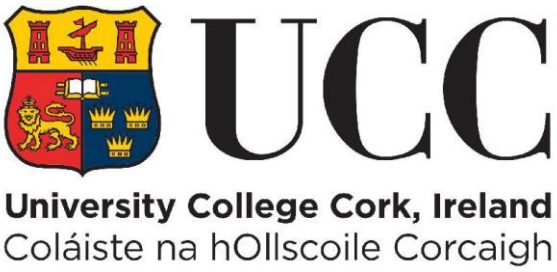

Predictors of Socio-Emotional Functioning in Childhood: Longitudinal Evidence

Study 1: Father Involvement and Behavioral Problems in Children from 0 to 17 Years: A Systematic Review of Longitudinal Studies

Study 2: Predictors of Socio-Emotional Functioning in Early Childhood: A longitudinal examination of the Role of Mother-Child Relationships and Maternal Mental Health

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Declaration

This is to certify that the work I am submitting is my own and has not been submitted for another degree, either at University College Cork or elsewhere. All external references and sources are clearly acknowledged and identified within the contents. I have read and understood the regulations of University College Cork concerning plagiarism.

Signed: 

Date: 05/05/2022

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Chapter One: Overview

Social and emotional development is a crucial component of overall functioning in childhood. These developmental domains describe a child's ability to effectively respond to a variety of emotions, to interact successfully with their peers and other individuals, and to navigate or learn from their environmental experiences (Neaum, 2019). Early social and emotional development is linked to all other domains of growth and development. Thus, when children struggle to achieve optimal social or emotional functioning, they may experience detrimental consequences across many aspects of their lives (Cohen, 2005). Considering the importance of child social and emotional functioning, it is perhaps unsurprising that empirical research has sought to understand the factors which may contribute to positive child social and emotional outcomes. Whilst a great many factors have been implicated in predicting outcomes here, the present thesis focuses on three parental factors: father involvement, the mother-child relationship, and maternal mental health.

The first factor, father involvement, refers to the active and positive participation of fathers in their children's lives (Marsiglio, 2000). Father involvement has been conceptualised in a variety of ways across the literature, with activities ranging from engagement in play or leisure to the monitoring of child behaviour and decision-making (Pleck, 2010). However, many parent-child studies thus far have focused almost exclusively on mother-child dyads, which creates difficulties in understanding how children develop within the wider family structure (Cabrera et al., 2018). This is concerning, given that fathers are typically more involved in parenting during early childhood in contemporary Western societies (Ahnert and Schoppe-Sullivan, 2020). Therefore, more research is required to understand how fathers can contribute to positive social and emotional functioning in childhood.

This thesis also provides a focus on maternal factors. In this regard, the mother-child relationship is explored via two inter-related constructs: mother-child attachment and maternal

perceptions of their relationship with their child. Attachment theory has foundations in the work of Bowlby (1969;1973) and Ainsworth (1969) and describes how early relational bonds facilitate the development of internal frameworks, which subsequently serve as a guide for children as they navigate their world (Bowlby, 1973). Interactions within the mother-child dyad influence the mother-child attachment relationship. For example, maternal sensitivity increases the likelihood of more positive mother-child interaction occurring, which consequently reinforces attachment security (De Wolff and Van Ijzendoorn, 1997). Alternatively, attachment relationships may be negatively impacted by unhelpful interactions within the mother-infant dyad, such as patterns of conflict (Kindsvatter and Desmond. 2013). At present, there is a need for more longitudinal research examining child social and emotional outcomes within the context of the mother-child relationship across infancy and pre-school years.

This thesis also explores maternal mental health as a predictor of child social and emotional outcomes since there is currently a need for more longitudinal research in this regard. The importance of examining maternal mental health is highlighted by evidence that children who have been exposed to clinical maternal depressive or anxiety symptoms at just one point in time have poorer outcomes than children of mothers who have not experienced such symptoms. Moreover, the risks of adverse child social and emotional outcomes increase rapidly after multiple exposures to maternal mental health difficulties (Hentges et al., 2020). In terms of child outcomes, maternal depression, anxiety, and stress have been significantly associated with higher levels of child internalising and externalising behaviours and general psychopathology (Cooke et al., 2019; Goodman et al., 2011; Prenoveau et al., 2017).

Aim of the Current Thesis

The overarching aim of this thesis was to understand how early experiences with parents (i.e., father involvement, the mother-child relationship, and maternal mental health) can influence positive social and emotional outcomes in childhood. This aim was achieved through the strength of longitudinal methodology, which facilitates an understanding of changes in family relationships over time (Miller and Wright, 1995). While these three parental factors served as the primary predictor variables in this thesis, consideration was also given to additional control factors that may influence child social and emotional outcomes. The importance of such an integrated approach was reflected in a model proposed by Cassidy and Shaver (2018), which suggests that additional risk factors, such as child characteristics, should also be considered in relation to child outcomes.

The first research project in this thesis describes a systematic review, which synthesised longitudinal evidence pertaining to father involvement and child behavioural outcomes. This systematic review utilises contemporary models of father involvement and includes outcomes for children aged 0 – 17 years. The inclusion of maternal involvement as a control or comparator variable was an especially novel aspect of this review since no previous systematic reviews have examined father involvement and maternal involvement concurrently. Overall, this systematic review contributes to clinical practice and research by highlighting the important role of fathers in children's behavioural functioning.

The second research project outlined in this thesis was a longitudinal quantitative study, which examined predictors of social and emotional functioning when children reached 48 months of age. The predictive utility of two variables was explored: the mother-child relationship and maternal mental health. The individual associations between these variables and outcomes were first examined. Next, these variables were explored within the context of additional factors highlighted by the research base as having associations with socio-emotional

functioning. These factors included indicators of child development, demographic factors, parental health, and child sleep factors. Overall, this study addressed Cassidy and Shaver's (2018) recommendation, which highlighted the need to explore how attachment factors may operate in conjunction with other variables to contribute to child development. The study also makes a novel contribution to current research in child social and emotional functioning by addressing key methodological issues identified across the current attachment and maternal mental health research base. In this regard, the current study utilised a longitudinal design to move towards elucidating more causal mechanisms of action. In addition, we were able to clarify how mother-child attachment and relationship factors may have differential significance at different developmental stages (Bowlby, 1973; Cassidy and Shaver, 2018).

Overall, findings from this thesis will have implications for clinical practice. Several of the predictor factors explored are putatively modifiable and can be targeted in psychological intervention. The longitudinal aspect of this study is especially important in this regard since the increased understanding of the developmental stages where attachment or maternal mental health predictors are potentially more salient may guide the selection of appropriate interventions.

Thesis Structure

` *Chapter Two* provides an extended critical literature review of research pertinent to the systematic review and major research project. *Chapter Three* outlines a systematic review of longitudinal studies, which examined whether higher father involvement was associated with fewer child behaviour problems. The systematic review was structured for submission to the journal entitled '*Parenting' (see Appendix A).* An extended account of the systematic review methodology is outlined in *Chapter Four. Chapter Five* outlines the major research project in a journal article format. This article has also been prepared for submission

to the journal entitled '*Parenting.' Chapter Six* provides supplementary information relevant to the major research project, including methodological considerations and reflections on conducting research during the COVID-19 pandemic. Finally, *Chapter Seven* provides a concluding summary of the thesis findings and associated contributions.

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Chapter Two – Extended Literature Review

In the interest of producing succinct and focused research articles for the systematic review and major research project, it was not possible to provide a detailed account of the literature that informed the research within each study. Thus, the following chapter contextualises the rationale for both studies by providing a critical overview of the literature and research regarding child social and emotional development. The chapter includes an overview of the key theoretical frameworks pertinent to the thesis, followed by a synthesis of the current evidence base regarding key predictor variables of interest (father involvement, the mother-child relationship, and maternal mental health). The rationale for examining additional control variables relevant to child social and emotional outcomes (including infant sleep, child development, and structural variables) is also provided.

Social and Emotional Development and Functioning in Early Childhood

'Child development' comprises the years of life spanning from infancy to adolescence, during which a range of complex physical, cognitive, emotional and social changes occur (Levin, 2011). One aspect of child development is the growth of emotional competence, which refers to a child's increased ability to experience and effectively manage emotional states to benefit themselves and other people (Neaum, 2019). Social development is related to emotional development and describes the progression from a primary parent-child relationship to the inclusion of other meaningful and relevant relationships (Zeanah, 2018). Development in the social domain is strongly contingent on the ability to play with or alongside other children effectively. The combination of both social and emotional development facilitates the formation of a child's self-image and self-concept, along with an understanding of the behavioural patterns expected of them (Neaum, 2019).

Research has consistently highlighted that appropriate social and emotional (henceforth referred to as socio-emotional) functioning is crucial for a child's overall well-being. Children acquire emotional regulation skills as part of their emotional development. When emotional regulation competencies are lacking, children may resort to maladaptive means (such as internalising or externalising behaviours) of managing overwhelming emotional states (Berger, 2011). The manifestation of poor socio-emotional functioning in child behaviour problems was recently evidenced in a study by Li et al. (2020), where neurotypical boys aged two to six years with more extensive emotional vocabulary engaged in fewer externalising behaviours. In contrast, less emotional control was associated with increased internalising problems, while more negative emotional expression was associated with externalising behaviours. Although this study was limited to a sample of boys only, internalising and externalising problems, along with prosocial behaviour deficits, have been consistently associated with lower socio-emotional competency across the recent empirical literature for boys and girls (e.g., Boyes et al., 2020; Huber et al., 2019; Maguire, 2016).

The manner in which children regulate their emotional states has subsequent consequences for their social experiences. For example, Suveg et al. (2010) suggested that children who struggle to regulate their emotional states during social interactions are not likely to be well-received by peers, which may increase a child's risk of being rejected. Positive peer relationships are crucial throughout childhood and adolescence. Children utilize these relationships to problem-solve, seek emotional support, and develop a sense of self (Wentzel, 2017). Such relationships also serve as protective factors against mental health difficulties in childhood (Gorrese, 2015). Findings from a longitudinal study of 149 Turkish preschool children conducted by Asik-Ozturk et al. (2019) supported the link between emotional difficulties and peer problems, where anxiety was associated with withdrawal from positive peer-play interactions. In a separate study, three to five-year-old children with a higher

understanding of emotional states were more likely to demonstrate superior social skills than children who lacked such understanding (Di Maggio et al., 2016). Increased emotional knowledge has also been associated with higher social competence (Alwaely et al., 2021). Thus, effective functioning in the social and emotional domains are highly interlinked.

Taken together, the empirical evidence base has demonstrated that socio-emotional competencies in childhood are crucial for many aspects of a child's well-being. When children struggle to regulate emotional states and effectively navigate the social world, they are at an increased risk of detrimental outcomes. However, evidence has also suggested that the importance of socio-emotional functioning is not limited to early childhood. Socio-emotional difficulties that develop during this stage of life can result in consequences that extend into later years. For example, longitudinal research has found a significant association between socio-emotional difficulties in childhood and problems later in adolescence, including substance abuse and anti-social behaviours (Picoito et al., 2021), self-harm and depressive symptoms (Papachristou and Flouri, 2021) and poor academic performance (Sallis et al., 2019). Given the lifelong importance of effective socio-emotional functioning in early childhood, a logical step for research is to further the current understanding of factors that may contribute to effective socio-emotional functioning. Moreover, despite the significant recent progress in childhood emotional regulation research, much remains to be explored in this field (Silk, 2019).

