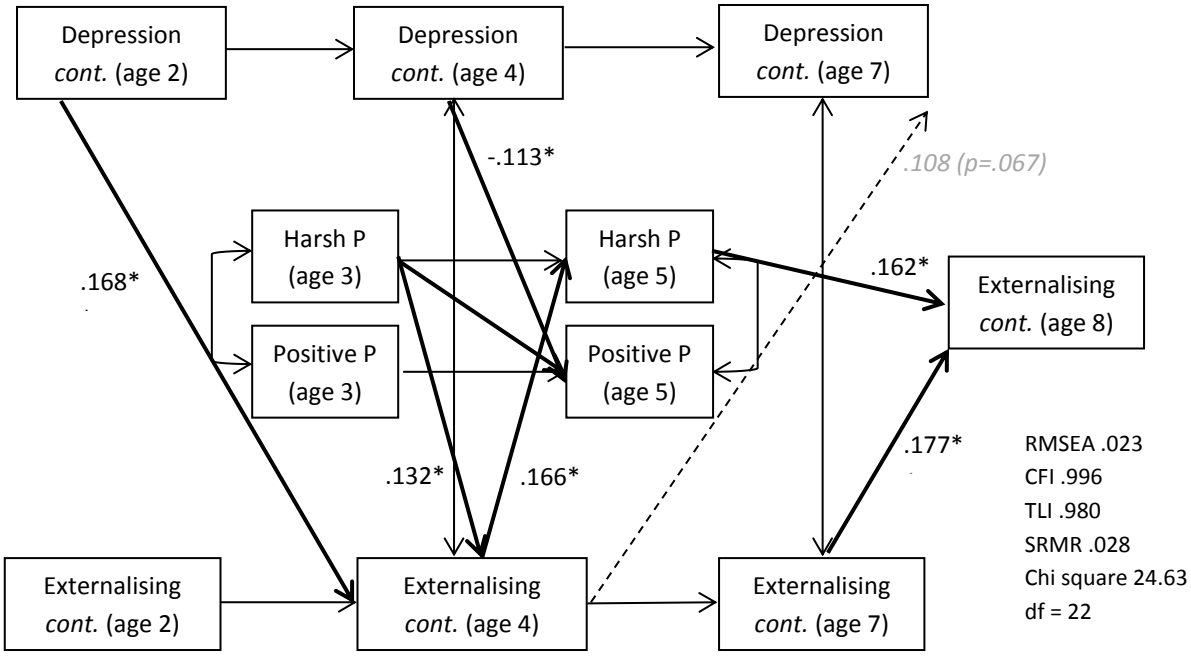
	Model 1: Categorical			***Model 2: Continuous***		
	B	**SE**	***Sig.***	***B***	**SE**	***Sig.***
Externalising (age 8)						
Mom depression (age 7)	-.043	.072	.546	-.043	.072	.546
Externalising (age 7)	.177	.080	**.027**	.177	.080	**.027**
Harsh parenting (age 5)	.162	.074	**.029**	.162	.074	**.029**
Positive parenting (age 5)	.065	.078	.407	.065	.078	.407
Mom depression (age 7)						
Harsh parenting (age 5)	.053	.065	.413	.053	.065	.413
Positive parenting (age 5)	.066	.063	.295	.066	.063	.295
Mom depression (age 4)	.524	.052	**.001**	.523	.052	**.001**
Externalising (age 4)	.109	.059	.068	.108	.059	.067
Externalising (age 7)						
Harsh parenting (age 5)	.005	.066	.942	.005	.066	.942
Positive parenting (age 5)	-.023	.069	.740	-.023	.069	.740
Mom depression (age 4)	.091	.059	.125	.091	.059	.124
Externalising (age 4)	.575	.056	**.001**	.576	.056	**.001**
Harsh parenting (age 5)						
Mom depression (age 4)	.024	.081	.768	.024	.081	.768
Externalising (age 4)	.166	.071	**.020**	.166	.071	**.020**
Harsh parenting (age 3)	.165	.063	**.009**	.165	.063	**.009**
Positive parenting (age 3)	-.081	.070	.246	-.081	.070	.246
Positive parenting (age 5)						
Mom depression (age 4)	-.113	.055	**.039**	-.113	.055	**.039**
Externalising (age 4)	-.107	.073	.144	-.107	.073	.144
Harsh parenting (age 3)	-.137	.061	**.024**	-.137	.061	**.024**
Positive parenting (age 3)	.180	.063	**.004**	.180	.063	**.004**
Mom depression (age 4)						
Harsh parenting (age 3)	.084	.074	.254	.097	.076	.201
Positive parenting (age 3)	.010	.072	.890	.003	.066	.961
Mom depression (age 2)	.303	.061	**.001**	.378	.053	**.001**
Externalising (age 2)	.145	.068	**.032**	.131	.076	.088
Externalising (age 4)						
Harsh parenting (age 3)	.121	.060	**.045**	.132	.063	**.037**
Positive parenting (age 3)	-.079	.055	.147	-.076	.051	.131
Mom depression (age 2)	.174	.056	**.002**	.168	.055	**.002**
Externalising (age 2)	.457	.049	**.001**	.500	.050	**.001**
Harsh parenting (age 3)						
Mom depression (age 2)	.130	.065	**.044**	.065	.065	.322
Externalising (age 2)	-.045	.068	.504	-.030	.071	.675
Positive parenting (age 3)						
Mom depression (age 2)	-.068	.061	.265	-.028	.062	.646
Externalising (age 2)	-.057	.058	.321	-.071	.053	.177

B = standardized beta coefficient

The first model with categorical baseline variables has good model fit (χ^2 = 12.36, *df* = 12; RMSEA = .012; CFI = .999; TLI = .995; SRMR = .026), indicating that the theorised associations are an acceptable representation of the data. Although maternal depression at age 2 predicts harsh parenting at age 3, which in turn predicts child externalising behaviours at age 4, the mediating effect of harsh parenting is non-significant. The non-significant result is in contrast to the significant partial mediation by harsh parenting found in Chapter Four, when harsh parenting was tested without the inclusion of positive parenting. Overall, the path model above highlights the bidirectional nature of associations between maternal depression, harsh parenting, and child externalising behaviour, particularly between ages 2 and 5, as well as the effect of analysing both types of parenting behaviours within the same model.

The second path model tested the specified associations but with continuous baseline variables of maternal depression and child externalising behaviour. The significant associations are illustrated in Figure 6.2 below and the results are presented in Table 6.1. In Figure 6.2, solid, bolded, and dashed lines are utilised in line with Figure 6.1.

Figure 6.2 Reciprocal effects with continuous baseline maternal depression and child externalising behaviour



The second model also has good fit to the data (χ^2 = 24.63, *df* = 22; RMSEA = .023; CFI = .996; TLI = .980; SRMR = .028), although the first model provides a more acceptable fit. Comparing the results from model 1 and model 2, the significant paths are identical but with two notable differences: as hypothesised, categorical maternal depression at age 2 predicts harsh parenting at age 3 whereas continuous maternal depression does not; categorical child externalising behaviour at age 2 predicts maternal depression at age 4 whereas continuous child externalising behaviour does not. The importance of baseline risk severity is discussed in greater detail below.

The analyses in this chapter explicitly aim to build on those from the previous chapter by including both positive parenting and harsh parenting variables in the same models. To explore whether including both parenting variables in the same models provides a more accurate representation of the data, separate categorical and continuous models were conducted for positive parenting and for harsh parenting to compare model fit. In a categorical baseline model with only positive parenting, the fit is good (χ^2=10.74, df = 10; RMSEA = .017; CFI = .999; TLI = .990; SRMR = .015) and is similar to the results from the combined parenting model. In the continuous baseline model with only positive parenting, the fit is acceptable but decreases (χ^2=24.99, df = 20; RMSEA = .032; CFI = .990; TLI = .966; SRMR = .030), and the combined parenting model provides a better fit to the data. A comparison of the significant associations between the models corroborates the finding that positive parenting does not predict child externalising behaviour at any time point in the model. The results indicate that this is true whether the model accounts for the effects of harsh parenting or not.

In separate harsh parenting models, the categorical baseline model provides a good fit to the data (χ^2=11.504, df = 10; RMSEA = .025; CFI = .997; TLI = .976; SRMR = .015) and is similar to the fit for the combined parenting model. In the continuous baseline model, the fit is good but marginally decreases (χ^2=23.33, df = 20; RMSEA = .027; CFI = .992; TLI = .974; SRMR = .033),

and the combined parenting model provides a better fit to the data (χ^2 = 24.63, *df* = 22; RMSEA = .023; CFI = .996; TLI = .980; SRMR = .028). Overall, the indices of model fit indicate that the inclusion of both positive parenting and harsh parenting in the same models provides a better fit to the data, particularly in the models with continuous maternal depression and child externalising behaviour at age 2. The results provide support for the analysis of different types of parenting variables within the same analytic models.

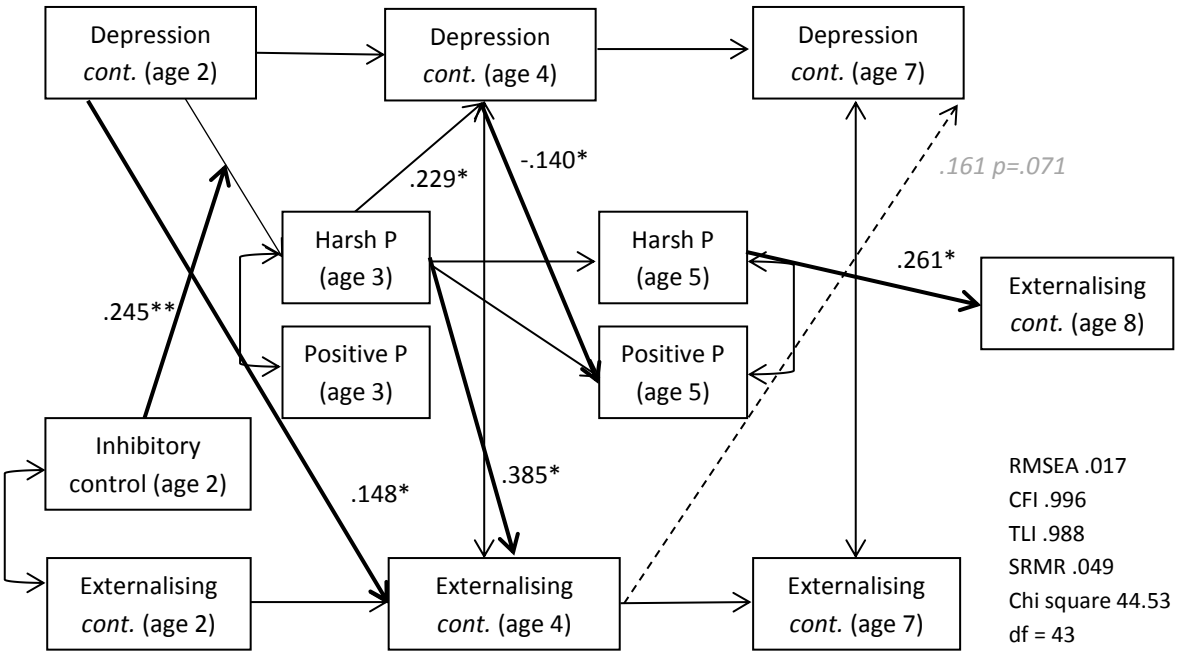
Two models were conducted to test for possible moderation effects of child inhibitory control. Building on the findings from the previous chapter, child inhibitory control was tested as a significant moderator of the relation between maternal depression at age 2 and harsh parenting at age 3, and between positive parenting at age 3 and child externalising behaviour at age 4. Analysed within the same model, child inhibitory control significantly moderated the relation between maternal depression and harsh parenting (*B* = .25, *SE* = .095, *p* < .01*),* but did not significantly moderate the relation between positive parenting and child externalising behaviour. Results for both models including the significant moderating effect of child inhibitory control are presented in Table 6.2 below. The pattern of significant associations is identical between the models of categorical and continuous baseline variables, with somewhat better model fit for the continuous variable model (χ^2 = 44.53, *df* = 43; RMSEA = .017; CFI = .996; TLI = .988; SRMR = .049) compared to the categorical variable model (χ^2 = 28.71, *df* = 25; RMSEA = .035; CFI = .990; TLI = .953; SRMR = .026). As the model with better fit, the results for the continuous baseline variable model are presented in Figure 6.3.

Table 6.2 Path coefficients including moderating effect of child inhibitory control (n = 641)

	Categorical			*Continuous*		
	B	**SE**	***Sig.***	***B***	**SE**	***Sig.***
Externalising (age 8)						
Mom depression (age 7)	-.035	.095	.709	-.036	.095	.708
Externalising (age 7)	.150	.102	.143	.149	.102	.142
Harsh parenting (age 5)	.261	.105	**.013**	.261	.104	**.013**
Positive parenting (age 5)	-.001	.123	.994	-.001	.123	.994
Mom depression (age 7)						
Harsh parenting (age 5)	.083	.104	.427	.082	.103	.426
Positive parenting (age 5)	.099	.098	.312	.098	.097	.312
Mom depression (age 4)	.546	.069	**.001**	.548	.068	**.001**
Externalising (age 4)	.161	.089	.071	.162	.090	.072
Externalising (age 7)						
Harsh parenting (age 5)	-.047	.101	.639	-.048	.102	.639
Positive parenting (age 5)	.020	.094	.832	.020	.094	.832
Mom depression (age 4)	.106	.077	.168	.108	.078	.167
Externalising (age 4)	.549	.077	**.001**	.556	.077	**.001**
Harsh parenting (age 5)						
Mom depression (age 4)	.152	.094	.104	.154	.095	.106
Externalising (age 4)	.109	.091	.231	.110	.092	.231
Harsh parenting (age 3)	.287	.084	**.001**	.293	.086	**.001**
Positive parenting (age 3)	.044	.089	.619	.044	.089	.619
Positive parenting (age 5)						
Mom depression (age 4)	-.138	.069	**.046**	-.140	.070	**.047**
Externalising (age 4)	-.029	.108	.787	-.030	.109	.786
Harsh parenting (age 3)	-.180	.092	.050	-.183	.093	.050
Positive parenting (age 3)	.127	.088	.148	.128	.089	.149
Mom depression (age 4)						
Harsh parenting (age 3)	.229	.094	**.014**	.229	.101	**.024**
Positive parenting (age 3)	.057	.088	.520	.027	.079	.736
Mom depression (age 2)	.412	.077	**.001**	.386	.071	**.001**
Externalising (age 2)	.024	.086	.781	.092	.112	.410
Externalising (age 4)						
Harsh parenting (age 3)	.374	.067	**.001**	.385	.072	**.001**
Positive parenting (age 3)	-.025	.070	.722	-.028	.068	.667
Mom depression (age 2)	.174	.066	**.009**	.148	.075	**.048**
Externalising (age 2)	.475	.061	**.001**	.092	.112	.410
Inhibitory control (age 2)	-.038	.064	.551	.086	.068	.205
Harsh parenting (age 3)						
Mom depression (age 2)	.129	.090	.152	.092	.096	.337
Externalising (age 2)	-.049	.097	.613	-.023	.097	.812
Inhibitory control (age 2)	-.350	.112	**.002**	-.228	.075	**.002**
Depression x Inhibitory control	.256	.134	**.053**	.245	.095	**.010**
Positive parenting (age 3)						
Mom depression (age 2)	-.067	.083	.416	.015	.082	.859
Externalising (age 2)	-.034	.080	.665	-.074	.075	.325
Inhibitory control (age 2)	.045	.097	.642	.031	.099	.752

B = standardized beta coefficient

Figure 6.3 Moderating effect of child inhibitory control on maternal depression and harsh parenting



The pattern of significant associations changes with the inclusion of the moderating effect of child inhibitory control at age 2. The interaction between maternal depression and child inhibitory control predicts harsh parenting at age 3 (*B* = .245, *SE* = .095, *p* < .01). Compared to the significant moderation effect found in Chapter Five, the effect is stronger in the combined parenting model of this chapter. As illustrated in the figure above, harsh parenting at age 3 predicts child externalising behaviours at age 4 (*B* = .385, *SE* = .072, *p* < .01), which is a stronger effect compared to the models in this chapter without the moderation effect (*B* = .132, *SE* = .063, *p* <.05). In the moderated model, harsh parenting at age 3 also has a significant effect on maternal depressive symptoms at age 4, such that higher levels of harsh parenting predict an increase in depressive symptoms the following year (*B* = .229, *SE* = .101, *p* < .01). Importantly, the previously significant association between child externalising behaviour at age 4 and harsh parenting at age 5 is non-significant when accounting for the moderating effect of child inhibitory control. Child externalising behaviour at age 7.5 also no longer significantly predicts teacher-reported child externalising behaviour at age 8. The implications of the early capacity

to self-regulate in understanding processes of resilience for children of mothers with depression are discussed below.