Attachment Theory – Early Beginnings and Contemporary Understanding

Attachment theory (as conceptualised by Ainsworth, 1969; Bowlby, 1969; 1973) describes how infants utilise selected caregivers as sources of comfort, support, nurturance, and protection. As attachment theory has continued to evolve, research has identified additional aspects of the parent-child relationship which may influence attachment. For example, when infants learn that their signals to caregivers result in their needs being met, it is more likely that

the caregiver-child dyad will experience positive interactions. In turn, opportunities for developing a secure attachment are increased (De Wolff and Van Ijzendoorn, 1997). In contrast, conflict within the parent-child relationship may be understood within the context of the unmet attachment needs of both parent and child. For example, if a child's attempts at seeking comfort are dismissed by their caregiver, they may utilise increasingly vigorous attempts to provoke the caregiving response (e.g., behaviour problems, attention-seeking, substance abuse). If such attempts provoke a deactivating response in parents, then further problem behaviours may occur, resulting in an unhelpful conflict pattern within the parent-child dyad (Kindsvatter and Desmond, 2013).

Attachment theory also describes how infants use early experiences of interacting with caregivers to develop working models of themselves and others. Overall, children rely on these working models to understand their current experiences, anticipate future events, and plan effectively. A child's interactional experience with their attachment figure is an essential component of these internal working models. Through these experiences, children develop a sense of how acceptable or unacceptable they are and whether their caregivers are available to them during times of need or distress. These experiences feed into the working model, which subsequently influences how children respond to 'alarming' or difficult situations throughout their lives. A child's understanding (or forecasts) of their caregiver's availability or unavailability is also thought to become increasingly important from the age of three years onwards (Bowlby, 1973).

There have been significant advances in attachment theory research since Bowlby and Ainsworth's pioneering work. For example, Long et al. (2020) proposed a neuro-anatomical model of human attachment (NAMA). Within this model, attachment systems are comprised of at least two affective neurological components that work dynamically to ensure survival. Repeated early experiences either 'aversion' or 'approach' processes lead to the development

of ‘prototypical pathways’ that guide children’s future responses. These pathways are similar to the concept of the attachment security groups proposed by Ainsworth (1969) and ‘developmental pathways’ described by Bowlby (1973). Thus, the combination of findings from early and contemporary research has shown that a theoretical attachment model can provide an understanding of infant-caregiver behaviour. As a result, attachment theory has made significant contributions to psychological science and has played a crucial role in understanding how early experiences can influence developmental outcomes (Cassidy and Shaver, 2018). In this regard, attachment theory was utilised as a primary theoretical framework for understanding how early experiences with parents can influence socio-emotional outcomes.

Father Involvement and Child Socio-Emotional Outcomes

Father involvement generally describes how fathers participate in their children’s lives and contribute positively to their development (Marsiglio, 2000). One of the most widely used conceptual models of father involvement was outlined by Lamb et al. (1987) and was subsequently reconceptualised by Pleck (2010). In this model, father *engagement* describes direct father-child interactions such as play, caregiving or leisure. *Warmth and responsiveness* relate to affectionate expressions from a father towards his child, while *control* describes the monitoring of child behaviour and participation in decision making. However, alternative conceptual models of father involvement are also described in the literature (Slaughter, 2018). McBride and Mills (1993) conceptualised father involvement in terms of interaction, accessibility and responsibility. Palkovitz (1997) utilised a broader approach in conceptualising father involvement, by including a cognitive domain (how the father thinks about his child), an affective domain (affectionate or encouraging behaviours), and a behavioural domain (including reading or helping with homework). It has been suggested that father involvement

can contribute to child development since these father-child activities can promote secure attachment relationships (Lamb, 2010).

It is unfortunate that despite the variety of ways fathers are involved in their children's lives, there is a tendency to exclude fathers from child developmental research. This exclusion is an important issue to address since research has indicated that father involvement plays an essential role in child socio-emotional outcomes. A previous systematic review by Sarkadi et al. (2008) demonstrated that increased father involvement was associated with fewer behavioural problems in boys, improved child cognitive development, and higher competence in children's relational functioning. However, this review only examined child outcomes within the context of father 'engagement', thus excluding additional father involvement domains such as responsibility and responsiveness.

Diniz et al. (2021) conducted a more recent systematic review of 86 studies, which demonstrated positive outcomes associated with father involvement for children aged up to 6 years. Five included studies suggested that father involvement in play and direct care was associated with fewer externalising behaviours, while four studies reported that father involvement was associated with better socio-emotional competence. Higher father involvement was also associated with improved cognitive ability, while lower father involvement was associated with more peer aggression. However, it should be noted that only a small proportion of studies included in this systematic review had examined child behavioural outcomes. This systematic review also did not focus specifically on child behaviour problems, and evidence pertaining to internalising behaviours was lacking. Furthermore, this review's broad search strategy approach did not include terms specific to child behaviour problems, and studies relating to children over the age of six were excluded. This may limit important insights into how father involvement may influence behavioural outcomes in older children and adolescents. Such evidence may be especially important for educational and clinical contexts

relevant to these populations. Thus, although there has been a much welcome resurgence of father involvement research in recent years, there are several existing limitations and issues within the literature base yet to be addressed.

The Mother-Child Relationship as a Predictor of Socioemotional Outcomes

A significant proportion of the research base has sought to examine child outcomes within the context of various aspects of the mother-child attachment relationship, including attachment security and the dynamic interactions between mothers and their children. Previous research evidenced an association between higher levels of social competence and a secure attachment style in preschool children (Waters et al., 1979). Laible (2004) later described the knock-on effect of attachment security, noting that attachment and child temperament were significantly associated with the quality of mother-child interactions. Mother-child interactions were, in turn, associated with socio-emotional outcomes.

Recent empirical research has continued to explore this link between mother-child relationship factors and socio-emotional outcomes (Groh et al., 2017; Spruit et al., 2020) although small to moderate effect sizes have often been reported. One study by Brumariu et al. (2021) of 87 community mother-child dyads found that disorganised and controlling attachment styles were significantly associated with poorer emotional regulation and expressiveness. The inclusion of a range of emotional regulation outcome dimensions was a notable strength of this study. However, the study focus was limited to examining disorganised/controlling attachments. Thus it was difficult to understand how positive attachment experiences can protect against child socio-emotional difficulties. A further limitation of this study was its reliance on cross-sectional methodology.

In contrast, longitudinal methodology supports the detection of progress and change over time (Rajulton, 2001). This methodological advantage was recently demonstrated by Kuo and Braungart-Rieker (2022), who measured the socio-emotional development of 135 community sample toddlers. Secure attachment to mothers at 12 months was significantly associated with more infant compliance in later toddlerhood. Several longitudinal studies have corroborated such findings (Boldt et al., 2020; Kochanska, 2001; Schmidt et al., 2002). Similarly, longitudinal research has demonstrated that early experiences of frequent positive parent-child interactions (Wong et al., 2020), maternal sensitivity (Behrendt, 2019), and mother-child closeness (Harmeyer et al., 2016) can contribute to positive child socio-emotional outcomes.

Although such longitudinal research provides robust evidence to support the association between parent-child attachment and child socio-emotional outcomes, several methodological limitations across the literature base are worth considering. Some studies merged mother-child and father-child relationship data, thus making it difficult to disentangle individual parent effects on child outcomes. In other studies, samples were notably small or were limited to low-income populations. Furthermore, the outcome instrument utilised by Kuo and Braungart-Rieker (2022) was derived from a measure of temperament (i.e., biologically-based factors) rather than a measure designed to detect variations arising from variations in early environments. There is also a particular need for more studies where parent-child relationship factors are measured at several stages of child development. Fewer longitudinal studies have thus far measured mother-child relationship factors during infancy and again during preschool years. This is an important issue for attachment-focused research to explore since parent-child relationships evolve in line with changing life circumstances and developmental factors. For example, as children leave toddlerhood, they begin to explore the world and strive for increased

independence. In this regard, they may utilise the attachment system in different ways (Cassidy and Shaver, 2018).

Overall, there is a need for more longitudinal research where parent-child relationship factors are examined within the context of the influence of additional relevant factors. This issue was highlighted by Cassidy and Shaver (2018), who cautioned against using a simplified approach to explain outcomes solely within the context of attachment. In this regard, researchers are urged to consider how attachment processes operate in the context of other risk factors to influence outcomes. This viewpoint is also perhaps evidenced in the previously reported low to moderate effect sizes identified among associations between attachment and socio-emotional functioning. With this consideration in mind, the current review will now turn its focus to another important predictor of child socio-emotional outcomes – maternal mental health.

Maternal Mental Health and Child Socio-Emotional Outcomes

Although figures vary across the literature, a review of 29 studies by Huscke et al. (2020) suggested that a significant number of mothers in the Republic of Ireland may present with mental health difficulties (i.e., depression, anxiety, or stress) during the perinatal period. Given the current gaps in the Irish perinatal mental health service, this finding was highlighted as particularly concerning. Such services were noted to primarily focus on the physical needs of the infant and mother rather than mental health needs. Manning and Gregoire (2009) outline that parental mental health difficulties can adversely impact children through indirect (including socioeconomic disadvantage and marital issues) and direct mechanisms (including genetics and direct exposure to aspects of mental health problems). Direct exposure to such problems can have particularly detrimental effects on aspects of parenting and parent-infant

interactions. Opportunities for emotional co-regulation, vocal synchrony, and engagement in enriching activities can be compromised when maternal mental health difficulties impede mother-child interactions (Arteche et al., 2011; Field, 2010; Stein et al., 2012). Parents experiencing mental health difficulties may also inadvertently model maladaptive coping strategies or behaviours to their children. In this regard, social learning theory asserts that children may develop socio-emotional problems as a result of observing and emulating such behaviours (Elgar et al., 2004).

The association between maternal mental health and child socio-emotional outcomes has been well documented. Maternal depression and anxiety have been associated with higher child emotional negativity (Prenoveau et al., 2017) and internalising or externalising behaviours (Cooke et al., 2019; Hughes et al., 2020; Riahi et al., 2012). Research has also demonstrated an association between parental stress and child internalising difficulties (Stone et al., 2016), behavioural problems (Neece et al., 2012; Pinquart, 2017) and social competence (Crum and Moreland, 2017). However, maternal stress has generally been examined less extensively as a predictor of socio-emotional outcomes relative to depression and anxiety. Moreover, studies that have included stress have often measured this within the context of 'parenting' stress relative to experiences with the child, rather than a more general indicator of maternal mental health. This issue was partly addressed by Thiele et al. (2021), where maternal reactions to stressful life events were associated with child socio-emotional outcomes at two years. Again, however, this study did not capture aspects of general maternal emotional stress.

Similar to the methodological issues identified within the attachment literature, there is a need for more longitudinal research where maternal mental health is explored within the context of additional relevant factors to determine predictive utility for child socio-emotional outcomes. The importance of examining maternal mental health alongside other factors was exemplified in a study by Vafai et al. (2016), where the relationship between post-partum

depression and child socio-emotional outcomes was attenuated to non-significance when confounding variables (such as parenting stress, race and education) were controlled. Moreover, although evidence suggests that mother-child attachment and relationship factors are associated with child outcomes, these factors are less often included alongside the maternal mental health measures in longitudinal studies. This is particularly important since evidence suggests that parental mental health and parent-child attachment factors may influence each other and thus influence child outcomes (Risi et al., 2021). The necessity for further longitudinal research examining maternal mental health and child outcomes is also highlighted by evidence suggesting that the chronicity and timing of maternal mental health problem onset are important considerations. For example, a longitudinal study of 1,992 mother-child dyads found a stronger association between maternal anxiety or depression and externalising or internalising outcomes when these mental health difficulties occurred during toddlerhood than prenatal or post-partum periods (Hentges et al., 2020).

An additional significant limitation inherent in many of the previously outlined longitudinal studies is the tendency to focus on mental health measures of anxiety and/or depression, rather than stress. This is an important consideration in light of the evidence suggesting that parental stress is also associated with child socio-emotional functioning. Some studies have partly addressed this issue. For example, a study by Swift et al. (2021) examined aspects of the parent-child relationship and parental mental health indicators at two time points; when children were aged 5 and 9 years. Findings suggested that socio-emotional outcomes were significantly (albeit with small odds ratios) associated with conflict within the parent-child relationship and with parental mental health factors (depression and stress). A separate report regarding the Infant Cohort of the *Growing up in Ireland* study (Williams et al., 2013) found a significant association between high parent stress and negative interactions within the parent-child relationship. It was noted that this particular finding indicated a need for more

multivariate and longitudinal studies, which may help to further the understanding of both direct and moderator effects within this association.

Additional Factors Associated with Child Socio-Emotional Functioning

Evidence has demonstrated that several structural and child-specific factors also influence socio-emotional functioning. Poorer socioeconomic status (Altafim et al., 2018; Reiss, 2013), lower parental education (Cabello et al., 2017), and parental physical health difficulties (Cordts et al., 2020) have been associated with adverse child socio-emotional outcomes. Evidence also suggests that a child's ability to use specific cognitive skills (such as processing speed, working memory, and inhibition) can contribute to their socio-emotional functioning (Anderson et al., 2019). Similarly, research has found significant associations between child socio-emotional functioning and child sleep problems or sleep duration (Bos et al., 2009; Hysing et al., 2016; Lobermeier et al., 2022). Thus, although child socio-emotional functioning may be understood within the context of the parent-child relationship and maternal mental health, additional potentially relevant factors should be incorporated into the picture.

Rationale for the Current Thesis

The methodological approaches utilised for both research projects outlined in the following chapters addressed many of the previously outlined limitations and issues in the literature base. The systematic review provides a synthesis of high-quality longitudinal research examining father involvement and child behavioural outcomes in children aged 0 to 17 years, with an additional focus on maternal involvement as a control or comparator variable. The major research project explored child socio-emotional outcomes within the context of the mother-child relationship and maternal mental health. The study addressed current gaps in the

research base by utilising a longitudinal design to measure the predictive utility of these variables from infancy through to early childhood. The study also controlled for additional relevant factors (i.e., infant sleep, indicators of development, structural factors and overall maternal health) to help disentangle these effects from mother-child relationship and maternal mental health factors. Overall, the systematic review and major research project complement each other by focusing on children's experiences and socio-emotional outcomes associated with maternal and paternal factors.

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Chapter Three: Systematic Review

Father Involvement and Behavioral Problems in Children from 0 to 17 Years: A Systematic Review of Longitudinal Studies

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Father Involvement and Behavioral Problems in Children from 0 to 17 Years: A Systematic Review of Longitudinal Studies

Abstract

Behavioral problems in childhood are associated with detrimental child and adolescent outcomes, including juvenile delinquency, poor academic performance, higher rates of alcohol abuse, and reduced overall quality of life. Father involvement is an important component of the father-child relationship that describes the various ways in which fathers actively participate in their children's lives. However, evidence that higher father involvement reduces the risk of behavioral problems in children is mixed, has often been reliant on cross-sectional data, has provided limited focus on behavioral outcomes, and has often excluded older children. The current systematic review focused on longitudinal evidence regarding father involvement and subsequent behavioral outcomes in children aged 0-17 years. In addition, maternal involvement was included as a control or comparator variable. Searches were conducted across *Pubmed, Scopus, Web of Science,* and *Embase*, and 16 studies met inclusion criteria. Overall, findings provided evidence that father involvement positively contributes to children's behavioral outcomes. The impact of father involvement appeared to be greatest in studies examining play or engagement in positive social activities. Limited use of validated father involvement measures and conceptual models are highlighted as important methodological considerations for future research.

Keywords: Father Involvement; Mother Involvement; Child Behavior; Longitudinal Research.

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Introduction

Father involvement is a multi-dimensional concept that broadly describes a father's positive, wide-reaching, and active participation in their children's lives (Marsiglio, 2000). Father involvement is one aspect of the father-child relationship that has been examined alongside additional relational concepts, including paternal sensitivity and father-child attachment (e.g., Brown et al., 2012; Fuertes et al., 2016; Pleck, 2007). Despite the growing interest in father involvement, no singular framework defines this concept (Slaughter, 2018). Lamb et al. (1987) initially proposed a widely used father involvement framework, which was later reconceptualized by Pleck (2010). This framework was primarily derived from research pertaining to heterosexual, resident and married fathers and operationalized father involvement in terms of engagement, warmth or responsiveness, and control. McBride and Mills (1993) provided an alternative conceptualization of father involvement based on their study of 100 mothers and fathers. This conceptualization included interaction, accessibility, and responsibility domains. Palkovitz (1997) provided a somewhat broader account of father involvement which describes a father's own experience of parenting their child.

It is, therefore, perhaps unsurprising that the breadth of definitions available for father involvement has created issues when researching this field and has contributed to what Pleck (2007) previously termed "the father involvement war." It is also worth highlighting that these existing conceptualizations and operationalization's of father involvement were often derived from research focusing on more 'traditional' family structures (i.e., two-parent, mother and father households). While we have focused primarily on such research here, it is important to contextualize this understanding by acknowledging that family structures extend beyond these 'traditional' family units. For example, many children grow up in a single parent or same-sex parent household. Such considerations and associated recommendations are discussed later in this review.

Existing theoretical frameworks may provide an insight into the factors and mechanisms underpinning father involvement effects on child outcomes. Attachment theory (Ainsworth et al., 1969; Bowlby, 1969;1973) describes how infants develop secure attachments with their primary caregivers. Lamb (2010) suggested that attachment theory may help to explain how father involvement influences young children since father involvement can promote positive attachment. In turn, attachment security has been associated with a range of socioemotional developmental outcomes for children (Fearon et al., 2010; Groh et al., 2017).

Cabrera et al's. (2014) ecological model of father-child relationships describes how fathers influence child development within the family context. This model primarily considers family structures consisting of mothers, children and siblings and outlines direct and indirect pathways associated with fathering and child outcomes. Direct father effects may be observed where father involvement and associated behaviors directly influence child development. With regards to indirect effects, factors pertaining to the wider family structure such as family relationships (e.g., mother-father and mother-child relationships), maternal characteristics (e.g., age, education and employment) and maternal behaviors may contribute to child outcomes by influencing father involvement. Furthermore, Cabrera et al. (2014) and Cassidy and Shaver (2008) contextualize the potentially unique influence of father involvement on child development by outlining similarities and differences among maternal and paternal parenting behaviors within such family structures. In terms of similarities, mothers and fathers both influence their child's development by contributing to parent-child attachment relationship security. The parental behaviors utilized to strengthen these relationships may differ between mothers and fathers. For example, fathers may be more effective in encouraging play or exploration, while mothers may be more effective in responding to, comforting and soothing a distressed child.

Existing research supports the distinction between maternal and paternal behaviors and associated child outcomes. When compared to mothers, fathers tend to engage in more physically playful or active activities with their children, act like similar age peers, allow children to take the lead during activities and provide challenges to their children as they play (John et al., 2013; Kazura, 2000; Yeung et al., 2001). These specific behaviors may subsequently help to increase children's sense of autonomy and independence (Bögels and Phares, 2008).

Research examining child behavioral outcomes has often conceptualized child behavioral problems as externalizing and internalizing difficulties (Achenbach, 1991). Studies have also utilized an alternative approach to understanding child behavioral problems by examining the concept of general child psychosocial adjustment. Psychosocial adjustment describes an individual's ability to respond appropriately to demands arising from their environment (Madariaga et al., 2014; as cited in Piqueras et al., 2019). For example, Carey et al. (2009) conceptualized child behavioral adjustment as behavioral competence, general achievement or performance in tasks, self-relation, internal status, effective/ineffective coping styles, and symptoms of physiological functioning. While these behaviors are similar to those outlined within externalizing and internalizing constructs, they are not explicitly defined as such in many studies. Therefore, it is essential not to limit understanding of child behavioral problems in terms of either externalizing or internalizing behaviors.

Examining the role of father involvement in child behavioral outcomes is an essential endeavor for furthering the understanding of developmental outcomes associated with father-child relationships (Lamb, 2010). The need for such research is evidenced across the existing literature base. Studies have found that child problem behaviors are associated with a reduced quality of life, academic difficulties and juvenile delinquency (U.S. Public Health Service, 2000, as cited in Caughy et al., 2016), increased risk of sickness absence later in working

adulthood (Narusyte, 2017), and a greater risk of alcohol abuse (Meque et al., 2019). Additionally, cross-sectional research of non-clinical or community population samples has suggested that father involvement may play a vital role in the protection against child behavioral problems (Gryczkowski et al., 2018; Kennedy et al., 2015; Temmen and Crockett, 2021). Therefore, advancing research in the field of father involvement and associated behavioral outcomes may positively affect public policy (Sarkadi et al., 2008) and clinical intervention development (Doherty et al., 2006; Ramchandani and Iles, 2014).

The emergence of systematic reviews and meta-analyses examining aspects of father involvement and child behavioral outcomes is an encouraging sign of increased interest in the field. Sarkadi et al. (2008) found that father involvement had positive effects on child developmental outcomes, including reduced behavioral difficulties in boys, enhanced cognitive development, and better relational functioning in childhood. A more recent review by Adamsons and Johnsons (2013) found that positive involvement of non-resident fathers was associated with beneficial child outcomes, although effect sizes were notably small. A meta-analysis by Zhang et al. (2021) reported a low negative correlation between positive aspects of father involvement and child externalizing and internalizing behaviors. Diniz et al. (2021) recently reported that higher father involvement was associated with better child socioemotional outcomes, with some evidence suggesting that boys benefited more from father involvement (conceptualized as play and direct care) than girls in terms of behavioral outcomes.

It is worth noting that some contradictory findings have been reported in a small number of studies. Opondo et al. (2016) reported no significant association between father involvement in childcare and child behavioral problems. A study examining the *Growing up in Ireland* 2008 cohort did not find a significant association between father involvement and child behavioral outcomes. However, the *quality* of the father-child relationship (i.e., levels of conflict and

closeness) was associated with better outcomes (Smyth and Russell, 2021). Such conflicting evidence suggests that more research in this field is needed.

The current systematic review seeks to extend previous research whilst modifying focus and inclusion criteria to clarify conclusions and mechanisms of action. Previous systematic review limitations have included restricting samples to younger-aged children, relying on cross-sectional studies, failing to report effect sizes, limited focus on behavioral outcomes, lack of study quality control, excluding resident fathers, focusing on only one aspect of father involvement, and incorporating dated studies. This review is original as it drew from recommendations outlined by Lamb (2010) and included maternal involvement as a control or comparator variable. Incorporating maternal involvement in this way may help more accurately determine the importance of father involvement relative to maternal involvement and may also help mitigate against drawing erroneous conclusions regarding the effects of father involvement. The latter consideration was previously highlighted by Amato and Rivera (1999), who reported that studies with less rigorous methodology were more likely to find a stronger association between father involvement and child outcomes.

The following primary research question is addressed: Is there a longitudinal association between father involvement and behavior problems in children aged from 0 up to 17 years? Secondary research questions relevant to this review included: (1) What is the relative contribution of father and mother involvement to child behavioral problems? (2) Are there specific aspects of father involvement that are more likely to be associated with child behavioral outcomes?

Materials and Methods

Methodology pertaining to this review was underpinned by the Preferred Reporting Items for Systematic Reviews and Meta-Analyses checklist guidelines (PRISMA; Moher et al., 2009). Please refer to *Appendix B* for further details.

Study inclusion/exclusion criteria

The following inclusion criteria were utilized:

(1) Participants included in the studies were biological fathers or father figures (i.e., stepfathers, adoptive fathers, fathers living in a different household, or men cohabiting with the mother) over the age of 18 years.