To consider the possible influence of cumulative risk, all path models were conducted controlling for the composite measure of cumulative risk. No significant differences between the models were found. To explore the effect of a more powered sample size, the path models were also conducted including the full Early Steps sample with missing data (N = 731). Again no significant differences between the models were found.

6.5 Discussion

The purpose of this chapter was to address questions of direct and indirect reciprocal effects between maternal depression, positive parenting, harsh parenting, and child externalising behaviours, as well as the potential moderating effect of child inhibitory control. Building on the analyses from preceding chapters, the analyses tested positive parenting and harsh parenting included in the same longitudinal models from age 2 to age 7.5, through to teacher-reported child externalising behaviour at age 8. The analysis of categorical and continuous baseline maternal depression and child externalising behaviour points to the importance of early risk and behaviour severity in terms of their predictive impact on later mother and child behaviours. As theorised based on previous research (Pardini et al., 2008; Patterson et al., 1990; Shaw, Gross, et al., 2009), the models indicate the relative strength of associations between maternal depression, harsh parenting, and child externalising behaviours during the early childhood years and highlight the dynamic nature of reciprocal influence between these constructs. The investigation of the potential moderating effect of baseline child inhibitory control also provides further support for the importance of individual differences in this early capacity (Eisenberg, Spinrad, et al., 2004; Kiff et al., 2011; Piotrowski et al., 2012). More specifically, child inhibitory control moderated the effect of maternal depression on harsh parenting and influenced the significance of later associations. Although the results are

indicative of the complexity of effects over time, arguably the main findings that emerge concern the importance of early risk severity, the salience of harsh parenting behaviours, the reciprocal nature of relations, and the moderating effect of child inhibitory control.

In line with the literature, the models provide support for maternal depression as a significant risk factor for maladaptive child externalising behaviours in early childhood (Ashman et al., 2008; Downey & Coyne, 1990; Goodman et al., 2011). At age 2, maternal depression measured either categorically or continuously predicted higher levels of child externalising behaviour at age 4. In the context of these theorised models, the direct effect of maternal depression on child externalising behaviour was only significant between ages 2 and 4 and was not significant in the following years. In contrast, the middle childhood models in the previous chapter found significant direct effects of maternal depression at age 4 on child externalising behaviour at age 7.5. The models in this chapter highlight that when accounting for previous levels of child externalising behaviours and concurrent maternal depression, as well as the effects of both positive and harsh parenting behaviours, the direct effect of maternal depression on child externalising behaviours is no longer significant from age 4 to 7.5. In support of previous research findings, these results suggest the importance of investigating effects from early in childhood, and that this might be a particularly salient time period during which maternal depression can have adverse effects on child behaviour functioning (Gross et al., 2008; Lovejoy et al., 2000).

A comparison of the categorical and continuous baseline variable models indicates the role of maternal depression severity in influencing later parenting behaviours, specifically harsh parenting behaviours. Only the presence of maternal depressive symptoms above the validated cut off at age 2 predicted higher levels of harsh parenting at age 3. The continuum of depressive symptoms at age 2 did not have a significant predictive effect on harsh parenting behaviours the following year. These results highlight the importance of a more clear and

sufficiently severe risk in influencing intermediary factors in early childhood (Rutter, 2006). In the previous chapter, the presence of maternal depression at age 2 predicted a decrease in positive parenting and an increase harsh parenting at age 3 when analysed in separate models. The inclusion of both parenting variables in the same model provides clarifying information regarding the association between maternal depression and different types of parenting behaviours. In line with the literature, support is provided for the relative strength of the association between maternal depression and harsh parenting compared to positive parenting (Goodman & Gotlib, 1999; Lovejoy et al., 2000), and the role of risk severity in influencing the strength of this association.

Interestingly, a follow-up comparison of levels of harsh parenting behaviours between mothers who were depressed at age 2 but not at age 4, and mothers who were depressed at age 2 and who were also depressed at age 4, found no significant difference. This result arguably suggests that once the more frequent use of harsh parenting behaviours becomes established by mothers with depression in early childhood, the engagement in such parenting behaviours is unlikely to decrease over time whether the mother is depressed again or not. Although the association may be strongest when the mother is currently depressed (Lovejoy et al., 2000), long-term effects on parenting behaviours seem to endure beyond the depressive episode. From a resilience perspective, the findings suggest that more adaptive child behaviour development is supported by those mothers with depression who do not engage in harsh parenting behaviours from early in childhood. Low levels of initial harsh parenting seem to avoid the prolonged use of such parenting behaviours and the establishment of negative patterns of mother-child interactions that are detrimental to child behaviour development over the long-term. The potential continuity in use of harsh parenting behaviours over time requires further research, to better understand how parenting behaviours may or may not change in relation to changes in maternal depression and to provide stronger support for the

importance of avoiding the initial engagement in harsh parenting behaviours suggested by these results.

In line with previous research and the results from Chapter Four and Chapter Five, the models highlight the differential impact of harsh parenting compared to positive parenting on child behaviour development (Acker & O'Leary, 1996; Del Vecchio & Rhoades, 2010; Kim et al., 2003). In the context of maternal depression, lower levels of harsh parenting significantly predicted decreased child externalising behaviour but higher levels of positive parenting were not predictive. Harsh parenting at age 3 predicted child externalising behaviour at age 4, and harsh parenting at age 5 predicted teacher-reported child externalising behaviour at age 8. Harsh parenting at age 5 did not predict child externalising behaviour at age 7.5, likely due in part to the strength of association between mother-reported child externalising behaviours at age 4 and age 7.5 (B = .575, p < .001). In contrast, positive parenting at neither age 3 nor age 5 predicted later child externalising behaviour, reported by the mother or by the teacher. The results indicate the salience of overtly negative and critical parenting behaviours on child behaviour development in early through middle childhood (Radke-Yarrow & Klimes-Dougan, 2002; Shaw et al., 2000). Furthermore, the long-term impact of harsh parenting on child behaviour is emphasised across informants and contexts, with the prediction of child externalising behaviours reported by teachers in the school setting. Considering the relative predictive strength of different types of parenting behaviours is important in terms of targeting intervention efforts. The results emphasise that the main priority is the reduction of harsh parenting behaviours to promote more positive child behaviour development both within the home and through to the school environment.

In contrast to the hypothesis outlined above, a test for the indirect effect of harsh parenting at age 3 in the relation between the categorical variable of maternal depression at age 2 and child externalising behaviour at age 4 was not significant. Although associations between

variables were significant, support was not provided for harsh parenting at age 3 as a process through which maternal depression at age 2 affected child externalising behaviour at age 4. In the preceding chapter, the partial indirect effect of harsh parenting at age 3 was significant when positive parenting and bidirectional effects were not included in the model. The combined parenting model of this chapter points to the previously supported mitigating effect of positive parenting behaviours (Brennan et al., 2003; Owens & Shaw, 2003), as harsh parenting no longer operated as a mediator of maternal depression and child externalising behaviour. As discussed in the previous chapter, evidence for an indirect effect of harsh parenting in the relation between maternal depression and child development is limited (Elgar et al., 2007; Silberg et al., 2010). The current state of the evidence indicates that harsh parenting is an important predictor of child behaviour development (Acker & O'Leary, 1996; August et al., 1999; Shaw et al., 2000). In terms of explaining the transmission of risk however, there is a lack of support for harsh parenting as a robust mediating mechanism when accounting for other parenting behaviours and reciprocal effects of the child on the mother.

The analyses of this chapter provide a more comprehensive understanding of how the harsh parenting behaviours of mothers with depression might operate to influence child behaviour development. Although in isolation harsh parenting may operate as a partial mediating mechanism (Elgar et al., 2007), when accounting for additional dynamics in the mother-child relationship it does not appear to be a process through which maternal depression influences child externalising behaviour in early childhood. In contrast, the results from Chapter Four found that harsh parenting interacted with maternal depression over and above the effects of positive parenting, child inhibitory control, and cumulative risk to predict child externalising behaviour. The robustness of the interaction effect in contrast to the mediating effect suggests that the relation between harsh parenting and maternal depression might more likely be a dynamic interaction concurrently in time (Lovejoy et al., 2000). The specific nature of the association between maternal depression and harsh parenting requires further longitudinal

research, to better understand concurrent as well as enduring effects and the subsequent impact on child development.

The models provide evidence for the reciprocal nature of relations between maternal depression, harsh parenting, and child externalising behaviour. Previous research has found bidirectional effects between maternal depression and child externalising behaviour (Gross et al., 2009; Gross et al., 2008), and between parenting behaviours and child externalising behaviour (Pardini et al., 2008). In the models of this chapter, reciprocal effects between all three constructs were considered simultaneously, advancing the understanding of how these transactional processes might be related over time. Considering the results from Chapter Five, child externalising behaviour predicted maternal depression between ages 2 and 4 and between ages 4 and 7.5 in the competing effects models. The models in this chapter indicate that when effects of reciprocal influence are tested in a single model rather than separate child-to-mother analyses, the effect of child externalising behaviour on maternal depression is weakened and less consistent. The analysis of longitudinal, bidirectional models provides valuable information that builds on the results from the previous chapter and in doing so, refines the understanding of how these constructs might be dynamically related over time. The direct reciprocal effect of child externalising behaviour on maternal depression appears to depend upon the severity of child behaviours and to be particularly salient between the ages of 2 and 4.

In line with previous research, the results provide general support for the bidirectional nature of effects between maternal depression and problem child behaviour. In their study of boys from ages 5 to 10, support was found for bidirectional effects between maternal depression and aggressive child behaviours specifically between the ages of 5 and 6 (Gross et al., 2008). From an earlier age, support was not found for aggressive behaviours but for child noncompliance in terms of predicting more chronic and elevated trajectories of maternal

depression (Gross et al., 2009). This thesis differs from previous research with the analysis of externalising behaviours more broadly rather than specific component behaviours, and considers reciprocal effects from age 2 through to age 7.5. In the model with categorical baseline variables, the presence of maladaptive child externalising behaviours at age 2 predicted increased levels of maternal depressive symptoms at age 4. The continuum of child externalising behaviours at age 2 did not however predict maternal depression at age 4. The results for the reciprocal effects of child externalising behaviour on maternal depression highlight the importance of the severity of child behaviour problems at age 2 for directly predicting maternal depressive symptoms two years later. Whereas the effects from maternal depression to child behaviour were significant for both the categorical and the continuous measure of maternal depression, the effects from child externalising behaviour to maternal depression were only significant if child externalising behaviours were of a particular severity. The results therefore provide general support for the bidirectional association between maternal depression and child externalising behaviours in early childhood, but highlight that the effects from child-to-mother in early childhood might depend upon the severity of child behaviours.

There is limited empirical support for the timing of reciprocal effects between maternal depression and child externalising behaviours, particularly from very early in child development. In contrast to previous findings (Gross et al., 2008), the results of this chapter indicate that reciprocal effects between maternal depression and child externalising behaviour pertain to ages 2 to 4, but do not seem to extend through to ages 4 to 7.5 The effect of maternal depression at age 4 on child externalising behaviour at age 7.5 was non-significant. The effect of child externalising behaviour at age 4 on maternal depression at age 7.5 did however approach significance. It is noteworthy that between the ages of 4 and 7.5, there was a trend towards a significant effect only in the direction of child-to-mother. From a developmental perspective, the results highlight the early childhood years as a period during

which the direct relation between maternal depression and child externalising behaviours is of a reciprocal nature. The results are limited however by the inconsistent data collection points, such that there is a two year difference between the constructs in early childhood (age 2 to age 4) but a three and a half year difference in middle childhood (age 4 to age 7.5). It is therefore difficult to interpret the extent to which reciprocal effects are stronger in early childhood compared to middle childhood, or if perhaps they operate over a more proximal period of time as indicated by previous research (Gross et al., 2008).

The results highlight that when accounting for maternal depression, the bidirectional effects between parenting and child externalising behaviour are particularly related to harsh parenting behaviours. Positive parenting did not predict child externalising behaviour and child externalising behaviour did not predict positive parenting between any time points in the models. In the absence of maternal depression, previous research supported a bidirectional relationship between diverse parenting practices and child behaviour examined from childhood to adolescence (Pardini et al., 2008). The models in this thesis support the dynamic interplay between harsh parenting and child externalising behaviours from ages 3 through 8 when also considering the impact of maternal depression. More specifically, higher levels of harsh parenting at age 3 predicted increased levels of child externalising behaviour at age 4. Elevated levels of child externalising behaviours at age 4 then predicted higher levels of harsh parenting at age 5, which in turn predicted increased levels of teacher-reported child externalising behaviour at age 8. In this thesis, the dynamic interplay between mother and child appears to be particularly related to the reciprocal nature of effects between child externalising behaviour and harsh parenting but not positive parenting. These results are in line with the theorised model of Shaw (2009), which posited that negative mother-toddler interactions influence the mother's ability to cope with her child, which lead to further negative interactions and establish a pattern which leads to future coercive exchanges.