(2) Children were aged 0-17 years at baseline and follow-up data collection (based on the definition of a ‘child’ outlined by the United Nations Conventions of the Rights of the Child; UNICEF, 1989).

(3) The study clearly conceptualized ‘father involvement’ as a predictor variable. Variations of 'father' (i.e., 'paternal') were accepted. This conceptualization must have subsequently aligned with one or more of the following existing conceptual models of father involvement: Lamb et al. (1987), McBride and Mills (1993), Palkovitz (1997), and Pleck (2010). Please refer to Slaughter (2018) for a summary of each of these conceptual models and associated operationalization.

(4) A quantitative measure of father involvement was used, where the measured domains aligned with the previously outlined conceptual models.

(5) Outcome measures must have been quantitative. Studies were included if they utilized: (a) previously published measures with known psychometric properties, (b) novel

measures where psychometric properties were evident or discussed, and (c) the measure was a report of child behavior. Outcome measures must have mapped onto one or more of the internalizing/externalizing/psychosocial adjustment constructs. A framework *(see appendix C)* was developed to guide the inclusion/exclusion of studies based on these outcomes. This framework was based on a synthesis of externalizing, internalizing, and psychosocial adjustment concepts and the domains/operationalizations outlined in validated behavioral measures (Achenbach, 1991; Conners, 2008; Goodman, 1997; McDermott et al., 1993). An overview of 37 evidence-based measures of pediatric psychosocial adjustment by Holmbeck et al. (2008) was also consulted during this process.

(6) A measure of maternal involvement was included as either a predictor or control variable. Unlike father involvement, there are no widely reported maternal involvement conceptual models. As such, studies were accepted where maternal involvement was conceptualized within the same remit of the previously outlined father involvement models. Measures that did not map onto mother involvement (such as mother-child attachment) were not accepted. Mothers must have also been over the age of 18 years.

(8) The study was longitudinal, and at least six months had elapsed since baseline data collection and subsequent follow-up.

(7) The study was written in English.

Studies were excluded from the review if: (1) the study described ambiguous terms relevant to father involvement but did not explicitly define these as 'father involvement' (e.g., 'father engagement' or 'father-child play'), (2) the study was qualitative, (3) the measure of father involvement was not reported or described, (4) only proxy measures of father involvement were used (i.e., present/absent), (5) fathers/children were living outside of natural

settings (e.g., incarcerated or residential care settings), (6) parents/children with a clinical physical/mental health diagnosis, (7) the study was not observational (e.g., focused on the development of a measure of evaluation of an intervention).

Search Strategy

Four bibliographic databases (*PubMed, Scopus, Embase,* and *Web of Science*) were searched based on Bramer et al.'s (2017) recommendations for optimal searches when conducting a systematic review. Google Scholar was also searched as sources for grey literature, while references were manually screened for studies not detected during database searches. Searches were conducted in September 2021 and updated searches were performed in April 2022. Initial scoping searches were conducted on *PubMed* using a broad range of potentially relevant terms. Due to the large number of irrelevant articles returned in searches, the search strategy was refined, and some terms were later removed. The *Web of Science* search strategy is outlined below as an example:

(father* OR dad OR paternal*) AND (involv*) AND (child* OR teen* OR adolescen* OR youth* OR young OR toddler* OR infan* OR minor* OR baby OR juvenile* OR kid OR schoolboy* OR schoolgirl* OR schoolchild* OR preteen* OR tween*) AND (behav* OR psychosocial OR "peer relations" OR adjustment) and Articles (Document Types) and English (Languages).

Procedure

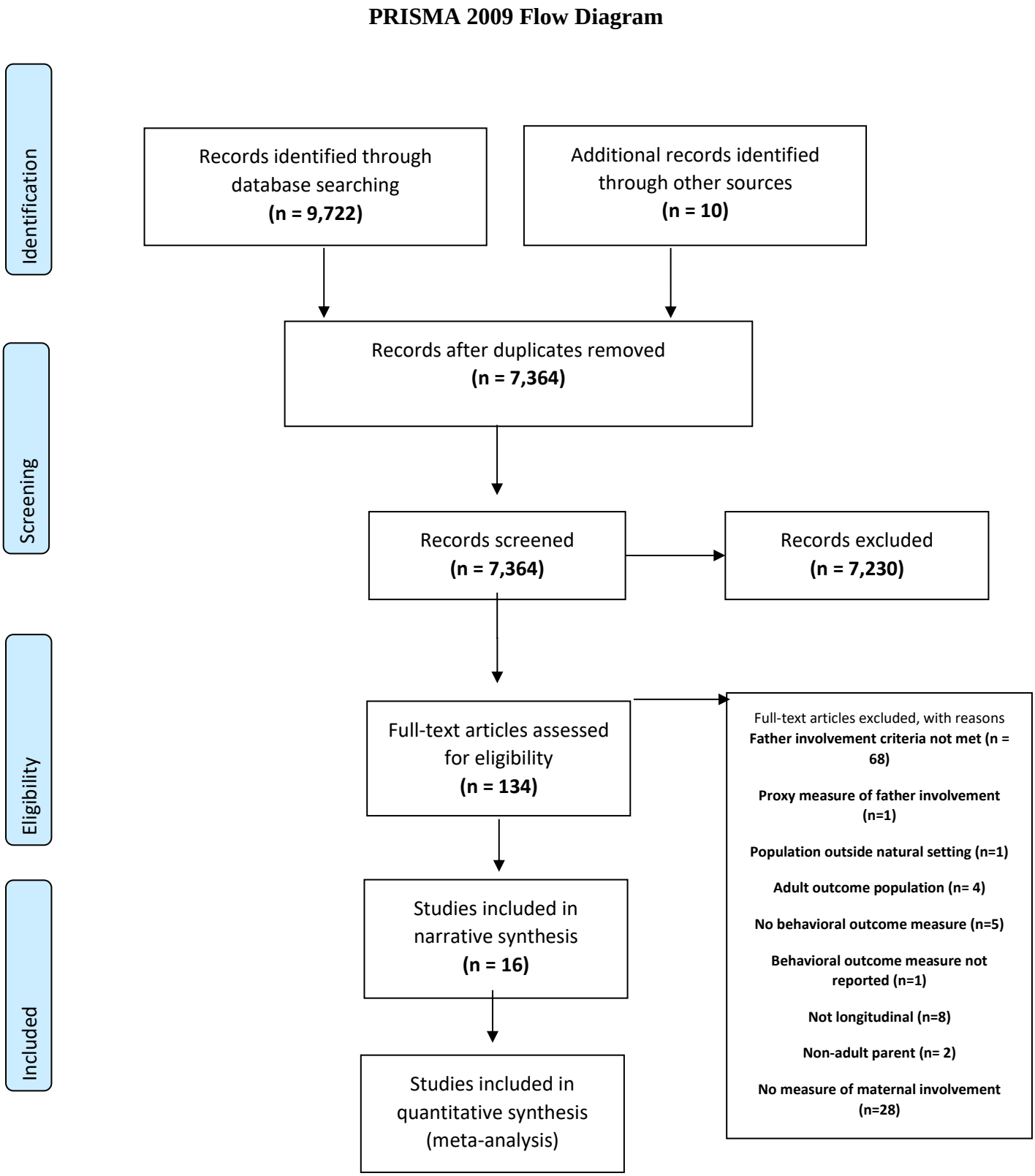
Once database searches were complete, duplicate results were identified and removed with the aid of Excel software. One reviewer screened titles and abstracts with the aid of Abstrackr (n.d.) online software to determine if the study met eligibility criteria. Full texts were consulted if it was unclear if the study met criteria based on titles or abstracts alone. Next, the full texts

of all remaining studies were screened using a novel screening and selection tool *(see appendix D).* Authors were contacted where necessary and, if possible, to obtain full texts for screening. Eligible full-text data was extracted using Covidence online software (Veritas Health Innovation, n.d.). Two additional reviewers independently screened all included articles to ensure inclusion criteria were met, and there was a 92% concordance rate among reviewers. Discrepancies were resolved through discussion, and it was agreed that 16 studies met the final inclusion criteria.

The primary reviewer assessed the quality of all included studies using The National Institute of Health (NIH) Quality Assessment Tool for Observational Cohort and Cross-Sectional Studies (NIH, 2014; see *Appendix E*). Secondary reviewers conducted quality appraisals of ten included studies, and there was a concordance rate of 80% with the primary reviewer's appraisals. Discrepancies were addressed through discussion among reviewers. All excluded full-text studies and the reason for exclusion were documented *(see Figure 3.1).*

Figure 3.1

Prisma Flow Diagram



From: Moher D, Liberati A, Tetzlaff J, Altman DG, The PRISMA Group (2009). Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement. PLoS Med 6(7): e1000097. doi:10.1371/journal.pmed1000097 For more information, visit: www.prisma-statement.org.

Results

134 full-texts were screened, of which 16 met the eligibility criteria for this review. Most excluded papers either did not operationalize father involvement as a predictor variable or did not include maternal involvement. Characteristics of included studies are provided in T*able 3.1*. Study completion years ranged from 1957 to 2013. Sample sizes ranged from (*N*= 93) to (*N*= 27,870). Although studies originated from various countries, most were conducted in the USA and the UK. The time between the measure of father involvement (exposure) and behavioral outcomes across studies ranged from 6 months to 108 months. Engagement or participation in positive or shared activities with the child was the most commonly measured father involvement domain. Father involvement domains also varied considerably across the included studies and incorporated direct interaction, direct caregiving, communication, closeness, and warmth.

Included studies were generally of robust methodological quality. Nearly all studies provided a detailed account of their population samples, applied inclusion or exclusion criteria uniformly, described effect sizes, and provided sufficient time between exposure and outcomes. Methodological quality was somewhat weaker regarding the instruments used to measure father involvement. Only three studies used a standardized or empirically validated scale of father involvement, while the remaining studies used novel questionnaires. These questionnaires were self-report Likert scales for all but one study. This remaining study (Lang et al., 2014) utilized a self-report diary methodology, whereby fathers and mothers recorded the time spent engaging in activities with their children. Overall, studies were rated as either "good" (*N*=11) or "fair" (*N*=5) quality.

Table 3.1

Study Characteristics

Study	Sample Population	Study Design and Measures	Country	Sample Size	Child Age	Time Between Exposure & Outcome	Study Quality
Aldous & Mulligan (2002)	White, continuously married couples with children aged 5 years.	Novel father self-report of tiem spent on childcare or alone with the child; maternal self-report of behavioral outcomes[11].	USA	600[a]	5 years – 9/10 years	Approx 60 months	Fair
Besnard et al. (2013)	Kindergarten class children from 40 large schools in suburban Montreal, 69% of sample 'at risk' of developing challenging behaviors.	Maternal self-report[7] of father's responsibility and engagement in playful/positive activities; parent self-report of behavioral outcomes[8].	Canada	644[a]	5 years	6 months (T1-T2); 12 months (T2 - T4)	Good
Cookston and Finlay (2006)	Families with two parents (biological mother and biological father or stepfather) residing with the child.	Novel adolescent self-report of shared activities, discussion of personal issues, closeness with father; adolescent self-report of behavioral outcomes using novel measure.	USA	2,387[a]	Mean age 15.5 years	Approx. 11 months	Fair
Davis et al. (2021)	Latino/a families residing in the USA for 5 years or less and living in urban settings.	Adolescent self-report[1] of father's communication/positive interaction and behavioral outcomes[2].	USA	241[a]	13 - 17 years	36 months	Good
Flouri and Buchanan (2002)	Generally representative sample of children born in England, Scotland and Wales in 1958, primarily biological fathers (81%), majority non-manual socioeconomic group.	Novel parent and teacher self-report of father's accessibility and direct interaction; mother self-report of of trouble with police.	UK	14,761[a]	7 years – 16 years	108 months	Fair
Flouri and Buchanan (2003)	Generally representative sample of children born in England, Scotland and Wales in 1958, primarily biological fathers (81%), majority non-manual socioeconomic group.	Novel parent (gender not specified) and teacher self-report of father's accessibility and direct interaction; maternal self-report of behavioral outcomes[10].	UK	8,362[a]	7 years - 16 years	108 months	Fair
Flouri et al. (2016)	Representative sample of children residing in the UK born between 2000-2002 and eligible for child benefit.	Novel father self-report of care frequency and positive activities; behavioral outcomes measured using mother self-report[5].	UK	8,302[a]	9 months – 7 years	24 months	Good
Hawkins et al. (2007)	Representative sample of children in grades 7 through 12 in the USA, who had a living, non-resident biological father. Control group of resident fathers included.	Novel adolescent self-report of father's communication, contact, and shared activities; behavioral outcomes measured using novel adolescent self-report.	China	3,394[a]	7 - 12 years	12 months	Good

Jia et al. (2012)	Primarily European American married/cohabiting parents living with focal child, recruited from a large midwestern city in the USA.	Novel father self-report of play and caregiving; behavioral outcomes measured using maternal self-report[9].	USA	93[a]	4 years	12 months	Good
Kroll et al. (2016)	Representative sample of children residing in the UK born between 2000-2002 and eligible for child benefit.	Novel measure of creative play with father (details of measure completer not reported); maternal self-report of behavioral outcomes[5].	UK	8,408[a]; 6,970[a]; 6,747[a]	5 – 7 years	24 months	Good
Lang et al. (2014)	Dual-earner, heterosexual, married, first time parents residing in a large midwestern city in the USA, with most being white and holding a B.A. degree.	Novel time diary measure of positive engagement completed by father; behavioral outcome measure completed by mothers[6].	USA	178[a]	3 months – 2 years	22 months (T1); 16 months (T2)	Good
McMunn et al. (2017)	Representative sample of children residing in the UK born between 2000-2002 and eligible for child benefit.	Novel father self-report of engagement (reading with child); behavioral outcomes measured by mother self-report[5.]	UK	9,238[a]	5 – 7 years	24 months (T1–T2); 24 months (T2–T3)	Good
Ochi and Fukiwara (2021)	Infants born in Japan in January and July 2001	Novel parent self-report survey of childcare hours and frequency of caregiving; novel self-report measure of behavioral outcomes.	Japan	27,870[a]	18 months – 5.5 years	54 months	Good
Ramchandani et al. (2010)	Population-based study sample from Bristol city.	Novel maternal self-report of father's direct care and positive engagement; behavioral outcomes measured using maternal self-report[5].	UK	5,064[a]	6 months to 6.75 years	60 months	Good
Slaughter and Nagoshi (2020)	Low-income married and unmarried parents and their children living in 20 cities in the USA.	Novel parent self-report of father's time spent on positive activities with their child; child self-report of behavioral outcomes[3, 12].	USA	2,236[a]	10-11 years	48 months	Good
Van Lissa and Keizer (2020)	Australian non-minority and intact biological families.	Parent self-report[4] of father's warmth and direct care; teacher self-report of behavioral outcomes[5].	Australia	1,884[b]	6 - 12 years	72 months	Fair

Note: [1] = Family involvement subscale of the Parenting Practices Scale (Gorman-Smith et al.,1996); [2] = Prosocial Tendencies Measure-Revised (Carlo et al., 2003); [3] = based on "Things that you have done" (Ensminger et al., 1991; Liska et al., 1986); [4] = Mix of validated (Child Rearing Questionnaire; Paterson & Sanson, 2001) and non-validated measure; [5] *The Strengths and Difficulties Questionnaire (Goodman, 1997);* [6] = Infant Toddler Social and Emotional Assessment (Carter et al., 2003); [7] = Involvement subscale of Alabama Parenting Questionnaire (Shelton et al., 1996); [8] Preschool Behavior Questionnaire (Tremblay et al., 1992); [9] = Child Behavior Checklist (Achenbach and Rescorla, 2000); [10] = Rutter 'A' Health and Behaviour Checklist (Rutter et al., 1970); [11] = Behavioral Problems Index (Peterson and Zill, 1986); [12] = Conner's Teacher Rating Scale – Revised Form (Conners, 2001). [a] = sample size where behavioral outcomes were analysed; [b]= baseline sample size.

Results from statistical analyses regarding father involvement and child behavioral outcomes are outlined in *Table 3.2.* Due to the large number of analyses performed across studies, only key effect sizes of interest are reported, along with the associated index (e.g., odds ratios, standardized beta coefficients, Pearson correlation coefficients, unstandardized correlation coefficients) where available. Levels of associated statistical significance are also outlined.

Eleven of the sixteen studies reported a significant association between father involvement and child behavioral outcomes in at least one behavioral domain (i.e., externalizing, internalizing, and psychosocial adjustment). The distribution of these significant associations varied across each study. For example, some studies found significant associations between father involvement and internalizing, but not externalizing behavior. Similarly, studies examining multiple domains of father involvement found significant associations for some domains but not for others. Five studies found no overall significant father involvement associations. For clarity, a consolidated summary of associations between father involvement conceptual domains and behavioral outcomes is outlined in *Table 3.3.*

Table 3.2

Key Effect Sizes, Statistical Significance, and Control Variables

Study Title	Father involvement Domain	Behavioral Outcome	Father Involvement Effect Size	Maternal involvement Effect Size	Control Variables
Aldous & Mulligan (2002)[b]	Time spent on childcare and time spent alone with the child	Adjustment	*NS*	*NS*	Household income, parental education, child age and gender, child behavior as preschoolers, number of children in home.
Besnard et al. (2013) [b]	Engagement, responsibility, playful/positive activities	Externalizing	*NS*	β = -0.06*	*Control variables not reported*
Cookston and Finlay (2006)[b]	Shared activities, discussion of personal issues, and parent-child closeness	Delinquency	β = -.04*	*NS*	Presence of stepfather, parent age, parent education, child gender. (Effects are *after* child behavior at wave 1 controlled).
		Depression	β = -.17***	*NS*	
		Alcohol use	*NS*	*NS*	
Davis et al. (2021)[b]	Communication and positive engagement.	Altruistic	*NS*	*NS*	Age, site and prosocial behaviors at time 1.
		Public	*NS*	*NS*	
		Emotional	*NS*	β= .15*	
		Dire	*NS*	β= .17*	
		Compliant	*NS*	β= .17*	
		Anonymous	*NS*	β= .18*	
Flouri and Buchanan (2002)[b]	Accessibility and direct interaction	Trouble with police (boys)	*B* = -0.16*	*NS*	SES group, intatc family, domestic tension, parental health/mentall health, household characteristics, child emotional/behavioral problems age 7, general ability age 11, low academic motivation age 16.
		Trouble with police (girls)	*NS*	*NS*	
Flouri and Buchanan (2003)[a]	Accessibility and direct interaction	Adjustment	*NS*	*NS*	Female gender, Parent SES, biological father, domestic tension, adjustment at age 7, parental ill health, general ability at age 11, low academic motivation age 16.

Flouri et al. (2016)[a]	Direct care and engagement in play or activities	School peer problems	*B* = -0.05***	*Controlled in model*	Family poverty, parental depressed mood, father's education, quality of inter-parental relationship, child's sibship size, ethnicity and gender.
		Conduct problems	*NS*		
		Hyperactivity	*NS*		
		Emotional symptoms	*NS*		
Hawkins et al. (2007)[a]	Shared activities	Externalizing	*NS*	*Controlled in model (Emotional closeness only)*	Gender, age, race, time since lived with father, parent education, parent nativity, family structure.
		Internalizing	*β* = -.07*		
	Communication	Externalizing	*NS*		
		Internalizing	*β* = -.05*		
	Emotional closeness	Externalizing	*NS*		
		Internalizing	*NS*		
Jia et al. (2012)[a]	Play (Teacher/Mother report)	Externalizing	β = -0.26*/ *NS*	*Controlled in model*	Parental age, family size, parents education, family income, child gender, and family earner status.
		Internalizing	β = *NS*		
		Social Competence	β = *NS*		
	Caregiving (Teacher/Mother report)	Externalizing	*NS*		
		Internalizing	*β* = 0.33* / *NS*		
		Social Competence	*NS*		
Kroll et al. (2016)[a]	Creative Play	Total behavior difficulties	OR = 0.89* (boys)	*NS*	(Varied across analyses). Included maternal age, mothers education, fathers education, breastfeeding duration, number of siblings in house, presence of father, mothers illness, mothers depression, fathers depression.
			OR = 0.81** (girls)	*NS*	
	Active Play		*NS* (boys and girls)	*NS* (boys and girls)	
	Creative Play	Prosocial behavior	*NS* (boys)	*OR* = 0.86***	
			NS (girls)	*OR* = 0.80***	
	Active Play		*NS* (boys)	*OR* = 0.89**	
			NS (girls)	*OR* = 0.84**	

Lang et al. (2014)[b]	Play and engagement in positive activities	Attention Mastery motivation	(slope) *β*= .34* (slope) *β*= .31*	(intercept) *β* = .35** (intercept) *β* = .37*	*Control variables not reported.*
McMunn et al. (2017)[b]	Engagement (reading with child)	Adjustment	*NS (T1-T2)* *NS (T2 – T3)*	*β* = -.05* *(T1 – T2)* *NS (T2 – T3)*	Child gender, infant temperament, at 9 months, parent age, occupational class, education, household income, working hours, parent depressive symptoms, number of siblings.
Ochi and Fujiwara (2021)[a]	Childcare and play or positive activities	Adjustment (boys) Adjustment (girls)	*OR* = 0.76*** *OR* = 0.77***	*Controlled in model*	Number of siblings, living with grandparents, paternal/maternal age at childbirth, paternal/maternal education, annual household income.
Ramchandani et al. (2010)[a]	Direct care and engagement in play or activities	Prosocial behavior Total behavior problems	*β* = .06** *β* = -.10**	*Controlled in model*	Infant gender and paternal education.
Slaughter and Nagoshi (2020)[b]	Time spent on positive activities with the child	Externalizing (girls) Delinquency (boys)	*β* = -.14** *β* = -.12*	β = .09* β = .11**	Models controlled for effects of fathers' age, SES, and health
Van Lissa & Keizer (2020)[b]	Warmth Direct care (within families)	Adjustment	*r* = 0.07[1] NR	*r* = 0.04[1] NR	No controls reported

Note: NR = not reported; *NS*= not significant; SES= socio-economic status; β= standardised beta coefficient; r = pearson correlation coefficient; B = unstandardised correlation coefficient; OR = odds ratio; *P< .05; ** P <.01; ***P < .001; [a] = reported father involvement effects are after maternal involvement and control variables were adjusted for in analyses; [b] = reported father involvement effects are after maternal involvement and control variables are accounted for.

Table 3.3

Synthesis of key associations

Study Title	Behavioral Outcome Domain	Father Involvement Domain
Aldous and Mulligan (2002)	Adjustment	Time spent on childcare or alone with the child
Besnard et al. (2013)	Externalizing	Engagement, responsibility, playful/positive activities
Cookston and Finlay (2006)	Externalizing (Delinquency) Internalizing* Adjustment	Shared activities, discussion of personal issues, and parent-child closeness
Davis et al. (2021)	Adjustment	Communication and positive interaction
Flouri and Buchanan (2002)	Externalizing (Trouble with police)*	Accessibility and direct interaction
Flouri and Buchanan (2003)	Adjustment	Accessibility and direct interaction
Flouri et al. (2016)	Adjustment*	Direct care and engagement in play or activities
Hawkins et al. (2007)	Externalizing Internalizing*	Participation in shared activities, communication, and emotional closeness (Resident fathers only)
Jia et al. (2012)	Externalizing* Internalizing* Adjustment	Play and caregiving
Kroll et al. (2016)	Adjustment*	Creative play and active play.