The models provide support for the bidirectional nature of effects between harsh parenting and child externalising behaviours from age 3. The results do not provide support for an effect of child externalising behaviour at age 2 on harsh parenting at age 3, whether child externalising behaviour was measured categorically or continuously. As previously discussed, the emergence of this effect is in contrast to the direct reciprocal effect between child externalising behaviour and maternal depression, which was significant only between the ages of 2 and 4. Harsh parenting at age 3 remained unaffected by child externalising behaviours the preceding year, whereas maternal depression at age 4 was higher for mothers whose children had externalising behaviour problems at age 2. At age 5 however, harsh parenting was significantly lower if child externalising behaviours were lower in the preceding year, and the effects on maternal depression only trended towards significance. It would seem that the direct reciprocal effects between maternal depression and child externalising behaviours are salient in early childhood, whereas the reciprocal effects between harsh parenting and child externalising behaviours might emerge later in development and become reinforced over time.

The analysis of both categorical and continuous measures of baseline depression points to the possible role of maternal depression in influencing the reciprocal cycle between harsh parenting and child externalising behaviour. The presence of maternal depressive symptoms above a validated threshold of severity contributed to the establishment of reciprocal negative exchanges between the mother and her child. At age 2, maternal depression predicted higher levels of harsh parenting at age 3, and higher levels of harsh parenting at age 3 were crucial in the early stages of the reciprocal cycle. The categorical and continuous measure of maternal depression at age 2 also directly predicted child externalising behaviours at age 4. These elevated levels of child externalising behaviour at age 4 then predicted higher levels of harsh parenting at age 5. The suggested presence of maternal depression and the full continuum of depressive symptoms at age 2 therefore appear to impact the reciprocal cycle between harsh

parenting and child externalising behaviours at different points. The results indicate that the measurement of maternal depression is an important consideration for understanding how depression in early childhood might influence the pattern of associations between harsh parenting and child externalising behaviour.

The analysis of moderating effects of child inhibitory control highlights that the associations between maternal depression, harsh parenting, and child externalising behaviour vary depending on the child's early ability to self-regulate. Higher levels of child inhibitory control predicted lower levels of harsh parenting particularly when the mother did not have depression, or when maternal depressive symptoms were low. The effect of child inhibitory control on harsh parenting was minimal in the presence of maternal depression, or when maternal depressive symptoms were high. Maternal depression appears to have a strong effect on levels of harsh parenting behaviours that the child's inhibitory control is only marginally able to attenuate. Building on previous evidence for children and parents in general (Kiff et al., 2011), children who were better able to self-regulate seem to elicit less harsh parenting behaviours compared to children with poorer self-regulation when maternal depression is absent or when maternal depressive symptoms are low. Furthermore, child externalising behaviour no longer significantly influenced harsh parenting the following year when accounting for the moderating effect of child inhibitory control.

The results of this chapter provide important insight into the processes through which adaptive child behaviour development occurs in the context of maternal depression (Rutter, 2007). The findings support harsh parenting and child inhibitory control as particularly important processes in the transactional relations between mother and child in early childhood. Maternal depression, measured as a more clear presence of risk, predicted higher levels of harsh parenting but not uniformly for all children. In support of previous research (Bridgett et al., 2009; Gartstein & Rothbart, 2003), the modulating impact of child inhibitory

control highlights the importance of this early emerging capacity in terms of decreasing the use of harsh parenting behaviours more specifically by mothers with depression. The moderating effect of child inhibitory control also suggests that the dynamic interplay between harsh parenting and child externalising behaviours might be changed by individual differences in early child self-regulation. When accounting for initial levels of child inhibitory control, child externalising behaviours at age 4 no longer predicted harsh parenting at age 5, pointing to the role of more competent self-regulation in avoiding the elicitation of later harsh parenting behaviours (Kiff et al., 2011). Given the resilience focus of this thesis, the buffering effect of child inhibitory control on the establishment of negative patterns of mother-child interactions is noteworthy. For children of mothers with depression, the individual capacity to self-regulate in early childhood appears to promote more adaptive behaviours particularly through effects on harsh parenting behaviour. Children who are better able to self-regulate from as early as 2 years of age appear to reduce the negative effects of maternal depression at age 2 on harsh parenting at age 3, and their externalising behaviours at age 4 no longer have an impact on harsh parenting at age 5.

The findings provide further support for the notion that resilience did not reside entirely within the individual (Garmezy et al., 1984; Masten et al., 1990). The child's individual capacity for inhibitory control is important, but so too are the effects of parenting. Particularly in the early childhood years, it is important to acknowledge that the child is highly depending upon the primary caregiver. Resilience research during this period therefore focuses on the dynamic nature of developmental processes operating within the caregiver-child relationship (Seifer, 2003). The promotion of more adaptive child behaviour involves addressing the nature of this relationship and not simply promoting early individual child-level competencies. By focusing on the mechanisms that influence change, the results of this chapter highlight the role of harsh parenting behaviours and the impact of child inhibitory control. More adaptive behaviour development is supported for children of mothers with depression with the decreased use of

harsh parenting behaviours alongside the promotion of early child self-regulation. Both factors are important for directing mother-child interactions away from coercive exchanges and promoting more adaptive patterns of reciprocal exchanges, supporting more positive outcomes for both the child and the mother.

The inclusion of reciprocal effects contributes an interesting perspective on the concept of resilience. Resilience research traditionally investigates the variability in adaptive outcome despite the experience of similar situations of risk (Luthar et al., 2000a; Masten, 2001). It does not tend to acknowledge that in certain situations, the adaptive outcome might then influence the nature of the risk itself and intermediary processes. Rather than an isolated, static risk factor preceding a specific outcome at discrete time points, risk may be experienced over an extended period of time during which the very nature of that risk might be influenced by individual differences in outcome. The results of this chapter raise the important consideration that although maternal depression in early childhood influences child behaviour development, the course of child behaviour development can then influence the subsequent experience of maternal depression and intermediary factors such as harsh parenting.

Not only then is the conceptualisation of resilience as a dynamic process emphasised (Egeland et al., 1993; Luthar, 2003), but resilience as a dynamic, potentially reciprocal process. The interplay between risk and adaptation over the course of child development highlights that intervening at an early stage can have important cascading effects over time, in terms of supporting better child behaviour outcomes but also in terms of mitigating later risk. Although the reciprocal nature of effects certainly does not pertain to all situations of risk, it seems to be an important and arguably integral characteristic of the association between maternal depression and child externalising behaviours, as well as intermediary factors like harsh parenting. To consider strictly unidirectional models fails to acknowledge that the variability in child externalising behaviours themselves have an important effect on maternal depression

and harsh parenting, and that if a more positive effect can be supported, the likelihood of long-term adaptive behaviour development increases.

In the context of the behaviour development of young children of mothers with depression, the results arguably emphasise the agency of both the child and the mother in influencing future outcomes. The experience of maternal depression presents an initial challenge to child behaviour development, but from as early as two years of age, individual differences in child inhibitory control and externalising behaviours can influence the subsequent experience of maternal depression and harsh parenting behaviours. The extent to which children present with adaptive behaviours from early in development therefore plays an important role in influencing risk and mechanisms of resilience. Furthermore, mothers with depression can avoid the establishment of more negative patterns of exchange with their child and support more positive child behaviour development by not engaging in the use of harsh parenting behaviours. The results highlight that mothers with depression and their very young children each play an active role in influencing subsequent risk and the dynamic nature of how processes of resilience unfold over time.

Building on previous analyses, this chapter adopted a process-oriented approach to test transactional effects between maternal depression, positive parenting, harsh parenting, and child externalising behaviour in a longitudinal model from early childhood (Bronfenbrenner & Morris, 1998; Yates et al., 2010). The purpose was to investigate a dynamic conceptualisation of resilience, focusing on reciprocal processes within the mother-child relationship that might explain the variation in behaviour outcomes for young children of mothers with depression (Goodman & Gotlib, 1999; Rutter, 2012). The results highlight the dynamic, mutually reinforcing interplay between maternal depression, harsh parenting and child externalising behaviours, and the potential impact of maternal depression severity on the establishment of negative patterns of interaction (Shaw, Gross, et al., 2009). Although harsh parenting did not

operate as a significant process through which maternal depression influenced child externalising behaviours, the results highlight the role of harsh parenting as an intermediary factor of reciprocal influence with child externalising behaviours. Individual differences in inhibitory control also point to the moderating effect of this capacity in early development, in terms of reducing the risk that mothers with depression will engage in harsh parenting behaviours with their young children (Kiff et al., 2011). With the analysis of transactional effects between mother and child, the role of both mother and child in actively influencing the experience of risk and processes of resilience becomes apparent. As previously supported (Seifer, 2003), the focus is therefore on the promotion of resilient developmental systems. Particularly from early in child development, the emphasis is on supporting more positive and health-promoting patterns of mother-child interactions. The results argue in favour of reduced harsh parenting behaviours and more effective child self-regulation, with continued efforts to reduce maternal depressive symptoms, thus increasing the likelihood of positive outcomes for both child and mother.

Chapter 7: Conclusions

7.1 Introduction

The purpose of this thesis was to investigate processes of resilience in relation to the externalising behaviour development of young children of mothers with depression. The starting point was the well-supported importance of establishing positive trajectories of behaviour from early in childhood (Masten & Powell, 2003; Moilanen, Shaw, & Maxwell, 2010) and the known risk that maternal depression can pose to child development (Avenevoli & Merikangas, 2006; Beck, 1999; Campbell et al., 2009). Despite the potential adverse effects of maternal depression, certainly not all children of mothers with depression develop problem behaviours. Adopting a resilience approach emphasises this variability in child behaviour outcomes and aims to better understand how to promote more positive child development despite the early experience of risk (Luthar & Bidwell Zelazo, 2003; Rutter, 2006). Acknowledging that processes of resilience involve more than just the individual child, particularly from an early developmental stage, the emphasis was on factors that are relevant to the mother-child relationship (Seifer, 2003; Yates et al., 2003). This thesis therefore investigated positive and harsh parenting behaviours of mothers and the early capacity of young children to self-regulate. The intention was not to attempt to explain the full variation in child outcome, but rather to focus on key factors that are relevant to the behaviour development of young children of mothers with depression. The findings have the potential to inform early intervention and prevention efforts to support more positive long-term development.

To investigate the variability in behaviours of young children of mothers with depression, the literature highlights the importance of developing theoretically-based models that are developmentally relevant and that address the reciprocal nature of effects (Goodman & Gotlib, 1999; Yates et al., 2010). The analyses of this thesis sought to address these

considerations by drawing from the literature and empirical evidence (e.g., Brennan et al., 2003; Eisenberg, Spinrad, et al., 2004; Shaw, Gross, et al., 2009), building on previous research to test theorised associations between constructs from early in child development. Chapter Four tested positive parenting, harsh parenting, and child inhibitory control as predictors of behavioural resilience, and investigated whether these were risk-specific predictors that might be particularly relevant for children of mothers with depression. Chapter Five progressed from testing predictors to testing potential mediating and moderating mechanisms. Positive parenting and harsh parenting were analysed as processes through which maternal depression might influence child externalising behaviours, and child inhibitory control was investigated as a potential moderator of these mediating effects. Building on the analyses of Chapter Five, Chapter Six analysed a longitudinal model of cross-lagged effects to investigate the reciprocal nature of associations between maternal depression, positive parenting, harsh parenting, and child externalising behaviours from age 2 through to teacher reports at age 8. A moderating effect of child inhibitory control was included to explore whether the nature of bidirectional effects varied depending on the child's early capacity to self-regulate.

Adopting a resilience approach throughout, the aim of this thesis was to explore developmentally relevant processes that might predict more positive behaviour development for young children despite the early risk of maternal depression. What emerged was not only an emphasis on reduced harsh parenting and improved child self-regulation, but the need to more fully consider the mutually influential nature of mother-child effects from early in child development. Resilience is emphasised not only as a dynamic process but one in which both the mother and the child might play an active role in influencing the nature of risk, adaptation, and intermediary factors over time (Rutter, 2012; Yates et al., 2003).

7.2 Summary of findings

7.2.1 Chapter Four findings

The primary aim of Chapter Four was to investigate positive parenting, harsh parenting, and child inhibitory control as general or risk-specific predictors of early child behavioural resilience. Prior to conducting the main analyses of the chapter, the definition and operationalization of resilience was explored to assess its validity. The validation of resilience highlighted that the categorical definition of resilience, as the presence of risk and the presence of sufficiently good functioning, identified a group of young children who were thus far doing well developmentally across domains. Between-group comparisons found that they were functioning better than those children who had similarly been exposed to maternal depression but who displayed problem behaviours, not only in the behaviour domain but also in the internalising and social domains. Furthermore, comparisons between the resilient group of children and those children whose mothers did not have depression found that children in the resilient group had lower levels of externalising behaviours. Comparisons of additional risk factors also indicated that the "resilient" group of children was not simply a lower risk group compared to the other children of mothers with depression who displayed behaviour problems. The validation of resilience provided support for a meaningful categorisation of children who were generally functioning well across multiple domains, in relation to similarly risk-exposed children as well as non-exposed children.

Following the validation of resilience and the comparative exploration of child functioning, the adverse effect of maternal depression on early child externalising behaviour was tested. Previous research provides extensive support for parental depression as one of the most consistent and well-replicated risk factors for childhood anxiety and disruptive behaviour disorders (e.g., Goodman & Gotlib, 1999; Hammen, Shih, & Brennan, 2004; Weissman et al., 2006). The results of this thesis were in line with the evidence and found that maternal

depression when the child was 2 and 3 years of age was associated with a three-fold increase in the odds of externalising behaviours at age 5. Furthermore, the continuous measure of depressive symptom severity accounted for 9.4% of the variance in child externalising behaviours, over and above the effects of poverty, maternal education, child gender and race. The results indicated a relatively strong and consistent effect, but also highlighted that despite the significance of this early risk factor, there was a substantial minority of children who did not present with maladaptive externalising behaviours. Furthermore, the continuous variable results indicated that there was a large proportion of unaccounted for variance in child externalising behaviours. These findings served as an important reminder that despite the risk conferred by maternal depression, there are multiple factors involved in explaining the variation in child behaviours.

The results of Chapter Four did not find support for positive parenting as a factor that predicted the presence of developmentally normative behaviours for children of mothers with depression. Although a significant main effect was found in the full sample of children, positive parenting did not interact with maternal depression to predict child behaviour. Given the results of this thesis, it does not seem that mothers with depression who engaged in higher levels of positive parenting had any greater effect on the externalising behaviour development of their children than mothers in general. Positive parenting appeared to operate as a general resource promoting child behaviour within the normative range in early childhood. However the effect of positive parenting was less consistent when predicting the continuous measure of externalising behaviours for the full sample of children. Overall, the results do not suggest that higher levels of positive parenting by mothers with depression are likely to increase the odds of normative child behaviour development, and only limited support is provided for children overall.