Lang et al. (2014)	Adjustment*	Positive engagement
McMunn et al. (2017)	Adjustment	Engagement (reading with child)
Ochi and Fujiwara (2021)	Adjustment*	Childcare and play or positive activities
Ramchandani et al. (2010)	Adjustment*	Direct care and engagement in play or activities
Slaughter and Nagoshi (2020)	Externalizing* Internalizing Delinquency*	Time spent on positive activities with the child
Van Lissa & Keizer (2020)	Adjustment*	Warmth and direct care

Note*: *denotes a significant association between outcome and father involvement.*

Externalizing Behavior

Of the six studies examining externalizing behavior, four reported significant father effects in this domain. Flouri (2002) found that father involvement significantly protected against problems with the police for male adolescents, suggesting that fathers played a significant role in preventing later delinquency in their sons. When maternal involvement was accounted for, there was no evidence that father involvement was a more important predictor of juvenile delinquency when maternal involvement was low. After controlling for maternal involvement, Jia et al. (2012) reported that father involvement in play was associated with decreased externalizing behavior in school. Interestingly, Slaughter (2020) reported that higher maternal involvement was associated with higher externalizing behavior, while higher father involvement was associated with lower externalizing behaviors in girls and delinquency in boys. Cookston and Finlay (2006) also reported a signficiant association between father involvement and reduced delinquency. Two studies (Besnard et al., 2013; Hawkins et al., 2007) did not find significant associations between father involvement and child externalizing behaviors. Thus, while there were findings to suggest that father involvement may protect against the development of externalizing behavioral problems in children, the evidence here remained equivocal.

Internalizing Behavior

Of the four studies examining internalizing behavioral outcomes, three reported significant father involvement associations. Hawkins et al. (2007) reported that resident fathers' participation in shared activities and communication with 7- 12-year-olds was significantly associated with lower internalizing problems after one year, with stronger effect sizes observed in the former domain. However, these associations were not present for non-resident fathers. Cookston and Finlay (2006) found that father involvement was associated with decreased

adolescent depression in 15-year-olds after one year, while no such effects were observed for maternal involvement.

Interestingly, Jia et al. (2012) reported that higher father involvement in the caregiving domain was associated with increases in internalizing behavior. It was hypothesized that fathers might rely on power assertion and directiveness during caregiving, which may heighten the risk of over-protection or overcontrol. These characteristics may subsequently increase the risk of behavioral problems. One study (Slaughter, 2020) found no significant father involvement or maternal involvement associations with child internalizing behaviors. Overall, the evidence base was also mixed regarding the protective effects of father involvement on internalizing behaviors.

Psychosocial Adjustment

Twelve studies conceptualized outcomes within the context of child psychosocial adjustment. Of these studies, seven reported significant direct father involvement effects. Ochi and Fujiwara (2021) reported that specific paternal activities such as taking children outside (for boys only) and playing at home (for boys and girls) in infancy helped to prevent later adjustment problems at 5.5 years. Similar effect sizes were observed for male and female children in this study. Lang et al. (2014) reported that higher father involvement with infants predicted better socioemotional competence and identified differing parental effect patterns. Fathers were associated with improved outcomes when their involvement increased over time, while children appeared to benefit from maternal involvement when they were involved from an initial early stage.

Kroll et al. (2016) found that child adjustment benefited significantly from father involvement in creative father-child play. There was no significant association reported

between active play and father involvement. Van Lissa & Keizer (2020) found marginally stronger effect sizes for father involvement (measured in terms of warmth) than maternal involvement effects on emotional adjustment in children aged 6-12 years. It was hypothesized that one-off interactions typical of fathers involving warmth (e.g., during play) may have accounted for these more substantial effects. Conversely, increased joint hours of direct care increased adjustment problems. It was suggested that excessive involvement in direct care might undermine opportunities for children to express autonomy, thus hindering the development of emotional regulation skills.

While Ramchandani (2010) reported significant father involvement associations with both outcome domains, stronger effect sizes were observed for reduced behavioral problems than increased prosocial behavior. Similarly, Kroll et al. (2016) reported that father involvement was not associated with prosocial behaviors. However, maternal invovlement was associated with prosocial behaviors when father involvement was controlled in analyses. Davis et al. (2021) reported that only maternal involvement was significantly associated with prosocial behavior. Neither maternal involvement nor father involvement with younger children was associated with fewer child behavioral problems in a study by Aldous and Mulligan (2002), while Flouri & Buchanan (2003) found no significant association between father or maternal involvement at age 7 and child adjustment at age 16 years.

While controlling for maternal involvement, Flouri et al. (2016) reported that higher father involvement was associated with fewer peer problems in school, although notably small effect sizes were observed for this association. Significant associations were not observed for hyperactivity or emotional problems. One study with a sample of younger children (McMunn et al., 2017) reported that only maternal involvement (reading with the child) reduced behavioral problems. This study hypothesized that reading with a child is more often associated with mothers and that maternal influences may have outweighed fathers'. Cookston and Finlay

(2006) utilized an adolescent sample and reported that associations between father involvement and maternal involvement and alcohol use were non-significant.

Discussion

We have examined whether higher levels of father involvement are associated with reduced child behavioral problems and increased psychosocial adjustment. This review advances and clarifies our understanding here by incorporating several specific strengths, such as (a) only including prospective studies, (b) including maternal involvement and other factors as control or comparator variables, (c) anchoring definitions of father involvement within established conceptual models and, (d) examining outcomes across a broader range of developmental ages. The studies included in this review also demonstrated a considerable number of methodological strengths. Sample sizes tended to be large, and participants were of various socioeconomic backgrounds, ethnicities, and family structures. Thus, the quality of all studies was evaluated, with all being rated as either ‘good’ or ‘fair’

The primary finding from this review was that of the sixteen studies that met inclusion criteria, twelve had reported significant father involvement associations with at least one domain of child behavioral outcomes. This finding provides considerable evidence to support the hypothesis that fathers can play a significant role in their child’s behavioral functioning. Given that previous research has consistently demonstrated the adverse outcomes of behavioral problems later in life (U.S. Public Health Service, 2000, as cited in Caughy et al., 2016; Meque et al., 2019; Narusyte, 2017), evidence from the current review suggests that father involvement may serve as an important protective factor more generally in a child’s life.

In line with previous reviews (Diniz, 2020; Sarkadi et al., 2008), aspects of father engagement (such as close contact, playing, and reading) was most commonly utilized to

conceptualize father involvement across studies in this review. Studies often reported a significant association between higher father involvement in play or enjoyable activities and fewer child behavioral problems (Flouri et al., 2016; Jia et al., 2012; Kroll et al., 2016; Lang et al., 2014; Ochi and Fujiwara, 2021; Ramchandani et al., 2010; Slaughter, 2020). The synthesis of such findings adds to existing literature regarding father-child play (Anderson et al., 2017; Bocknek et al., 2017; Dumont and Paquette, 2013) since maternal involvement was controlled or accounted for in this review.

These findings regarding play and enjoyable activities also align with Cabrera et al.'s (2014) suggestion that mothers and fathers may engage in the same behaviors, yet influence child development differently. In this regard, Paquette (2004) theorized that fathers might play an important role in developing a child's openness to the world through an "activating relationship." Interestingly, one study (Slaughter and Nagoshi, 2020) reported surprising findings in which higher maternal involvement in this domain was associated with increased child behavioral difficulties. However, it should be noted that maternal involvement was controlled in many of these studies examining play and positive activities, and associated maternal effect sizes were not available. Thus, while we have provided additional evidence that father involvement in enjoyable or playful activities constitutes a protective factor against the development of later behavioral problems, further research is required to determine if fathers are particularly unique in this regard.

Evidence regarding the effects of father involvement on specific child behavioral domains was more equivocal. For example, we found some evidence to suggest that father involvement may protect against the development child externalizing behavior. However, two studies did not report such associations. Similarly, seven studies reported associations between father involvement and behavioral adjustment, while eleven did not. Only four studies

examined associations between father involvement and internalizing behavior outcomes, of which two reported beneficial father involvement effects. It is possible that some methodological differences across studies partially explained such differential findings. For example, studies varied in terms of their conceptualization and measurement of father involvement, which may have contributed to inconsistencies in findings. However, such differential findings cannot be solely attributed to methodological variations alone, and more research is required in this regard. Thus, while we have found that father involvement generally contributed to positive behavioral outcomes, examining the effects of father involvement in isolation did not reveal distinct trends with regards to potentially unique effects on specific child behavioral domains.

When we examined the findings more broadly and contrasted both maternal and paternal involvement effects, there was some evidence to suggest that children benefited more from maternal than paternal involvement in terms of prosocial outcomes. In the two studies of prosocial outcomes where mother and father involvement effects were available (Davis et al., 2021; Kroll et al., 2016), only maternal involvement was significantly associated with child prosocial behavior. After controlling for maternal involvement, Ramchandani (2010) reported a significant association between father involvement and prosocial behaviors, with effect sizes being somewhat weaker than the effect sizes observed for the association with behavioral problems. While the overall evidence in this regard was limited, these findings regarding prosocial behavior outcomes raise an interesting hypothesis for future father involvement research to examine. It would be interesting to examine whether aspects of maternal involvement are more salient in promoting prosocial or positive behavioral functioning, while perhaps father involvement may have stronger protective effects against problematic behaviors.

This systematic review also added to the current research base by including studies examining children of a broad age range. However, only two studies measured both father involvement and outcomes during adolescence. Davis et al. (2021) found no father involvement associations with prosocial behavior outcomes. Conversely, Cookston and Finlay (2006) hypothesized that fathers might uniquely contribute to a reduction in adolescent depressive symptoms since adolescents may expect less from fathers in this regard than a more normative mother-child close relationship. These contrasting findings highlight a need for further research examining father involvement during adolescence and associated adolescent behavioral outcomes.

Limitations and Future Directions

Several limitations relevant to this review warrant some consideration. Although the review provides a detailed account of research relevant to community and non-clinical population samples, clinical populations and participants living outside natural settings were excluded. Future research may wish to examine father involvement within the context of such clinical populations, which may be beneficial for specialized intervention and policy development. The current review also utilised a systematic focus on the concept of 'father involvement.' It was hoped that this would facilitate a valid and more consistent comparison and understanding of study findings. Many studies returned in the initial search had referenced or measured concepts similar to father involvement but did not specifically conceptualize or operationalize these as such. These studies were therefore excluded from the review. In this regard, future studies could consider grounding their research within an established father involvement conceptual framework.

Only three studies in this review used empirically validated measures of father involvement and one study utilized diary methodology to measure father involvement, which

may have advantages over the more frequently used Likert self-report (Juster and Stafford, 1991). Thus, future studies could utilize standardized and validated father involvement measures to enhance the validity and reliability of findings. As previously outlined, while the majority of father involvement research has focused on more 'traditional' family structures (i.e., two-parent, heterosexual family units), it is important to recognize the diversity of family structures. Lamb (2010) argues that the father involvement construct has theoretical relevance to diverse family groups (e.g., same-sex parent families) and is also applicable to mothering. In this regard, future systematic reviews may wish to advance the father involvement construct and current understanding of child development by modifying criteria to focus on diverse family structures. Finally, studies may have been missed as this review was limited to articles written in English.

Clinical Implications

Despite the outlined limitations, evidence from the current review can have positive implications for clinical practice. Indeed, encouraging empirical evidence regarding interventions designed to increase father involvement has emerged in recent years (Pruett et al., 2017; Pruett et al., 2019; Rempel et al., 2017). Overall, Ramchandani and Iles (2014) highlighted a need for health, education, and social services to proactively support both parents with engaging in their children's lives from the very start. Thus, findings from this review and the broader empirical evidence suggest that proactive support (i.e., encouraging early father and mother involvement in non-clinical populations) could play a key role in preventing behavioral problems and subsequent referrals to mental health services.

In line with such a proactive approach, clinicians working across a range of community services could capitalize on the positive effects of father involvement while working with

parents and children in a community population. Evidence regarding the association between father involvement and positive behavioural outcomes could be consolidated into accessible psychoeducational material, which may outline specific father involvement activities and discuss the overall behavioural benefits associated with such involvement. For example, GP's, public health nurses or midwives could proactively encourage father involvement from an early stage by providing such psychoeducational material to parents during perinatal appointments or in antenatal classes. Primary Care clinicians could incorporate such evidence into community-based educational workshops designed to support parents with positive parenting ideas and strategies. On a wider scale, this evidence could also be disseminated to a large number of parents in the community using educational advertising campaigns.

While the current review focused primarily on non-clinical population samples, the current findings may also have relevance to clinical populations. Psychoeducational material regarding father involvement could also be utilised in appointments to reinforce the important role fathers can play in their child's socio-emotional functioning. Services could also strive to include *both* parents in the early referral process. By way of example, the standardized community referral form outlined in the Irish CAMHS Operational Guidelines (HSE, 2019) invites contact information for only one parent. Such forms and associated operational guidelines could be adapted to explicitly promote the inclusion of both parents (i.e., 'Name of Mother,' 'Name of Father,' 'Name of Second Caregiver.'

Conclusion

The current review adds to existing evidence suggesting that fathers play an essential role in preventing or reducing behavioral problems in children. Further research is required to understand how fathers and mothers differ in their potential effects on child behaviors.

However, some evidence suggests that fathers' involvement in play and enjoyable activities could be particularly salient in preventing or reducing behavioral problems. Included studies generally utilized robust methodology. However, studies were somewhat weaker regarding the measurement of father involvement. Future studies should strive to utilize available, validated measures of father involvement and draw from existing conceptual models to promote consistency across the research base. Findings from this review may hold particular significance for clinicians working across various services, where both father involvement and maternal involvement effects can be capitalized upon to prevent and address child behavioral difficulties.

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Chapter Four: Extended Systematic Review Methodology

The volume of available research literature grows and expands over time as new studies and relevant evidence are published. Professionals working within clinical settings rely on such literature to guide important decision-making processes. However, it can be difficult for professionals to efficiently work through such vast quantities of literature to find relevant data. Systematic reviews seek to address this issue by providing updated summaries of current knowledge relating to a particular topic (Higgins et al., 2019). The systematic review process involves defining a research question, identifying and critically appraising the relevant literature, and deriving conclusions from the synthesised available evidence. Assessing the quality of information derived from research is also a key feature of systematic review methodology. Therefore, systematic reviews are considered one of the most robust approaches for synthesising high-quality research (Boland et al., 2017). The following chapter will provide an extended outline and critique of the methodology used to conduct the current systematic review, which was not possible to include in the main article. As previously described, the procedures and steps underpinning the current systematic review were conducted as per the methodological recommendations by Boland et al. (2017).

Development of Systematic Review Research Questions

This systematic review sought to complement the research theme of the major research project of this thesis, which is outlined in *Chapter Five.* In this regard, a conscious effort was made to focus on paternal predictors of child socio-emotional functioning since the major research project examined such outcomes from a maternal perspective. The first step in achieving this objective was to develop a clear focus for the review and identify a primary research question. A scoping review was initially conducted using *Google Scholar* and

PubMed. General relevant keywords (e.g., “father-child relationships” and “child behavioural outcomes”) were used in these searches to identify relevant background literature.

The scoping review subsequently revealed that there was extensive literature available regarding mother-child relationships and child socio-emotional outcomes. However, there were relatively fewer research articles examining the same for fathers. This prompted a further and more refined scoping review of literature specific to father-child relationships and socio-emotional outcomes, which led to the identification of several ‘father involvement’ conceptual models. These models provided a guiding framework as the scoping review continued. Finally, a review of literature relevant to ‘father involvement’ revealed several issues and limitations among individual studies and existing systematic reviews in the current evidence base.

The research questions for the current systematic review were developed to address such gaps in the literature. While the review's primary focus was on examining father involvement as a predictor of child behavioral outcomes, the scoping review revealed that several studies also included maternal involvement as a predictor variable. Despite such studies, no previous systematic reviews had been found to focus on both mother and father involvement factors. Thus, it was decided that a secondary aim would be to further contextualise father involvement by incorporating maternal involvement factors as a control or comparator variable. The review also examined whether specific aspects of father involvement were more likely to be associated with child behavioural outcomes. This question sought to address current issues regarding conflicting findings and to contribute to the theoretical understanding of specific attachment dynamics in father-child relationships.

A quantitative approach was utilised to address these questions since examining effect sizes could yield a better understanding of the strength of father involvement effects on

behavioral outcomes. Such data could also contrast father involvement and maternal involvement effects where effect sizes were available for both.

Protocol Development

Prior to the commencement of the systematic review process, a protocol was developed as a guiding framework. This protocol was developed with consultation and collaboration from the Research Supervisor and contained a broad outline of the current literature base and proposed research questions and methodology. The protocol development stage facilitated the identification of some key issues that required consideration prior to the commencement of the review. For example, child behavioural problems were initially conceptualised solely within the context of either internalising or externalising behaviours. After some consideration, it was noted that narrowing the focus in this way could exclude additional markers of child behavioural outcomes. The construct of child psychosocial adjustment was subsequently included in the overall conceptualisation of behavioural outcomes to address this issue.

Methodology

Inclusion/Exclusion Criteria

This systematic review's inclusion and exclusion criteria were developed within the PICOSS framework. PICOSS refers to the population, intervention (exposure), comparator, outcome, study design, and setting. A detailed PICOSS table is outlined in *Table 4.1.* The inclusion and exclusion criteria were developed using this framework.

Table 4.1

PICOSS Framework for the Current Systematic Review

Participants	• Mothers/Fathers aged 18 years or older. • Children aged 0-17 years.
Intervention	• Father/Mother Involvement
Comparison	• *Not applicable to the current review*
Outcome	• Child behavioural problems
Study Type	• Longitudinal • Quantitative
Setting	• Natural settings

Search Strategy

Initial search terms were generated based on the concepts outlined in the PICOSS framework. This process was aided by searching synonyms for each term using online search engines and identifying terms used in existing systematic reviews (Sarkadi et al., 2008; Litchford, Roskos & Wengreen, 2020). Pilot searches were initially conducted to determine whether the search string was appropriate. Child outcomes were initially searched within the context of 'behaviour problems' and 'psychosocial adjustment problems.' However, it was noted that the inclusion of the term 'problems' may have potentially introduced an element of bias into the search. This term was subsequently dropped, and broader terms such as 'behav*,' 'psychosocial,' 'adjustment,' and 'peer relations' were utilised.

An initial search of *PubMed (see Appendix G)* included a broad range of terms derived from the previous scoping review. However, using these terms resulted in a large volume of studies being returned in the search, the majority of which did not meet the inclusion criteria for the current study. Thus, some terms were dropped and the search string was refined for subsequent searches. The search strategy was adapted to fit each database where possible. For

example, the "W/15" function was utilised while searching Scopus, ensuring that terms relevant to 'fathers' appeared within at least 15 characters from terms relating to 'involvement.'

Full-Text Screening and Data Extraction

24 studies were initially deemed eligible for inclusion following the data screening stage. All of these included studies were screened by two additional reviewers to confirm whether inclusion criteria had been met. There was a high level of agreement (92%) among reviewers regarding the inclusion of these studies. Two studies were excluded following discussion among reviewers, resulting in 22 studies moving forward to the data extraction stage. However, during the data extraction stage, it became evident that six of the initially included studies did not meet the inclusion criteria. One of these studies utilised parent samples who were under the age of 18, while two studies contained a sample with participants who were 18 years or older. Two studies did not conceptualise maternal involvement in line with the inclusion criteria, while the final study did not examine the direct effects of father involvement on behavioural outcomes. Further discussions were had with the second reviewer who had previously screened these studies, and it was agreed that the studies would be excluded from the review. This resulted in the final 16 studies being included in the systematic review.

Quality Assessment

The National Institute of Health (NIH) Quality Assessment Tool for Observational Cohort and Cross-Sectional Studies (NIH, 2014) was used to assess the quality of included studies and to identify potential biases *(see Appendix E).* This tool was selected as it was designed to include the assessment of longitudinal study designs. The tool indicates whether studies are of "*Good*," "*Fair*," or "*Poor*" quality. Relevant aspects of the study assessed by the

tool included the study research question, population, recruitment and uniform eligibility, sample size justification, exposure prior to outcome measurement, study time frame, exposure and outcome measurements, follow-up rate, and statistical analyses. The primary reviewer assessed the quality of all studies, while secondary reviewers reviewed ten of these studies. There was an 80% agreement rate among reviewers regarding study quality *(see Appendix F).* Disagreements in quality ratings were resolved through discussion.

Data Analysis and Synthesis

Based on recommendations from Ellis (2010), levels of statistical significance were reported alongside the associated effect size. The inclusion of effect sizes in this way may be considered a methodological strength since the practical significance of results could be interpreted. This approach supported the identification of different association strengths between specific father involvement or maternal involvement domains and child behavioural outcomes. Esterhuizen and Thabane (2016) noted that pooling results from studies that differ significantly might lead to potentially deceptive and invalid findings. Therefore, a narrative summary approach was chosen for this systematic review rather than a meta-analytical approach. This decision was made since there was a degree of heterogeneity among studies regarding the conceptual models of father involvement utilised.

Systematic Review Quality Assessment

The Reporting of Items for Systematic Reviews and Meta-Analyses (PRISMA; Moher et al., 2009) *(Appendix B)* was utilised as a guide while outlining the systematic review methodology and findings.

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Chapter Five: Major Research Project

Predictors of Socio-Emotional Functioning in Early Childhood: The Role of Mother-Child Relationships and Maternal Mental Health

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Predictors of Socio-Emotional Functioning in Early Childhood: The Role of Mother-Child Relationships and Maternal Mental Health

Abstract

Early attachment and maternal mental health have been reliably posited as predictors of socio-emotional outcomes in children. However, there is a need for further longitudinal research to examine the influence of these variables at multiple stages throughout infancy and early childhood. The current study utilized a longitudinal design to evaluate the predictive significance of these associations from 4 months to 48 months, relative to other demographic, maternal and child factors in a community sample of mothers (N = 124). Secondary data was obtained from three previous waves of the ongoing *BabySMART* study. The current study recruited participants for a fourth wave of data collection using an online survey. Preliminary bivariate analyses suggested that indicators of maternal mental health and overall health-related quality of life (when children were aged 4, 18 and 48 months) and mother-child closeness and conflict (at 48 months) were significantly associated with child socio-emotional problems at 48 months. Aspects of child cognitive development (only at four months) were also significantly associated with socio-emotional problems at 48 months. Further hierarchical regression models confirmed the particular significance of mother-child relationship and maternal mental and physical health factors at four months for predicting child socio-emotional outcomes at 48 months. Clinical implications and future research in this field are discussed.

Keywords: Attachment, maternal mental health, child socio-emotional functioning, longitudinal research.

Introduction

It has been reliably demonstrated that early experiences are formative for the developing child. During these early years of life, neural circuits are established at an extraordinary rate. The development of such circuits is highly influenced by various environmental circumstances and experiences (Zeanah, 2018). Patterns of child development may be observed across many areas, including physical, cognitive, linguistic, emotional, and social domains. The latter two domains are often merged to describe overall socio-emotional development. The development of socio-emotional skills is imperative since these skills enable children to successfully manage and express a range of emotional states and develop positive relations with others (Neaum, 2019; Zeanah, 2018).