The results did find support for child inhibitory control as an individual-level resource predicting more positive behaviour development for children in general and more specifically for children of mothers with depression. There was no differential impact of inhibitory control for children of mothers with depression compared to other children, but unlike the results for positive parenting, there was a significant predictive effect within the subgroup of children of mothers with depression. Furthermore, child inhibitory control significantly predicted the categorical variable of child externalising behaviour, whereas neither positive nor harsh parenting was predictive. Both children of mothers with depression, and children more generally, who were better able to inhibit and manage their behaviours in response to cues and stimuli from their environment at age 3, had higher odds of developing normative behaviours at age 5. Individual differences in child inhibitory control from early in development therefore appeared to play a role in promoting more positive behaviours for young children, including children of mothers with depression.

Given the focus on maternal depression in early childhood, the results from Chapter Four specifically highlighted the importance of lower levels of harsh parenting behaviours. Not only did lower levels of harsh parenting predict more positive behaviours for children of mothers with depression, but they were differentially predictive for these children compared to children whose mothers did not have depression. At low levels of harsh parenting, the impact was similar between the two groups. As levels of harsh parenting increased however, the adverse effect on child externalising behaviours at age 5 increased specifically for those children whose mothers were depressed at ages 2 and 3. The results therefore pointed to the importance of reducing the use of harsh parenting behaviours particularly by mothers with depression. Levels of externalising behaviours of children of mothers with depression looked most similar to their non-exposed peers at low levels of harsh parenting. It was those mothers with depression who were not engaging in overtly critical, angry and rejecting parenting behaviours that were helping to support the more positive behaviour development of their

children. Overall, the results from Chapter Four provided limited support for the importance of positive parenting for children more broadly. Stronger support was provided for a main effect of child inhibitory control on the behaviour development of children of mothers with depression as well as children in general, and for a risk-specific effect of harsh parenting particularly for children of mothers with depression.

7.2.2 Chapter Five findings

Building on the analyses from Chapter Four and recent research (Elgar et al., 2007; Silberg et al., 2010), the purpose of Chapter Five was to explore mediators and moderators of the relation between maternal depression and child externalising behaviours. Whereas Chapter Four investigated general or risk-specific predictors of child behaviour, Chapter Five investigated whether different types of parenting behaviours operated as processes through which maternal depression influenced child externalising behaviour. Positive parenting and harsh parenting were tested as potential mediators and child inhibitory control was tested as a potential moderator of this mediating effect. The purpose was to contribute to the understanding of processes through which maternal depression might influence child behaviour development in early childhood and how these specific mechanisms of transmission might vary depending on an important child-level factor.

As hypothesised, positive parenting did not significantly mediate the relation between maternal depression and child externalising behaviours between either the ages of 2 and 4 or between the ages of 4 and 7.5. The non-significant results indicated that positive parenting behaviours of mothers in this sample was not a process through which the severity of their depressive symptoms influenced the behaviour development of their children. A moderated mediation analysis was conducted to determine whether there might be a mediating effect depending on the child's ability to self-regulate. Although the mediating effect remained non-significant, a significant moderation effect was found specifically for the association between

positive parenting at age 3 and child externalising behaviours at age 4. The results indicated that for children who had high baseline levels of inhibitory control, the effect of positive parenting on child externalising behaviours was consistent across levels of positive parenting. Even at low levels of positive parenting, there was minimal effect on child externalising behaviours if the child was better able to self-regulate. For children who had low levels of inhibitory control however, low levels of positive parenting had a strong effect on externalising behaviours. The early capacity to self-regulate was generally predictive of more positive behaviours, and when accounting for maternal depressive symptoms, was also specifically beneficial in the context of low levels of positive parenting behaviour.

The results of Chapter Five found preliminary support for harsh parenting as a mediating mechanism in early childhood. Observed levels of harsh parenting behaviours at age 3 partially mediated the relation between the presence of maternal depression at age 2 and child externalising behaviours at age 4. A moderated mediation analysis found that the mediating effect of harsh parenting became non-significant when accounting for the moderating effect of child inhibitory control. Despite the non-significant indirect effect, there was a significant moderation of child inhibitory control on the association between maternal depression at age 2 and harsh parenting at age 3. For children who were low on inhibitory control, harsh parenting levels were consistently elevated across levels of maternal depression. For children who were high on inhibitory control, harsh parenting levels were only elevated when the mother was also depressed. The child's ability to self-regulate from as early as two years of age appeared to be an important individual-level factor specifically associated with negative parenting behaviours. In line with recent meta-analytic findings, children with a poorer capacity to manage and inhibit their behaviours in response to their environment were likely to experience significantly higher levels of harsh parenting behaviours (Kiff et al., 2011).

The inclusion of the competing effects models served as an important reminder of the bidirectional nature of effects between child externalising behaviours and maternal depression. Supported by previous research (Shaw, Gross, et al., 2009), the results of the competing bidirectional models provided consistent support for the significant main effect of child externalising behaviours on maternal depression. These results served as an important reminder that children, even very young children, are active agents in their environment with the potential to influence those around them in diverse ways (Dodge & Pettit, 2003; Gladstone, Boydell, & McKeever, 2006). Because of the dynamic nature of the relation between mother and child, the analyses in the following chapter tested a model of transactional effects between maternal depression and child externalising behaviours to investigate a theorised model of mutual influence.

7.2.3 Chapter Six findings

The aim of Chapter Six was to investigate mother-child interactions and potential bidirectional effects between maternal depression, positive parenting, harsh parenting, and child externalising behaviours. The theorized model was one in which elevated maternal depressive symptoms, higher levels of harsh parenting, and elevated child externalising behaviours might be mutually reinforcing over time (Patterson et al., 1998; Shaw, Gross, et al., 2009; Yates et al., 2010). The possible moderating effect of child inhibitory control was also explored, to investigate whether individual differences in this early capacity might influence the nature of associations (Eisenberg, Spinrad, et al., 2004; Kiff et al., 2011). The aim was to better understand how patterns of maladaptive mother-child interactions might become established and the ways through which such negatively reinforcing cycles might be avoided. From the resilience perspective, such information is important in terms of more effectively promoting more positive mother-child relationships over the long-term.

A comparison of categorical and continuous variables of baseline maternal depression found that maternal depression severity influenced later harsh parenting behaviours. Only the presence of maternal depressive symptoms above the validated cut off at age 2 predicted higher levels of harsh parenting at age 3, suggesting the impact of a more clear and sufficiently severe risk (Rutter, 2006). Furthermore, the results provided support for the relative strength of association between maternal depression and harsh parenting behaviours compared to positive parenting behaviours, given the non-significant association between maternal depression and positive parenting. In support of previous research, the results also indicated the salience of overtly negative and critical parenting behaviours compared to positive parenting behaviours on child externalising behaviours over time (Radke-Yarrow & Klimes-Dougan, 2002; Shaw et al., 2000). The inclusion of both parenting variables in the same model provided clarifying information regarding the strength of associations between different types of parenting behaviours and maternal depression, as well as child externalising behaviours.

Tested in a separate mediation model in Chapter Five, support was found for harsh parenting as a partial mediating mechanism of the relation between the presence of maternal depression at age 2 and child externalising behaviours at age 4. When accounting for positive parenting behaviours and bidirectional effects, the models in Chapter Six did not find support for a mediating effect of harsh parenting. The analyses of this chapter therefore provided clarifying information regarding how the harsh parenting behaviours of mothers with depression might operate to influence child behaviour development. Although harsh parenting was a significant intermediary factor, it did not appear to operate as a rigorous process through which differences in child externalising behaviours might be explained in the context of maternal depression.

The models in Chapter Six found support for the dynamic association between harsh parenting and child externalising behaviours from ages 3 through 8, with an initial impact of maternal

depression at age 2. The presence of maternal depression at age 2 predicted higher levels of harsh parenting at age 3, which in turn predicted higher levels of child externalising behaviour at age 4. Elevated levels of child externalising behaviours at age 4 then predicted higher levels of harsh parenting at age 5, which in turn predicted increased levels of teacher-reported child externalising behaviour at age 8. The dynamic interplay between mother and child appeared to be particularly related to the reciprocal nature of effects between child externalising behaviour and harsh parenting but not positive parenting. In line with previous research (Snyder et al., 2005), the effects appeared to carry through from the home to significantly predict child behaviour functioning reported by the teacher at school.

The analysis of moderating effects of child inhibitory control highlighted that the bidirectional associations between maternal depression, harsh parenting, and child externalising behaviour changed depending on the child's early ability to self-regulate. Building on previous evidence for children and parents in general (Kiff et al., 2011), children who were better able to self-regulate seemed to elicit less harsh parenting behaviours compared to children with poorer self-regulation. Decreased harsh parenting predicted lower maternal depressive symptoms and lower child externalising behaviour the following year. Importantly, child externalising behaviour no longer significantly influenced harsh parenting the following year when accounting for the moderating effect of child inhibitory control. Given the resilience focus of this thesis, the effect of child inhibitory control on the establishment of negative patterns of mother-child interactions was noteworthy. For children of mothers with depression, the individual capacity to self-regulate in early childhood appeared to promote more adaptive behaviours particularly through effects on harsh parenting behaviour. Children who were better able to self-regulate from as early as 2 years of age appeared to reduce the negative effects of maternal depression at age 2 on harsh parenting at age 3, and their externalising behaviours at age 4 no longer had an impact on harsh parenting at age 5.

The results highlighted the dynamic, mutually reinforcing interplay between maternal depression, harsh parenting and child externalising behaviours, and the potential impact of maternal depression severity on the establishment of negative pattern of mother-child interaction (Shaw, Gross, et al., 2009). Although harsh parenting did not operate as a significant process through which maternal depression influenced child externalising behaviours, the results indicated the role of harsh parenting as an intermediary factor of reciprocal influence with child externalising behaviours and maternal depression. Individual differences in inhibitory control also pointed to the moderating effect of this capacity in early development, in terms of reducing the risk that mothers with depression engaged in harsh parenting behaviours with their young children (Kiff et al., 2011).

7.3 Limitations

In considering the results and their contribution to the current evidence, it is important to be aware of the limitations of this thesis. There are measurement and analytic limitations, in terms of inconsistent time points, differences in operationalization of constructs between chapters, and shared method variance. Despite the explicit focus on maternal depression and the dynamic nature of the mother-child relationship, the lack of inclusion of co-parent effects on both the mother and the child limits a more broad understanding of these relationship dynamics. The higher-risk nature of the sample limits the generalizability of the findings, as does the specific cultural setting of American communities within which the families live. A focus on developmentally salient environmental mechanisms directed the focus towards parenting behaviours and child self-regulation. Other important factors however, such as neurobiological mechanisms and genetics, remain unaccounted for. Both significant and non-significant results of this thesis provide valuable information concerning the nature of associations between specific factors in early child development, but it is important to be mindful of the various factors that limit the interpretation of these findings.

7.3.1 Inconsistent time points and operationalization of constructs between chapters

The models in Chapters Five and Six are limited by inconsistent measurement time points between variables. There is a one year difference between variables from ages 2 through 5, but a two and a half year difference between variables from age 5 to age 7.5. Assessments were made in the Early Steps study on an annual basis except for when a funding review restricted data collection for children at age 6. Data collection resumed when the children were approximately 7.5 years of age. It is therefore difficult to determine whether non-significant effects between the ages of 5 and 7.5 represent a lack of actual association or if the variables are perhaps more proximally associated in time. For example, in the mediation models tested in Chapter Five, harsh parenting at age 3 significantly predicted child externalising behaviours at age 4 but harsh parenting at age 5 did not significantly predict child externalising behaviours at age 7.5. The effect of harsh parenting at age 5 approached significance (p = .087), suggesting that perhaps if child externalising behaviours had been measured the following year a significant effect might have been found.

Across the chapters of this thesis, the synthesis of results is limited by differences in the operationalization of maternal depression. In Chapter Four, maternal depression was measured categorically as the presence of depressive symptoms above the validated cut-off at both child ages 2 and 3, and continuously as mean depressive symptoms for ages 2 and 3. In Chapters Five and Six however, maternal depression was measured categorically and continuously at single time points. The decision to do so was primarily motivated by the aims of the research questions. Chapter Four was interested in predictors of behavioural resilience, and defined a more severe criterion of maternal depression risk to investigate risk-specific effects. Chapters Five and Six investigated mediating effects of parenting behaviours and moderating effects of child inhibitory control through the use of path analysis. To conduct rigorous analyses of mediating effects, it is important for constructs to be separated over time.

Furthermore, to investigate the dynamic interplay between constructs in longitudinal models of cross-lagged effects, the use of variables at single time points is more appropriate. Despite the inconsistency of operationalization of maternal depression, the analytic strategy of each chapter was selected according to the specific research questions.

7.3.2 Shared method variance of maternal reports

It is necessary to be mindful of the shared method variance between maternal depression and child externalising behaviours, given that mothers self-reported their depressive symptoms and reported on the externalising behaviours of their children. Meta-analytic studies highlight that there is generally low agreement between different informant reports of child behaviour, suggesting the importance of including observational data and reports from multiple informants (Achenbach, 2006). In this thesis, it was decided that alternate caregiver reports would be used for the measure of child self-regulation rather than child externalising behaviours. One reason for this is because in Chapter Four, mothers' self-reports of depressive symptoms are measured at the same time point as reports of child self-regulation but not child externalising behaviours. It therefore seemed more important that an alternate informant report on child self-regulation. Furthermore, because the relationship of the alternate caregiver to the child is variable, including aunts and grandmothers as well as biological fathers, it seemed more important that the primary outcome measure be reported by a consistent group of responders who were similarly related to the child.

The possible influence of a depressive bias on reports of child externalising behaviours has been previously supported (De Los Reyes & Kazdin, 2005; Müller, Achtergarde, & Furniss, 2011; Najman et al., 2001). For example, mothers with depression and/or anxiety reported higher incidence of youth behaviour problems than mentally healthy mothers or the youths themselves (Najman et al., 2000). Despite their longitudinal study design, significant findings were reported only for current maternal mental health impairment (Najman et al., 2000).

Consideration of the depressive bias is particularly relevant to the analyses in Chapter Six, when maternal depression and child behaviour are included in the models at concurrent time points. As previously mentioned, the variability of alternate caregiver relationships to the child was a factor in deciding to utilise maternal reports. The substantially smaller sample size of alternate caregiver reports was another consideration, such that maternal reports offered greater analytic power. Furthermore, despite the evidence in support of the depressive bias there is also conflicting findings concerning child externalising behaviours. In a sample of mothers and children aged 6 to 12, significant results between maternal psychopathology and internalising problems were found, but results were low to non-significant for externalising behaviours (Kroes et al., 2003). Including alternate informant reports, it was also found that higher levels of informant neuroticism were related to higher ratings of child behaviour problems reported by professionals but not by biological mothers (Kroes, Veerman, & De Bruyn, 2005). Nevertheless, it is important to be aware of the potential issues concerning maternal reports made by mothers with more elevated depressive symptoms, as well as the impact of shared method variance. Noting these concerns, it was decided that maternal reports represented a more consistent and well-powered report of child externalising behaviours.

7.3.3 Conceptual and measurement overlap between child externalising behaviours and child inhibitory control

Concern regarding the potential overlap between child externalising behaviours and inhibitory control was discussed in Chapter Four but is briefly reiterated here. Particularly at such an early developmental stage, the issue was raised that child externalising behaviours and child inhibitory control may not represent sufficiently distinct constructs. Externalising behaviours were measured using maternal reports on the CBCL, which includes attention problems and oppositional or aggressive behaviours, as well as the corresponding disorders of Attention-

Deficit Hyperactivity Disorder (ADHD) and Oppositional Defiant Disorder (ODD) (Achenbach & Rescorla, 2000; F. Gardner & Shaw, 2008; Lahey et al., 1992). At age 5, measurement of the broad-band Externalising factor also includes rule-breaking behaviours (Achenbach et al., 1991). Inhibitory control was measured using alternate caregiver reports on a subscale of the CBQ (Rothbart et al., 2001) and focuses particularly on child inhibitory control as part of the broader domain of effortful control. According to Rothbart, effortful control is defined as ‘‘the ability to inhibit a dominant response to perform a subdominant response’’(Rothbart & Bates, 2007, p. 137), and includes attentional control and activation or inhibitory control.

Although the constructs are theoretically different, items on both measures were compared to investigate measurement overlap, particularly in the attention domain. Only one item from the CBCL attention domain (“Can’t sit still or restless “) coincided with an item from the CBQ Inhibitory Control subscale (“Has trouble sitting still when s/he is told to”), although the inclusion of a directive in the latter is noted. Of the 24 items included in the CBCL measure of child externalising behaviours, 19 items are concerned with aggressive, oppositional, or rule-breaking behaviours (e.g., “Angry moods”, “Gets in many fights”, “Disobedient”, “Selfish or won’t share”). These items address notably different child behaviours than the 13 items included in the measure of CBQ measure of inhibitory control (e.g., “Is good at following directions”, “Is usually able to resist temptation when told s/he is not supposed to do something”, “Can lower his/her voice when asked to do so”). The majority of items on both measures are concerned with distinctly different child behaviours, noting as well that constructs were reported at different time points and by different informants. To more fully address the potential measurement overlap, replication of significant findings with multiple informant reports or observed measures of child behaviour and self-regulation would strengthen the validity of results.

7.3.4 Lack of paternal depression and effects

This thesis explicitly focused on child behaviour outcomes in the context of maternal depression. It was noted that despite being less common, paternal depression is also an important factor associated with an increased risk of child behaviour problems, particularly for boys (Ramchandani et al., 2005). Unfortunately, the limited number of biological fathers compared to biological mothers precluded the investigation of effects of parental depression more broadly on child externalising behaviours. Furthermore, the possibility that mechanisms might differ between mothers and fathers with depression was an important consideration that influenced the decision to focus primarily on mothers with depression. Beyond the effects of depression, the influential role of the father more generally within the family is an important consideration. Support has been found for both positive and negative effects of the father's relationship with the mother, in terms of providing positive support for mothers with depression but also potentially exacerbating depressive symptoms through their own mental health concerns or antisocial behaviours (Conrad & Hammen, 1993; Goodman & Gotlib, 1999). Similarly, there is a diversity of potential father effects on the child, again in terms of either supporting more positive child development or conferring additional risk (Brennan et al., 2003; Elgar et al., 2007).

From a resilience perspective, the role of the father in supporting the mother's mental health and potentially buffering the child from adverse effects is an important consideration. The analysis of the potentially diverse ways in which a father might be influencing the dynamics within the family was beyond the scope of this thesis. It is clearly not possible to account for the multitude of complex dynamics occurring within a family. For example, there was a substantial number of grandmothers in the role of alternate caregivers in this study, however their role in influencing both mother and child is also unaccounted for. The focus of this thesis was restricted to maternal effects, to specifically explore the dynamic nature of associations

between maternal depression, maternal parenting behaviours, and child externalising behaviours. The acknowledgement is made however that in choosing this focus, there are multiple potentially influential effects of the father as well as other family members that are not considered. To more comprehensively explore those processes that contribute to the positive behaviour development of children in the context of parental depression, additional factors would need to be considered. It would be interesting to investigate whether a similar pattern of associations would emerge in the context of paternal depression, as well as the extent to which the patterns in this thesis might change depending on characteristics or behaviours of the father.

7.3.5 Unaccounted for genetic risk and biologically-based effects

A clear limitation of this thesis is the lack of inclusion of shared genetic risk and biologically-based effects (Goodman & Gotlib, 1999; Rutter, 2003; Seifer, 2003). Given the investigation of effects of maternal depression on biological offspring, heritability is inevitably implicated (Hammen, 2005; Radke-Yarrow & Klimes-Dougan, 2002). Previous research has found support for higher heritability rates for clinical levels compared to subclinical levels of maternal depression. When considering the influence of heritability of depression however, the issue is further complicated by the possibility that environmental factors themselves may also be heritable (Goodman & Gotlib, 1999). Currently the evidence is unclear on the processes through which heritability might mediate the association between maternal depression and child outcome, and despite the importance of such processes, these are beyond the scope of this thesis. To try to minimise the potentially diverse impact of genetic and heritability effects, the sample was restricted to biological mothers.

Despite the significant findings of this thesis, the results also highlight the substantial amount of unaccounted for variance in child externalising behaviours. In Chapter Four, the full linear regression including intervention, poverty, maternal education, child gender and race,

depressive symptom severity, positive parenting, harsh parenting and child inhibitory control, accounted for only 26% of the variance in externalising behaviours for children of mothers with depression. Clearly there are other important factors and processes involved in explaining why some children of mothers with depression develop more positive behaviours than others (Kim-Cohen, Moffitt, Taylor, Pawlby, & Caspi, 2005). Previous research suggested the importance of biological stress response systems and neuro-regulatory processes (Masten et al., 1990; Yates et al., 2003). Differences in caregiver-child attachment, child temperament more broadly, and social support have also been suggested as important factors (Bates et al., 1985; Shaw et al., 2003). This thesis certainly does not claim to account for all factors, nor does it presume to account for the most strongly predictive factors. In exploring mechanisms of behavioural resilience for young children of mothers with depression, the aim was to test specific processes with strong empirical evidence supporting their relevance in early childhood. It was with this aim in mind that parenting behaviours and child self-regulation became the primary focus. Drawing from theory and empirical research, parsimonious models were analysed in favour of more broad and complex models attempting to account for a greater number of factors. Despite their increased breadth, such models can be difficult to interpret in terms of the complexity of ways through which factors are associated.

7.3.6 Generalizability of results

It is important to be mindful that the sample analysed in this thesis is a higher risk group of families. These are families who were experiencing multiple difficulties in multiple domains, not simply at the level of the child or the parent, but also within the family and the community more broadly. Of the full Early Steps sample of 731 families, more than two thirds of families had an annual income of less than $20,000 (USD) at baseline assessment. Nevertheless, maternal depression still contributed a unique predictive effect to the development of child externalising behaviours, suggesting that even in higher poverty communities there is

additional risk conferred specifically by maternal mental health. The effect of maternal depression was not simply washed out by the other risk factors, but contributed unique explanatory power. Despite the predictive contribution of maternal depression, the high-risk nature of the sample limits the generalizability of the findings. It is not known whether positive parenting will continue to operate as a general predictor of more positive child behaviours across a more broadly representative sample of families. Perhaps the effects of positive parenting are particularly salient in the context of minimal risk. Additionally, perhaps the risk-specific effects of harsh parenting behaviours are particularly relevant to a higher risk sample. Although the results may not generalise to an average community population, significant effects in a higher risk group do have important implications for targeted intervention strategies. The Early Steps sample consists of families that had been identified as at-risk for child conduct problems. The significant results of this thesis therefore have implications for those families that prevention and early intervention efforts would be most interested in targeting.

Participants in the Early Steps study represent an ethnically diverse sample of families recruited from three different sites in the United States. Study sites were selected to include an urban, suburban and rural setting, represented by Pittsburgh, Eugene, and Charlottesville, respectively. Families are ethnically diverse, such that approximately one half of primary caregivers are Caucasian, over a quarter are African American, and the remaining quarter are Hispanic American, biracial or self-reported "Other" (e.g., American Indian, Native Hawaiian). Despite the diversity of ethnicities and communities represented by the sample, the results of this thesis are nevertheless limited to North American culture. Although findings might reasonably be assumed to generalise to similar settings, such as families living in Western Europe or Australia, it may not be the case that findings also hold within cultures that have notably different perceptions of key constructs. For example, perspectives on what constitutes appropriate parenting behaviours or normative child behaviours may differ by culture (e.g.,

Chen, Dong, & Zhou, 1997; Julian, McKenry, & McKelvey, 1994; Parke & Buriel, 2007). Furthermore, in the context of resilience, different cultures have their own understandings of resilience and well-being that may not coincide with the definitions of this thesis (Kirmayer, Dandeneau, Marshall, Phillips, & Williamson, 2012). Early Steps families therefore represent a high-risk group within a particular cultural setting and the findings of this thesis must bear this consideration in mind, in terms of the extent to which the findings may or may not generalize across diverse cultural settings.

7.4 Contribution of findings

The results of this thesis contribute to the field of resilience research in terms of pointing to certain key predictors and mechanisms of behaviour development for young children of mothers with depression. Overall, the results highlight the importance of low levels of harsh parenting behaviours and better child inhibitory control. Between ages 2 and 5, harsh parenting behaviours appear to be detrimental to the behaviour development of children particularly in the context of maternal depression. Furthermore, the more frequent use of such parenting behaviours may be a potential process through which maternal depression influences child behaviours in early development. The continued use of harsh parenting behaviours seem to be implicated in a mutually reinforcing pattern of negative mother-child interactions, in which harsh parenting and child externalising behaviours each increase the risk for the other over time (Shaw, Gross, et al., 2009; Yates et al., 2003). Transactional effects appear to not only have relevance within the home environment, but seem to carry through to influence child behaviour functioning reported by the teacher (Snyder et al., 2005).

The risk for the establishment of these negatively reinforcing patterns of behaviour appears to be influenced by individual differences in the child's early capacity to self-regulate. Not only do higher levels of inhibitory control predict lower levels of externalising behaviours for children of mothers with depression, but inhibitory control was found to moderate the relation

between maternal depression and harsh parenting between the ages of 2 and 3. From an early age, those children who are better able to self-regulate are less likely to experience harsh parenting behaviours than those children who are less capable of managing and inhibiting their behaviours. The results highlight that both the mother and the child play an important role in influencing processes of resilience, suggesting both the dynamic and potentially reciprocal nature of resilience over time.

7.4.1 Dimensional conceptualisation of resilience

The results of this thesis contribute to the dimensional understanding of resilience. Previous resilience research most often adopts a categorical approach to understanding risk and adaptation, with the investigation of the presence of a particular risk and the presence of a defined adaptive outcome. This thesis is unique in its use of both a categorical and a continuous variable approach to the investigation of resilience-related questions, the latter of which enabled the exploration of how the full range in risk severity impacts the full spectrum of observed variability in outcome. As discussed more fully in Chapter Four, categorical and continuous variable approaches each have their strengths and limitations. The inclusion of both approaches within this thesis uniquely enabled a more in-depth exploration of how the operationalization of risk and adaptation can importantly impact the findings and their interpretation in light of the resilience framework.

The categorical variable approach provided a clearer operationalization of resilience that was more readily validated and communicated through specific terminology (Jaffee et al., 2007). The validation section of Chapter Four was capable of exploring differences in child functioning between groups of children because of the four categories created by the presence or absence of risk and adaptation (Zucker et al., 2003). It was therefore possible to explore how children who were risk-exposed but doing well behaviourally compared to other children. A limitation of the categorical approach however is the use of cut-off scores to create these groups, such

that the difference of one point on a scale can mean the difference between a child falling into the “resilient” group rather than the “vulnerable” group. Despite the comparisons facilitated by the categorical variable approach, the necessity of establishing and utilising cut-offs scores involves subjective decision-making. There is thus considerable variability across studies, in terms of how a “sufficiently severe risk” and “good enough” functioning are defined. The continuous variable approach avoids the need to establish such criteria using subjective cut-off scores by exploring risk and adaptation dimensionally.

In Chapter Four, the investigation of both categorical and continuous variable analyses was important in terms of understanding the effect of harsh parenting on child externalising behaviours. Within the group of children of mothers with depression, strictly adopting a categorical variable approach would have failed to find the main effect of harsh parenting on the variation in child externalising behaviours. Although lower levels of harsh parenting did not predict the presence of developmentally normative child externalising behaviours, they did account for a significant proportion of the variability in these behaviours. Importantly, a failure to dimensionally explore risk and behavioural adaptation would have overlooked the interaction effect between harsh parenting and depression in predicting the variance in child externalising behaviours. In terms of explaining why some children of mothers with depression develop more positive behaviours than others, harsh parenting is an important factor that is particularly relevant to the situation of risk (Roosa, 2000). Given the broad interest in promoting more positive behaviour functioning for these young children, the continuous variable approach provides valuable information that helps to explain why some children may develop more positive behaviours than others.

Beyond the risk-specific effects that were found for harsh parenting behaviours, the analysis of both the categorical and continuous variable approaches also pointed to the importance of risk severity. In the exploration of indirect effects in Chapter Five, only when maternal depression

was measured as a categorical variable did harsh parenting operate as a process through which maternal depression influenced child externalising behaviours. As emphasised within the resilience literature (Rutter, 2006), the results provide support for the need to investigate a sufficiently severe risk and the impact of risk severity on intermediary processes. Although harsh parenting did not operate as a mediating mechanism when also accounting for positive parenting and reciprocal effects in Chapter Six, differences between the categorical and continuous models again highlighted the role of depression severity on harsh parenting. A pattern of mutual influence emerged between harsh parenting and child externalising behaviours, and the presence of depressive symptoms influenced this cycle by increasing the likelihood of harsh parenting behaviours. Maternal depressive symptoms of a particular severity therefore seem to play a role in the initial formative stages of this cycle from age 2, and increase the risk for the establishment of a negative pattern of mother-child interaction over time.

7.4.2 Reciprocal conceptualisation of resilience

Not only is the conceptualisation of resilience as a dimensional and dynamic process emphasised (Egeland et al., 1993; Luthar, 2003), but resilience as a potentially reciprocal process in the context of maternal depression and child behaviour development. The purpose of Chapter Six was to investigate reciprocal processes within the mother-child relationship that might explain the variation in externalising behaviours for young children of mothers with depression (Goodman & Gotlib, 1999; Rutter, 2012). The bidirectional nature of effects certainly does not pertain to all situations of risk. However, previous research and the results from Chapter Six suggest that reciprocal effects play an important role in the association between maternal depression, child externalising behaviours, and the intermediary factor of harsh parenting. Although the focus is on promoting more positive child behaviours, strictly

analysing unidirectional models of influence fails to acknowledge that the variability in child behaviours themselves have an important effect on maternal depression and harsh parenting.

As discussed in Chapter Six, the risk factor of maternal depression in early childhood is not a static risk preceding a particular outcome at a discrete point in time. Rather, the interpersonal nature of maternal depression means that it is susceptible to influence by factors including individual child characteristics and behaviours (Hammen, 2003a). Furthermore, the outcome of child behaviour is clearly not an isolated incident that follows an experience of risk. The young child of a mother with depression experiences the effects of maternal mental health on an ongoing basis, whilst at the same time their behaviours reflect an ongoing process of both influencing and being influenced by their mother and their environment more broadly (Dumas et al., 1995; Elgar et al., 2004; Pardini et al., 2008). To support more positive child behaviour development therefore also involves an ongoing process, and one in which the child's more successful management of risk is supported not only by individual characteristics but by the behaviours of their caregiver. Through the promotion of adaptive child behaviours over time, the child can influence the nature of ensuing risk and intermediary factors, capturing the dynamic as well as potentially reciprocal nature of resilience. With the analysis of transactional effects between mother and child, the results from Chapter Six highlight that both mother and child are active agents and as such, both play an active, on-going role in influencing the experience of risk and processes of resilience over time.

7.4.3 Intervention implications

The purpose of this thesis was to try to better understand mechanisms of behavioural resilience in early childhood, and in doing so, has the potential to inform early intervention and prevention research (Luthar et al., 2000a). Throughout this thesis, the results consistently point to the detrimental impact of higher levels of harsh parenting behaviours and the positive role of more effective child inhibitory control in the context of maternal depression. From the

intervention perspective, results emphasise that particularly for mothers with depression who have young children, there is a need to reduce harsh parenting behaviours to promote more positive child behaviour development. The results from Chapter Four also suggest that for young children in general, including those who have mothers with depression, more effective inhibitory control is an important child-level resource. Both parenting and child self-regulation have been shown to be amenable to change through intervention efforts (e.g. Dishion et al., 2008; C. E. Izard et al., 2004; Scott et al., 2010; Webster-Stratton et al., 2008). The evidence from this thesis indicates that early intervention and prevention research should focus on evaluating the impact of reduced harsh parenting behaviours specifically by mothers with depression and improving early self-regulation of their children.

The longitudinal design provides the framework within which to consider processes over time and from an early developmental stage (Luthar & Bidwell Zelazo, 2003; Seifer, 2003). Considering factors that are implicated in the promotion of more positive child behaviour development, the results emphasise that intervention efforts need to begin from as early as two years of age. During that time, basic systems are in their formative developmental stages and may be particularly susceptible to risk as well as amenable to change (Masten, 2001; Sameroff et al., 2003). The results also highlight that the negative pattern of reciprocal influence between harsh parenting and child externalising behaviours appears to become established early in childhood. To avoid the initial onset of such patterns of caregiver-child behaviour necessitates prevention efforts aimed at supporting mothers in their parenting behaviours, particularly in terms of avoiding the habitual use of harsh parenting behaviours. Such behaviours can become increasingly difficult to change over time, in the absence of alternative parenting strategies and with the reinforcing effects of child behaviour problems (Shaw et al., 2000; Webster-Stratton, Reid, & Hammond, 2001). Given the impact of maternal depression at age 2 on these behaviours at age 3 prevention efforts need to be reaching mothers when their children are still very young.

The results of this thesis are in contrast to the family-based intervention for children and mothers with depression developed by Riley and colleagues (2008), which was explicitly termed “resilience-promoting”. The theoretical rationale supporting their intervention seems to draw from the evidence more generally, in terms of factors that predict more positive behaviours for children overall but not necessarily for children of mothers with depression. In their intervention, it was thus assumed that more positive child outcomes could be promoted through more supportive and responsive parenting. The findings were largely disappointing, with minimal effects (Riley et al., 2008). There is substantial evidence however from previous research of intervention effects on improved parenting behaviours and reduced child behaviour problems (e.g., F. Gardner, Burton, & Klimes, 2006; Hutchings et al., 2007; Scott et al., 2010; Webster-Stratton et al., 2001). The results of this thesis highlight that whilst positive parenting predicts lower levels of externalising behaviours for children in general, it may not be predictive for children of mothers with depression. Instead, a differential effect of harsh parenting was found, such that harsh parenting behaviours were detrimental to child behaviour development particularly in the context of mothers with depression.

The risk-specific results of this thesis provide valuable information for intervention research targeting mothers with depression. Rather than improving parenting more broadly, the results point to the need for reducing levels of harsh parenting (e.g., blaming or being critical of the child, frequently displaying anger and annoyance). By investigating those processes that are particularly relevant given the situation of risk (Roosa, 2000), resilience research provides evidence to better inform early intervention and prevention efforts aimed at supporting positive development within specific high-risk groups. In the context of young children of mothers with depression, this thesis directs the focus towards reduced harsh parenting behaviours in particular.

A current shortcoming in the provision of adult mental health services is that they do not routinely collect information on parenting status nor do they address individuals in their role as parents (Gladstone et al., 2006). This is the case despite the potential adverse effects of mental health problems on the mother as well as on the quality of her relationships and the development of her children (Downey & Coyne, 1990; Goodman et al., 2011; Hammen, 2003a). This thesis provides further support for the argument made by Gladstone (2006), that there needs to be better coordination and liaison between adult mental health services and child agencies. Improved alignment of services for both parents and children would serve to more fully address the nature of dynamics within the family as a whole, acknowledging that parents and children each play an active role in influencing each other. To better support more positive behaviour development of children of mothers with depression requires the support not only of child-level capacities such as self-regulation, but well-targeted support for the mother in her role as caregiver. To improve service delivery for mothers with depression also requires the acknowledgement that the more difficult behaviours of her child could be having an important impact on her functioning. The argument is made in favour of supporting mothers and their young children through improved coordination of intervention efforts, addressing individual mother and child behaviours and capacities more comprehensively within the dynamic mother-child relationship.

7.5 Suggestions for future research

Overall the results of this thesis provide support for the effect of harsh parenting behaviours specifically for mothers with depression. The results of this thesis did not find a differentially predictive effect of positive parenting on child externalising behaviours for mothers with depression compared to other mothers, nor was a significant main effect found specifically for children of mothers with depression. Somewhat in contrast to these findings, previous research found that maternal warmth interacted with maternal depression to predict outcomes in adolescence (Brennan et al., 2003). Although maternal warmth is not identical to

positive parenting behaviours measured in this thesis, there is the suggestion that more positive parenting strategies might nevertheless play a role, potentially when the child is older. Extending the analyses of this thesis would be a useful next step, to investigate whether general or risk-specific factors of parenting change over the course of child development. It may be that positive parenting plays a particularly important role in the adolescent years, whereas harsh parenting is more relevant in early childhood. Considering potential effects of child gender could also provide useful information on whether any such differences in developmental timing differ between boys and girls.

As mentioned in the limitations section above, the inconsistent time points in the models of this thesis challenge the interpretation of results. Replicating the analyses with annually reported data could highlight effects that might operate more proximally in time, such as positive parenting. As emphasised in the literature, it is important to consider developmentally salient processes (Luthar & Bidwell Zelazo, 2003; Masten, 2001). Extending the models in time would therefore also need to acknowledge processes relevant to the adolescent years, for example the increasingly important role of peers on externalising behaviours. Future research could address not only the changing nature of parenting effects over time, but could also elucidate the emergence of additional processes implicated in the promotion of more positive behaviour development from early childhood through to late adolescence.

Although the findings from Chapter Four emphasise the risk-specific effect of harsh parenting, this thesis does not answer the question of why mothers with depression are more likely to engage in harsh parenting behaviours than other mothers. Appendix C of this thesis explored this question, to try to understand what it might be more specifically about the experience of depression that makes a mother more susceptible to the use of such behaviours. Given the symptom profile of depression and the types of behaviours described as harsh parenting, the irritability dimension of depression was expected to influence the more frequent use of such

behaviours. However, exploratory analyses of Appendix C did not find support for this association. Rather, results suggested that the hopelessness dimension of depression, including feeling that life had been a failure and lacking hope for the future, might be more specifically relevant to the use of parenting behaviours such as blaming or being critical of the child. The patterns of association tested in Appendix C were exploratory and the results were only suggestive of potential links between maternal depression and harsh parenting within this high-risk sample. A better understanding of why it might be that mothers with depression engage in harsh parenting behaviours would allow intervention efforts to target the causal processes underlying this association. For example, addressing the sense of failure and lack of hope would not only address important symptoms of the mother's experience of depression but could also reduce her tendency to be more critical and blame her child.

As discussed in the limitations section above, the lack of paternal depression data precluded the investigation of child behaviour development in the context of a father with depression. Future research could provide additional information concerning the similarity or dissimilarity of processes between maternal depression and paternal depression (Cummings et al., 2005; Elgar et al., 2007). Although maternal depression interacted with harsh parenting but not positive parenting to predict child externalising behaviours, perhaps this is not necessarily the case for the parenting behaviours of fathers. The investigation of father effects more generally could also provide valuable insight, in terms of either the positive or negative effects that a father might have on the nature of associations. Perhaps the positive presence of a supportive partner and father plays a role in mitigating the effects of maternal psychopathology on child behaviour development. Alternatively, the presence of a partner and father with elevated symptoms of psychopathology or antisocial behaviours might further exacerbate maternal mental health and problem child behaviours. Future research could advance the understanding of how best to promote more positive child development by more

comprehensively exploring the nature of dynamics within a family, addressing not only the diversity of maternal effects but paternal effects as well.

7.6 Final note

The literature cautions against framing the child as a "victim of parent problems", encouraging instead the understanding of children as "active participants in the lives of the family"(Gladstone et al., 2006). In line with the literature, this thesis arguably serves as a reminder of the agency of both mothers and children, and the positive impact that each can have on the other. Depression is frequently experienced by women, often on a recurring basis, with the potential for adverse effects on the mother, child, and family environment (Avenevoli & Merikangas, 2006; Goodman et al., 2011; Keller et al., 1992). Despite this increased risk, the variability in parenting behaviours and child development highlights that not all mothers with depression will inevitably engage in higher levels of harsh parenting behaviours and not all children will develop behaviour problems (Brennan et al., 2003; Lovejoy et al., 2000; Seifer, 2003). Those mothers with depression who manage to refrain from the more frequent use of critical, angry or rejecting parenting behaviours play a key role in increasing the likelihood of more positive behaviour development for their children. Furthermore, those children of mothers with depression who are better able to respond to their environment, with more effective management and inhibition of their behaviours, also play an important role in reducing the elicitation of harsh parenting behaviours and increasing the likelihood of more positive behaviour development (Kiff et al., 2011). Given the known capacity for change in both parenting behaviours and child self-regulation (e.g., C. E. Izard et al., 2004; Reading, 2009; Webster-Stratton et al., 2008), there is much that can be done to support more adaptive developmental systems within the caregiver-child relationship from early childhood, to increase the likelihood of positive outcomes for both children and mothers over time.

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Appendices

Appendix A: The Family Check-Up (FCU) Intervention

This thesis does not analyse intervention effects and controls for the intervention condition in all analyses. A brief description of the intervention rationale and procedures are presented below for additional information.

A.1 Intervention rationale

It is well-established in the research literature that parenting practices are central to the early onset and maintenance of child problem behaviours. To reduce this risk, it is argued that intervention efforts need to be extended beyond telling parents what *not* to do, to promote positive parenting practices (Dishion et al., 2008). By improving parents' use of positive behaviour support strategies, parents are better equipped to more effectively manage and prevent child behaviour problems. Further, engaging parents more positively with their children may serve to increase the frequency and quality of parent-child interactions, such as conversation and play, which are instrumental in the development of language and self-regulation (Dishion et al., 2008). It may also serve to decrease the likelihood that coercive parent-child interactions will escalate over time, which can impede later intervention efforts.

The FCU therefore targets disrupted and poorly skilled family management practices in early childhood and focuses on promoting positive parenting strategies. Those parenting factors that are found to comprise parenting quality, and are related to the development of persistent child problem behaviours, are of particular interest. These family practices are targeted within a family-centred intervention framework, which represents a shift from treatment models to a prevention approach and emphasises the proactive engagement of families in intervention efforts across settings.

A.2 The Family Check-Up (FCU)

The FCU was developed by Dishion and Kavanagh (2003) from the work of Miller and Rollnick (2002) on a programme called the Drinkers Check-Up. This programme utilised motivational interviewing techniques combined with assessment information to motivate change through client-therapist interactions. The FCU similarly emphasises families' motivation to change and has two key features. First, it is assessment driven and tailored to the needs of the child and family, with information gathered from multiple sources. Second, the intervention is typically brief, generally including three sessions as follows:

Session 1: The therapist meets with parents to explore perceptions and concerns regarding their family life and the child's behaviour.
Session 2: A comprehensive assessment is completed of the family, including videotaped observations of parent-child interactions in the home.
Session 3: The therapist provides a structured feedback session drawing from the assessment results, emphasising parenting and family strengths whilst highlighting possible areas of change.

The FCU is motivational in its approach by stimulating the family to recognise and address important family problems either on their own or through the facilitated support of the therapist. The intervention is therefore tailored to the self-identified needs of the family and capitalises on the family's desire and willingness to change. The FCU was developed to meet a wide range of need on a large-scale, to maximise the programme's reach and effectiveness at improving child behaviour problems across settings. The tailored, adaptive and motivational approach produces the relatively brief nature of the intervention and reflects the public health focus of the intervention design.

A.3 Intervention protocol

The FCU typically includes 3 meetings: initial contact, assessment, and feedback. In the Early Steps trial, family assessments were completed before random assignment to prevent differential drop out and to optimise internal validity. Therefore the intervention protocol was: baseline assessment, randomisation, initial interview, feedback session, and possible follow-up sessions. In the first meeting (described below), the family assessment is completed by research staff. Families engage in a range of in-home videotaped parent-child interaction tasks and the primary caregiver completes questionnaires pertaining to personal, child and family functioning. The second session is the initial interview of the family by the parent consultant. The parents' concerns are explored, with an emphasis on the current family issues that are most relevant to the child's functioning. The third session involves feedback from the parent consultant, who presents a summary of the assessment results using motivational interviewing strategies. The main goal is to explore the parents' willingness to change problematic parenting strategies, to identify and support existing parent strengths and to identify those services most appropriate to meet the family's needs. Parents are then offered follow-up sessions that focus on promoting positive parenting strategies, and that address other family management concerns and contextual issues (e.g., child care resources, marital adjustment, house, etc).

The parent consultants were PhD and masters level service workers with no prior experience with the FCU but all had previous experience in family intervention. The consultants received training for 2.5-3 months before being certified by lead consultants who had been trained by the intervention developers (Dishion & Kavanagh, 2003; Dishion et al., 2008). Certification was established by reviewing video-taped recordings and certification reviews are made on an annual basis. To maintain consistency across the three intervention sites, cross-site case reviews are held weekly and a parent consultant meeting is convened annually.

To conduct the family assessment, the primary caregiver and target child are scheduled for a 2.5 hour home visit. The home visit begins with the child being introduced to a range of age-appropriate toys, and is given 15 minutes for play while the mother completes study questionnaires. This is followed by a 5 minute clean up task, a 5 minute delay of gratification task, four 3 minute teaching tasks (with the final one completed by the alternate caregiver if present), 4 minutes of free play, a second clean up task for 4 minutes, the presentation of two inhibition inducing toys, and finally a 20 minute meal preparation and lunch task. During the home visit, the staff member completes ratings of parent involvement with and supervision of their child. The same home-visit and observation protocol is repeated as ages 3 and 4 for both control and intervention groups. Families received $100 at age 2, $120 at age 3, $140 at age 4 assessments.

Appendix B: Constructing positive and harsh parenting variables using RACS coding scheme

The purpose of constructing the parenting variables is to develop cross-measure, multi-method constructs of positive parenting and harsh parenting at age 5 using the newly implemented Early Steps coding scheme (RACS). The aim is to develop theoretically sound measures of parenting that are also comparable to the age 3 measure analysed in this thesis, which use the previous Early Steps coding scheme (RPC). At the time of data analysis, RACS coded data were available at child ages 2 and 5. Each parenting construct included coder impression (COIMP) items from video-recorded tasks in the families' homes, coded using the RACS system, and items from interviewer reports on the HOME inventory. The process of developing both parenting constructs utilised a theoretically driven approach followed by exploratory and confirmatory factor analysis of age 2 and age 5 data.

B.1 Positive parenting

The positive parenting variable is conceptualised as a construct of "positive behaviour management". The items of interest therefore reflect those behaviours of the parent that provide positive structure and support for appropriate child behaviours. From the list of COIMP items on the RACS at child age 2, items were selected if they reflect the construct of a parent providing positive management of the child's behaviour, including proactive structuring of the situation, and appropriate and contingent "in the moment" response to the child. An initial pool of 11 items fit these criteria.

These 11 items were then subjected to exploratory factor analysis (EFA) using a randomly selected half of the Early Steps sample (n = 366). The EFA was conducted using Mplus 6. The results of the EFA suggest that 7 items loaded best onto a single factor, while the remaining 4 items cross-loaded between two other factors.

The 7 COIMP items that load onto one factor are (PC = Primary Caregiver, TC = Target Child):

1. PC uses directives that seem specific and clear to TC
2. PC sets limits without using aversive control
3. PC is appropriately contingent in responding to positive or compliant TC behaviour
4. PC communicates to TC in calm, simple, and clear terms
5. PC defines the situation so as to assure TCs interest, success and comfort
6. PC is mindful of TCs behaviour, whereabouts, activities, and feelings
7. PC uses verbal structuring to make the tasks manageable

These 7 items were then subjected to confirmatory factor analysis (CFA) using the other half of the Early Steps sample (n = 365). The CFA assessed item loadings onto one latent factor of positive parenting. The results suggest satisfactory model fit (*CFI* = .933*; TLI* = .899*; SRMR* = .042*; RMSEA* = .134), acceptable item loadings (*range* = .62-.83, *p*<.001*)* and inter-item correlations (*r* = .34-.64), and good reliability (Cronbach's alpha, α = .88).

The same 7 COIMP items at age 5 were then also subjected to a CFA to test construct reliability over time (n = 731). The results are comparable, although the alpha was somewhat lower (*CFI* = .951*; TLI* = .926*; SRMR* = .044*; RMSEA* = .107; loading range = .36-.88, *p*<.001*;* inter-item correlations, *r* = .26-.61*, p*<.01*;* α = .79).

Six items were selected from the HOME inventory, which also reflect the construct of positive behavior management. Three of these items make up the HOME involvement subscale, developed by the measure's developers (Bradley et al., 2001). Three further items were selected because of their theoretical relevance to the construct of positive parenting.
The 6 HOME items are:

1. PC keeps TC in visual range and looks often
2. PC talks to TC while doing household work
3. PC structures TC's play period

4. PC seemed in good control of TC
5. PC disciplines TC appropriately
6. PC has good problem solving skills

To create the multi-measure construct, the items within each of the two measures were summed, and the total scores were standardized and summed to create a composite measure of positive parenting. To assess construct validity, bivariate correlations were tested between the positive parenting composite and child outcomes known to correlate with other indicators of positive parenting (i.e., self-report measures, observed measures using the previous coding system). Child outcomes included measures of externalising behaviours from the Child Behaviour Checklist, reported by the primary caregiver at ages 2 through 7, as well as teacher reports at age 7. Correlations were in the expected direction and of an expected strength.

B.2 Harsh parenting

The harsh parenting construct is conceptualized to capture overt displays of actively harsh or negative behaviours of the parent towards their child. The items were therefore selected to reflect this definition, with a particular focus on behaviours that are actively harsh rather than disengaged or more passively negative. From the list of COIMP items at child age 2, an initial pool of 10 items was selected. This list of items was reduced to a total of 5 items through theoretically driven decisions to reduce redundancy and item overlap.

The 5 COIMP items are:

1. PC displays anger and frustration/annoyance with TC
2. PC makes statements indicating that TC is worthless
3. PC displays nonverbal expressions of disengagement to TC
4. PC to TC negative physical
5. PC to TC conflict or tension

These 5 items were subjected to CFA in Mplus 6. The results of the CFA suggest satisfactory model fit (*CFI* = .98*; TLI* = .95*; RMSEA* = .106; *SRMR* = .026), acceptable inter-item correlations (*r* = .43-.75), and an acceptable alpha (*α* = .86). The same five items from the age 5 COIMP were then also tested using CFA, to assess construct reliability over time. The age 5 results are similar to the age 2 results, with slightly lower inter-item correlations but a comparable alpha (CFA: CFI = .97 TLI = .919; RMSEA = .12; SRMR = .036; inter-item correlations, r = .34-.64; α = .88).

Four items from the HOME inventory at age 2 were selected as theoretically relevant to the construct of harsh parenting, in terms of addressing parenting behaviours that are actively harsh or negative.

The 4 HOME items are:

1. PC shouts at TC
2. PC expressed overt annoyance/hostility to TC
3. PC slaps or spanks TC during visit
4. PC scolds, criticises TC during visit

At age 5, the HOME inventory items change somewhat to reflect a measure of middle childhood. For positive parenting, the items of interest from age 2 to age 5 are identical. For harsh parenting however, the items of interest are worded somewhat differently, and one item in particular ("PC expressed overt annoyance/hostility to TC") is no longer present. Only 3 items of harsh parenting behaviours from the HOME were therefore included at age 5.

The 3 HOME items at age 5 are:

1. PC scolds/yells at/derogates TC more than once
2. PC uses physical restraint during visit
3. PC slaps or spanks TC during visit

In line with the positive parenting composite, to create the harsh parenting composite the items were summed within each measure, and the totals were standardised and summed. Bivariate correlations were then conducted between the harsh parenting composite and identical measures of child outcomes from the positive parenting analyses above. Correlations were in the expected direction and of an expected strength.

Appendix C: Exploratory follow-up analyses of the relation between harsh parenting, maternal depression and child externalising behaviour

C.1 Predicting harsh parenting and buffering its negative effects

To follow-up the interaction between maternal depression and harsh parenting, levels of harsh parenting were compared between the depressed and non-depressed groups of mothers. Harsh parenting was also compared within the group of mothers with depression, between the groups of children who did and did not exhibit externalising behaviours (i.e., between the resilient and vulnerable groups of children). The results of the t-test confirmed that mothers with depression engaged in significantly higher levels of harsh parenting than mothers without depression $t(493) = -3.23$, $p < .01$. A comparison of the levels of harsh parenting within the depressed group found no significant differences in harsh parenting between those children who did and did not exhibit externalising behaviours at age 5. The results indicate that mothers with depression engage in higher rates of harsh parenting behaviours, but that within the group of depressed mothers, resilient children have not simply been exposed to lower levels of harsh parenting compared to children in the vulnerable group. The results are in line with the findings from this chapter. Within the full sample there is a significant interaction between maternal depression (both categorical and continuous) and harsh parenting in predicting later child externalising behaviours (see Section 4.6.3). Within the group of mothers with depression, harsh parenting does not predict the presence or absence of externalising behaviours but does predict the variation in child externalising behaviours (see Section 4.6.2).

Two key questions emerged from these findings and are explored in the sections that follow:

1. Why do mothers with depression engage in significantly more harsh parenting behaviours than mothers without depression? In other words, what makes mothers with depression particularly susceptible to the use of harsh parenting behaviours?

2. Why are some children of mothers with depression more vulnerable to the effects of their mother's harsh parenting behaviours than other children?

C.1.1 Why do mothers with depression engage in significantly more harsh parenting behaviours than mothers without depression?

To address the first question, predictors of harsh parenting were explored in the group of mothers with depression (n = 149) and in the full sample (N = 554). To test whether any significant predictors were differentially predictive given the presence of maternal depression, significant predictors of harsh parenting in the full sample were followed up with a test for an interaction effect between the predictor and maternal depression. Of particular interest were the following predictors: baseline covariates, financial stress, relationship satisfaction, daily hassles, and general life satisfaction. Baseline covariates include intervention, poverty, maternal education, child gender, and child race. It was hypothesised that the additional stress of poverty might be an important factor involved in explaining why a mother with depression might be all the more susceptible to engaging in harsh parenting behaviours. It was hypothesised that increased relationship stress and dissatisfaction more generally might also predict increased harsh parenting behaviours.

C.1.1.2 Predictors of harsh parenting for mothers with depression (n = 149)

Within the group of mothers with depression (n = 149), none of the covariates predicted harsh parenting behaviours. Harsh parenting of mothers with depression does not appear to significantly differ by poverty, maternal education, child gender, or child race. Mean depressive symptoms also did not predict harsh parenting behaviours. The results suggest that the severity of depressive symptoms of mothers with depression is not directly predictive of levels of harsh parenting. Financial stress, relationship satisfaction, daily hassles, and general life satisfaction were not significant. Baseline child externalising behaviours and child inhibitory control were also not significant. Given that these are subgroup analyses (n = 149), it may be that the regressions were underpowered. Nevertheless, the results do not provide any further

indication as to why mothers with depression engage in higher levels of harsh parenting behaviours than mothers without depression.

C.1.1.3 Predictors of harsh parenting for mothers overall (N = 554)

Within the full sample of children and mothers, poverty and child gender significantly predicted harsh parenting behaviours (B = .29, SE = .086, p < .001; B = -.210, SE = .076, p < .01). Levels of harsh parenting were significantly higher for mothers who lived below the poverty line and for mothers of boys. Both poverty and gender were predictive over and above maternal depressive symptoms. To determine if poverty and child gender were particularly important given the presence of maternal depression, an interaction effect was tested. The results were not significant. Although poverty and child gender have a significant main effect on harsh parenting, they do not appear to predict harsh parenting behaviours any more specifically for mothers with depression. Of the other predictors of interest, only General Life Satisfaction predicted harsh parenting behaviours, such that lower General Life Satisfaction related to increased levels of harsh parenting. General Life Satisfaction remained significant over and above the baseline covariates as well as maternal depression (B = -.015, SE = .006, p < .01). It did not interact with maternal depression to predict harsh parenting. Decreased life satisfaction appears to relate to increased use of harsh parenting in mothers in general but not differentially for mothers with depression. Daily Hassles, Financial Stress, and Relationship Satisfaction did not significantly predict harsh parenting. Baseline child externalising behaviours and total problem behaviours were also non-significant.

Overall, the results suggest that mothers of boys, mothers who live below the poverty line, and mothers with lower life satisfaction are more likely to engage in harsh parenting behaviours. In a linear regression model predicting harsh parenting behaviours at age 3, these three baseline predictors were significant over and above the covariates. Poverty, gender and life satisfaction do not however seem to differentially predict harsh parenting behaviours for mothers with

depression but are predictive for mothers in general. It therefore remains unclear as to why mothers with depression are particularly susceptible to engaging in higher rates of harsh parenting behaviour. Perhaps because this is a relatively high risk sample, there is insufficient variability to detect any differences that might exist with the population of mothers with depression more broadly. Importantly, these are simple exploratory analyses that sought to investigate a follow-up question generated by the primary results and are not of a more sophisticated or a priori nature.

C.1.2 Why are some children of mothers with depression more vulnerable to the effects of their mother's harsh parenting behaviours than other children?

The second follow-up question concerns the differential susceptibility of children to the harsh parenting behaviours of mothers with depression. Although the harsh parenting behaviours of mothers with depression did not differentiate between the resilient and vulnerable groups of children, there was a significant effect of harsh parenting on the variance in child externalising behaviours. Within the risk group, it seems that the behaviours of certain children are more likely to be influenced by the harsh parenting of their mothers than others. To address this question, predictors of child externalising behaviours were tested for children of mothers with depression, over and above the effects of harsh parenting and depression severity. Predictors of interest were baseline covariates (poverty, maternal education, child gender, and child race) as well as child inhibitory control. Interaction effects with harsh parenting behaviours were tested to explore if certain children were particularly sensitive to the harsh parenting behaviours of their mother with depression.

For children of mothers with depression (n = 149), poverty, maternal education, child gender, and child race did not significantly predict child externalising behaviours at age 5. Further, these factors did not interact with harsh parenting to predict child externalising behaviours, suggesting that children are not differentially susceptible to the effects of harsh parenting as a function of whether they live in poverty or have mothers who are less educated, or by their

gender or race. Child inhibitory control did significantly predict child externalising behaviours, over and above the effects of harsh parenting, depressive symptoms, and baseline covariates (*B* = -2.85, *SE* = 1.03, *p* < .01). The interaction between child inhibitory control and harsh parenting however was non-significant, suggesting that harsh parenting behaviours do not appear to be particularly predictive for children as a function of their level of inhibitory control. The results indicate that child inhibitory control has a main effect on later child externalising behaviours, such that higher inhibitory control predicts decreased externalising behaviours. Child inhibitory control also appears to lessen the main effects of depressive symptoms and harsh parenting on later child externalising behaviours, although both depressive symptoms and harsh parenting continue to be significant predictors. The differences in child inhibitory control offer some insight into why certain children of mothers with depression might be less likely to develop higher levels of externalising behaviours. However, the differential susceptibility of these children specifically to the effects of their mother's harsh parenting behaviours does not appear to be explained by the child's inhibitory control.

Within the full sample, the results from Section 4.6.3.2 indicated that not only do depression and harsh parenting have a main effect on child externalising behaviours, but that depression and harsh parenting interact to predict child externalising behaviours. Harsh parenting behaviours particularly of mothers with depression or with elevated depressive symptoms increases the risk for higher levels of child externalising behaviours. To explore whether the effect of harsh parenting on externalising behaviours varies according to the severity of maternal depressive symptoms for children of mothers with depression, an interaction effect was tested within the risk-exposed group (n = 149). The interaction effect between mean depressive symptoms and harsh parenting was significant over and above baseline covariates (*B* = 1.71, *SE* = .86, *p* <.05). Although the presence of depression interacts with harsh parenting in the full sample (N = 554), within those mothers that are currently depressed, the severity of their depressive symptoms also interacts with their harsh parenting to predict child

externalising behaviours. With the inclusion of the interaction term in the regression model, the main effect of depressive symptoms remains significant but the main effect of harsh parenting becomes non-significant (p = .80). The significant interaction effects within the full sample and within the group of mothers with depression suggest that the presence of maternal depression is important but so too is the severity of the depressive symptoms of those mothers who are depressed. More severe depressive symptoms seem to further exacerbate the negative effects of harsh parenting in predicting higher levels of child externalising behaviours. As previously suggested, it would seem then that there is important variation within the risk group in terms of influencing the effects of harsh parenting on child behaviour development. Not only does harsh parenting predict higher levels of externalising behaviours, but the harsh parenting behaviours of mothers with more severe depression is particularly predictive.

Within the full sample of mothers, the interaction effect between harsh parenting and maternal depression remained significant over and above the effects of positive parenting and child inhibitory control (both PC and AC reported). In the regression model reported in Table 4.25, there was a significant main effect of child inhibitory control, but the main effects and interaction between harsh parenting and depression also remained significant. Within the risk group, potential buffering effects of positive parenting and child inhibitory control were also explored. The purpose of these analyses was to investigate whether these two factors might play a role in reducing or eliminating the interaction between harsh parenting and depression severity more specifically for children of mothers with depression. A linear regression was conducted, including baseline covariates, mean maternal depression severity, harsh parenting, the interaction between mean maternal depression severity and harsh parenting, positive parenting, and child inhibitory control. The results indicate that when accounting for child inhibitory control reported by the alternate caregiver B = -2.59, SE = 1.07, p < .05), the

interaction between harsh parenting and depression severity becomes non-significant (p = .27).

The results suggest that child inhibitory control is not only a predictor of more positive child behaviour development, as indicated by the results in Section 4.6.3, but that it might serve as an important factor at the child-level that buffers the negative effects of harsh parenting interacting with maternal depression severity. Those children with a greater ability to regulate and inhibit their behaviours at age 3 appear less vulnerable to the impact of their mother's depression and harsh parenting in terms of their behaviour development two years later. Whereas child inhibitory control is an important factor for promoting lower externalising behaviours for children in general, it seems more specifically important for buffering the negative interaction effects of harsh parenting and depression severity for children of mothers with depression.

C.2 Inter-item correlations: Maternal depression items, harsh parenting items, and child externalising behaviours

In an attempt to better understand the nature of relations between maternal depression, harsh parenting, and child externalising behaviours, measures of harsh parenting and maternal depression were analysed at the item-level. As in the previous section, these analyses are entirely exploratory in nature and serve strictly as a follow-up to the primary, hypothesis-driven analyses of this thesis. The purpose of these analyses was to try to unpick whether there might be certain dimensions of maternal depression that specifically relate to particular types of harsh parenting behaviours. The general hypothesis was that there would be an association between the irritability dimension of depression and more overtly harsh and critical parenting behaviours. The following analyses are entirely exploratory in nature, the purpose of which is to both explore associations at a more detailed level and also to generate future research questions that could be tested in a rigorous, a priori fashion.

C.2.1 Correlations between component harsh parenting items, mean depression and child externalising behaviours

First, correlations with the component harsh parenting behaviours were explored to investigate whether there might be particular types of harsh parenting behaviour (age 3) that are associated with mean depression (ages 2 and 3) and then also associated with externalising behaviours (ages 3, 4 and 5). The harsh parenting composite is comprised of three duration proportions, (Negative Verbal, Negative Directive and Negative Physical) and six items from the coder impressions ("Give inappropriate reasons for behaviour change"; "Displays anger, frustration, annoyance"; "Criticizes, blames child for family problems, difficulties and stressors"; "Uses physical discipline"; "Actively ignores or rejects the child"; "States, gestures child worthlessness"). The correlations between these nine component harsh parenting items, mean maternal depression, and child externalising behaviours are shown in the table below. The table highlights that mean maternal depression correlates with the composite harsh parenting variable (.100*), but that at the item-level, mean maternal depression only correlates with "criticizes/blames" (.138**) and "actively ignores/rejects" (.091*). "Criticizes/blames" is also the item that correlates most strongly with child externalising behaviours at age 3 (.233**), age 4 (.239**), and age 5 (.186**). This specific harsh parenting behaviour correlates more strongly with child externalising behaviours at age 5 than the composite harsh parenting variable.

Table C.1 Correlations between harsh parenting items (age 3) and child externalising behaviours (N = 554)

	RPC Negative Verbal	RPC Negative Directive	RPC Negative Physical	Inappro reasons for beh change	Anger, frustrat, annoy	**Criticize, blames for fam probs**	Uses physical discipline	**Actively ignores, rejects TC**	States, gesture TC worthless	Harsh P age3
Mean Dep	.037	-.039	-.017	.007	.086	**.138****	.082	**.091***	.060	.100*
Ext 3	.100*	.091*	-.033	.096*	.205**	**.233****	.179**	**.164****	.163**	.249**
Ext 4	.152**	.099*	-.007	.064	.222**	**.239****	.145**	**.132****	.132**	.238**
Ext 5	.087	.027	.001	.031	.179**	**.186****	.108*	**.131****	.131**	.155**

These same correlations were explored within the subgroup of mothers with depression and are presented in the table below. The association between "criticizes/blames" and child

externalising behaviours is stronger than in the full sample, and again is the parenting behaviour that correlates most strongly with child externalising behaviours at age 3 (.270**), age 4 (.318**), and age 5 (.282**). "Actively ignores/rejects", "states/gestures TC worthlessness" and "anger, frustration/annoyance" are also significantly associated with externalising behaviours at age 5. The non-significant correlation between mean maternal depression and harsh parenting behaviours is not surprising given these are correlations within the group of mothers with depression.

Table C.2 Correlations between harsh parenting items (age 3) of mothers with depression and child externalising behaviours (n = 149)

	RPC Negative Verbal	RPC Negative Directive	RPC Negative Physical	Inappro reasons beh change	**Anger, frustrat, annoy**	**Criticize, blames for fam probs**	Uses physical discipline	**Actively ignores, rejects TC**	**States, gesture TC worthless**	HP3
Mean Dep	-.038	.004	-.124	.055	.055	.136	-.004	.035	.112	.016
Ext 3	.047	.108	-.145	.179*	**.195***	**.270****	.181*	**.220***	**.218***	.271**
Ext 4	.148	.145	-.068	.057	**.262****	**.318****	.161	.106	**.227****	.253**
Ext 5	.092	.086	-.002	.134	**.306****	**.282****	.137	**.229****	**.226****	.292**

C.2.2 Correlations between component depression items, harsh parenting and child externalising behaviours

Second, the correlations between individual depression items on the CESD (at age 2 and at age 3) with harsh parenting (age 3) were tested to explore whether certain characteristics of depression might be more strongly linked with harsh parenting behaviours. The item correlations with externalising behaviours (ages 3, 4, and 5) were also explored. The CESD includes 20 self-report items that are rated on a 4-point scale, from 0 ("Rarely or none of the time") to 3 ("Most or all of the time"). Because the scale is ordinal, it is strictly speaking not appropriate to conduct correlations. It is also not appropriate to calculate a mean score at the item level for ages 2 and 3, to coincide with the item-level equivalent of the overall mean depression measure. The item correlations are therefore reported separately for depression age 2 and depression age 3, and with these limitations in mind. The correlations with depression items at age 2 are presented in the first two tables and with items at age 3 in the second two tables.

For depression at age 2, the only items that significantly correlate with harsh parenting are "Keeping mind on work" , "Hopeful about the future", and "Life had been a failure". The latter two items correlate with externalising behaviours at ages 3, 4, and 5, whereas "Keeping mind on work" only correlates with child externalising behaviours at age 3. The depression items at age 3 that significantly correlate with harsh parenting are again "Hopeful about the future" and "Life had been a failure". "Keeping mind on work" is no longer associated, but "Happy", "People were unfriendly", "Enjoyed life", and "Crying spells" are also significantly associated.

Table C.3 Correlations between maternal depression items (age 2), harsh parenting (age 3) and child externalising behaviours (N = 554)

Age 2	Bothered by every-thing	Poor appetite	Can't shake blues	Felt just as good as others	**Keeping mind on work**	Depress	Every-thing an effort	**Hopeful about future**	**Life had been failure**	Fear-ful
HP3	.033	.048	.043	-.081	**-.091***	.018	.021	**-.093***	**.112***	.060
Ext 3	.110**	.152**	.192**	-.168**	**.155****	.225**	.114**	**-.138****	**.165****	.086*
Ext 4	.128**	.169**	.151**	-.128**	.076	.126**	.088*	**-.151****	**.141****	.089*
Ext 5	.108*	.203**	.115**	-.096*	.076	.129**	.052	**-.132****	**.149****	.049

Age 2	Restless sleep	Happy	Talked less	Lonely	People unfriendly	Enjoyed life	Crying spells	Sad	People disliked me	Couldn't get going
HP3	.014	-.021	-.014	.055	.046	-.060	.050	.058	.094	.046
Ext 3	.151**	-.177**	.018	.135**	.103*	-.093*	.168*	.194**	.121**	.177**
Ext 4	.102*	-.126**	.015	.079	.093*	-.091*	.083	.137**	.112**	.172**
Ext 5	.111**	-.120**	.091*	.098*	.058	-.104*	.091*	.144**	.119**	.134**

Table C.4 Correlations between maternal depression items (age 3), harsh parenting (age 3) and child externalising behaviours (N = 554)

Age 3	Bothered by every-thing	Poor appetite	Can't shake blues	**Felt as good as others**	Keeping mind on work	Depress	Every-thing an effort	**Hopeful about future**	**Life had been failure**	Fear-ful
HP3	.061	.023	.043	**-.099***	.005	.049	.070	**-.134****	**.124****	-.040
Ext 3	.297**	.222**	.300**	**-.194****	.276**	.298**	.217**	**-.135****	**.291****	.247**
Ext 4	.273**	.129**	.224**	**-.194****	.194**	.225**	.231**	**-.122****	**.229****	.153**
Ext 5	.260**	.157**	.191**	**-.202****	.174**	.223**	.125**	-.077	**.255****	.205**

Age 3	Restless sleep	**Happy**	Talked less	Lonely	People unfriendly	**Enjoyed life**	**Crying spells**	Sad	People disliked me	Couldn't get going
HP3	.009	**-.130****	.009	.078	.137**	**-.119****	**.099***	.057	.002	-.020
Ext 3	.284**	**-.263****	.251**	.300**	.200**	**-.184****	**.246****	.301**	.210**	.294**
Ext 4	.236**	**-.200****	.155**	.263**	.200**	**-.154****	**.185****	.248**	.182**	.232**
Ext 5	.243**	**-.192****	.148**	.224**	.188**	**-.122****	**.198****	.240**	.197**	.269**

C.2.3 Correlations between component depression items, component harsh parenting items, and child externalising behaviours

Taken together, the tentative suggestion from these correlations is that the feeling that life had been a failure and a lack of hope for the future might be a possible, more specific aspect of depression that is associated with harsh parenting and child externalising behaviours. Unhappiness, feeling good and enjoyment of life also seem to be associated. This general supposition is supported by the previous analyses in which General Life Satisfaction was the only significant predictor of harsh parenting behaviours, and remained significant over and above the severity of depression. Rather than the increased irritability, isolation or low energy levels associated with depression, it might instead be the hopelessness and sense of failure that manifests as more harsh parenting behaviours with the child. In the previous set of correlations, "Criticises/blames child for family problems, difficulties and stressor" was the specific harsh parenting behaviour that was most consistently and strongly associated with depression and child externalising behaviours. "Actively ignores/rejects the child" was also associated with both depression and child externalising behaviours, and "Anger, frustration, annoyance" was associated in the depressed group. Perhaps the sense of failure and hopelessness of mothers with depression manifests more specifically in terms of being more critical and blaming the child, as well as displaying increased frustration and annoyance. This pattern of correlations between depression items and specific harsh parenting behaviours is presented in the table below.

Table C.5 Correlations between mean maternal depression, depression items, harsh parenting items, and child externalising behaviours (N = 554)								
	Mean maternal depression (ages 2&3)	Hopeful about future (age 2)	Hopeful about future (age 3)	Life a failure (age 2)	Life a failure (age 3)	Ext 3	Ext 4	Ext 5
HP3	.100*	-.093*	-.134**	.112*	.124**	.249**	.238**	.155**
Criticizes/blames	.138**	-.059	**-.108***	**.091***	**.151****	.233**	.239**	.186**
Anger/annoy	.086	-.084	**-.118****	**.122****	**.144****	.205**	.222**	.179**
TC Worthless	.060	-.049	.000	.047	.067	.163**	.170**	.134**
Actively rejects	.091*	**-.105***	**-.162****	.065	.070	.164**	.132**	.131**
Ext 3	.401**	-.138**	-.135**	.165**	.291**			
Ext 4	.321**	-.151**	-.122**	.141**	.229**			
Ext 5	.307**	-.132**	-.077	.149**	.255**			

Bearing in mind that these are simple bivariate correlations of an exploratory nature, the pattern of results suggests the possibility that there might be certain aspects of maternal depression that are more specifically associated with certain types of harsh parenting behaviours. The literature consistently supports an association between maternal depression and harsh parenting behaviours. Adopting a more fine-grained approach to unpicking this more broad association would serve to improve the understanding of how these factors are related and why they interact. This information would be particularly important in terms of more effectively targeting mental health interventions to reduce the use of harsh parenting of mothers with depression. Furthermore, given the impact of harsh parenting and maternal depression on child behaviour development, more effective targeting would also be instrumental in reducing the risk for externalising behaviours in young children of mothers with depression.