Research has consistently demonstrated that difficulties with socio-emotional functioning in childhood have detrimental and cumulative consequences. Children who struggle to regulate their emotional states have been shown to find it more difficult to socialize with their peers (Asik-Ozturk et al., 2019) and demonstrate weaker social skills (Di Maggio et al., 2016). In contrast, children who have better social competencies have been shown to have higher learning motivation in school (Magelinskaite et al., 2014) and fewer behavioral problems (Hukkelberg et al., 2019). Longitudinal evidence has also indicated that socio-emotional problems in childhood are associated with poorer outcomes later in adulthood, such as anti-social behavior and drug abuse (Picoito et al., 2021), internalizing symptoms and self-harm (Papachristou and Flouri, 2021) and academic problems (Sallis et al., 2019). Given the importance of socio-emotional development for child wellbeing and social outcomes, it is unsurprising that research has sought to understand the potential risk and protective factors for same.

It is generally accepted that biological and social factors interact to shape child development (Bronfenbrenner, 1979; Neaum, 2019). Regarding social factors, research has consistently shown that aspects of the caregiver-child relationship play a critical role in child socio-emotional development. Attachment theory (Bowlby 1969; 1973; Ainsworth, 1969) provides a theoretical context for understanding how such relational factors influence child outcomes. For example, children learn to internalize emotional regulation strategies through their experiences of the caregiver relationship, which are later generalized to experiences outside of the attachment relationship (Brumariu, 2015). Attachment may also directly shape behavior in cases where children learn to utilize maladaptive behaviors (e.g., challenging behaviors) to meet their attachment needs. Moreover, children may internalize emotion regulation strategies or cognitive biases from their experiences of the caregiver relationship (Cassidy and Shaver, 2018). Attachment itself may also be influenced by interactions within the caregiver-child dyad (De Wolff and Van Ijzendoorn, 1997).

Evidence supports this theoretical link between the parent-child relationship and child socio-emotional functioning. Positive attachment-related factors have been associated with higher competencies in understanding and regulating emotions (Boldt et al., 2020; Brumariu et al., 2021), more empathic understanding (Murphy & Laible, 2013), better peer interactions (Cummings et al., 2013; Fearon et al., 2010; Groh et al., 2014), fewer socio-emotional problems (Wong et al., 2022) and more efficient responses to stressful situations (Contreras et al., 2000). Such findings corroborate the understanding that children rely on attachment relationships to support their emotional development and regulation (Zeanah, 2018).

A second factor to emerge as an important consideration for socio-emotional outcomes in children is their parent's mental health. Parenting involves meeting a range of complex and often competing demands. Evidence has shown that experiences of postpartum depression and

anxiety can make it challenging to use adaptive interaction styles with infants, attain vocal synchrony, engage in child-enriching activities, and process positive facial expressions (Arteche et al., 2011; Field, 2010; Stein et al., 2012). Research has consistently demonstrated an association between parental mental health difficulties and child socio-emotional problems (Crum and Moreland, 2017; Jones et al., 2021; Neece et al., 2012; Pinquart, 2017; Prenoveau et al., 2017; Stone et al., 2016; Theule et al., 2013).

This evidence base, however, is not unequivocal, and several issues remain. While research has examined child socio-emotional outcomes within the context of *either* the mother-child relationship or maternal mental health, fewer studies have measured *both* of these constructs simultaneously. Even fewer studies have examined the longitudinal associations between these variables during infancy and early childhood (i.e., preschool years). Studies examining maternal mental health have also tended to focus on indicators of depression or anxiety while maintaining a minimal focus on maternal stress. Moreover, Cassidy and Shaver (2018) emphasized the need to understand further how attachment operates in conjunction with additional factors to influence child development. In this regard, there is a need for more studies that control for additional variables which have shown associations with child socio-emotional functioning, such as structural factors, parent physical health, and aspects of infant sleep (Altafim et al., 2018; Cabello et al., 2017; Carvahlo Bos et al., 2009; Cordts et al., 2020; Hysing et al., 2016; Lobermeier et al., 2022; Reiss, 2013).

Finally, to the best of the author's knowledge, no longitudinal studies have included indicators of child development alongside mother-child relationship and maternal mental health factors while exploring child socio-emotional functioning. Including child development factors is crucial since these factors may also influence socio-emotional outcomes (Anderson, 2018). Thus, there is an overall need for more longitudinal research to address these current

issues since longitudinal studies where reporting is dissociated in time can allow for more causal inferences to be made.

The present study examined socio-emotional functioning in early childhood by recruiting a community sample of mothers and children aged 48 months. These families had participated in previous longitudinal research (the *BabySMART* study) since their children were 2 weeks old. This study was initially developed to examine the effect of an infant massage intervention on child outcomes (INFANT, 2020). We examined associations, the unique variance and total variance of maternal mental health factors and the mother-child attachment relationship at 4, 18, and 48 months, and child socio-emotional outcomes at 48 months. To further contextualize these predictor variables and their contribution to child socio-emotional outcomes, we included additional variables relevant to child socio-emotional functioning. These variables included infant sleep factors, the mother's health-related quality of life, and child developmental indicators. In sum, our study sought to address the following questions:

Primary Research Question: Does maternal mental health and the mother-child relationship at 4 and 18 months predict early childhood socio-emotional outcomes at 48 months? Do relationship and maternal mental health factors measured concurrently at 48 months add to the significance of any longitudinal associations?

Secondary research question: Do these factors add to the variance in outcomes explained by other relevant variables, such as structural factors (e.g., demographic family factors, overall parent health) and early child factors (e.g., developmental indicators, sleep difficulties)?

Materials and Methods

Study Design

This study was longitudinal in design. Maternal mental health and mother-child relationship factors at 4 and 18 months were examined for predictive utility for child socio-emotional outcomes at 48 months. Comparable predictor variables, collected cross-sectionally at 48 months, were also examined. Ethical approval for this study was received from The University College Cork Clinical Psychology Research Ethics Committee (CPREC), and The Clinical Research Ethics Committee approved this protocol amendment of the Cork Teaching Hospitals (CREC*) (see appendix H).*

Participants and Recruitment

The current study examined the primary and secondary research questions in a non-clinical sample. The community sample was recruited from the ongoing *BabySMART* (Study of Massage therapy, sleep And neurodevelopMenT) project. This project was conducted by the *Irish Centre for Maternal and Child Research* (INFANT). Participant eligibility criteria for this original study included mothers of healthy, singleton birth infants born after 37 weeks gestation (INFANT, 2020; Ventura et al., 2022). Initial study recruitment began in 2017 at *Cork University Maternity Hospital*, where mothers were approached by members of the research team within 48 hours post-delivery. Participants were randomized into either an intervention (massage) or non-intervention group at 2 weeks (INFANT, 2020). Data was available for participants at 2 weeks (N = 269), 4 months (N = 178) and 18 months (N = 171).

Baseline sample representativeness at two weeks was considered with reference to data from the *Irish Central Statistics Office* (CSO, 2017; 2020; 2021). The majority of mothers and fathers in this sample were white Irish, and there were slightly more male (55%) than female

children. These characteristics were largely representative of the 2016 Irish CSO census data. However, household, socio-economic and educational attainment demographics were generally more advantaged than the general population represented by this data. While only 10% of the original baseline sample were lone parents, this figure was 21% in national census norms. The proportion of participants who had attained third-level education or higher (93%) was above the national average (53%), while just over half of participants (51%) reported earnings above the national annual average for full-time employment.

Participants who had previously taken part at 4 months were contacted by text and email. Emails included an information poster *(Appendix J)* and a URL link to a detailed information sheet, consent form, and an online survey (delivered via Qualtrics software; Provo, UT) *(see Appendix K).* Upon completing the survey, participants were thanked for participating, and two further prompt texts and emails were sent to participants of previous waves who did not respond to the initial invitation. Sample characteristics for participants who opted in at 48 months (N=124) are outlined in *Table 5.1* and contrasted with those who were not contactable or declined to participate (N=145). Overall, the 48-month sample demographics remained consistent with the original baseline sample. Pearson's Chi-Square analyses revealed that maternal nationality was the only statistically different demographic factor ($p < .05$) between responders and non-responders at 48 months. In this regard, a significantly smaller proportion of non-Irish mothers participated at 48 months than in the original baseline sample at two weeks.

Table 5.1

Key Demographics of Baseline, Phase 4 Completer and Phase 4 Non-Completer Sample

Variable	Baseline Sample - N (%)	48 month Completers – N (%)	48 month Non-Completers – N (%)
Infant Gender			
Male	147 (55%)	73 (59%)	74 (51%)
Female	122 (45%)	51 (41%)	71 (49%)
Maternal nationality*			
Irish	236 (88%)	115 (93%)	121 (83%)
Other	33 (12%)	9 (7%)	24 (17%)
Maternal Ethnicity			
White	262 (97%)	121 (98%)	141 (97%)
Other	7 (3%)	3 (2%)	4 (3%)
Paternal Nationality			
Irish	232 (86%)	112 (90%)	120 (83%)
Other	37 (14%)	12 (10%)	25 (17%)
Paternal ethnicity			
White	259 (96%)	122 (98%)	137 (95%)
Other	10 (4%)	2 (2%)	8 (6%)
Parental education			
Below third level	18 (7%)	8 (6%)	10 (7%)
Third level or higher	251 (93%)	116 (94%)	135 (93%)
Employment			
Employed	236 (88%)	110 (89%)	126 (87%)
Unemployed	33 (12%)	14 (11%)	19 (13%)
Household Structure			
Living with spouse/partner	242 (90%)	112 (90%)	130 (90%)
Parent living alone	4 (2%)	1 (1%)	3 (2%)
Parent living with others	265 (98%)	123 (99%)	142 (98%)
Household Income			
Below 48K/year	46 (17%)	15 (12%)	31 (21%)
Above 48K/year	137 (51%)	68 (55%)	69 (48%)
Not reported	86 (32%)	41 (33%)	45 (31%)

Note: *denotes a statistically significant difference (P = <.05) between phase 4 completers and non-completers.

Measures

All predictor and outcome measures used at each time point are outlined below in *Table 5.2.*

Table 5.2

Measures Utilised at Each Stage of Data Collection

Variable(s)	2 Weeks	4 Months	18 Months	48 Months
Demographics	Maternal age, infant gender, mother and father ethnicity/nationality, education, employment, living alone/with spouse or partner, net income, education)	-	-	-
Infant Sleep	Infant sleep hours/problems	Infant sleep hours/problems	Infant sleep hours/problems	-
Child Development	-	*Griffiths-III*	*Griffiths-III*	-
Maternal Health-Related Quality of Life	*European Quality of Life Measure*	*European Quality of Life Measure*	*European Quality of Life Measure*	*European Quality of Life Measure*
Infant Massage	Initial participation in infant massage intervention	-	-	-
Maternal Mental Health	-	*EPDS*	*BAI & BDI-II*	*DASS-21*
Mother-Child Relationship	-	*MPAS*	-	*CPRS-SF*
Socio-emotional Functioning	-	-	-	*SDQ (2-4)*

Note: ***MPAS*** **=** *Mother Postnatal Attachment Scale;* ***EPDS*** *= Edinburgh Postnatal Depression Scale;* ***BDI*** **=** *Beck Depression Inventory;* ***BAI*** **=** *Beck Anxiety Inventory;* ***DASS-21*** **=** *Depression, Anxiety and Stress Scale;* ***CPRS-SF*** *= Child Parent Relationship Scale (Short Form);* ***SDQ*** *= Strengths and Difficulties Questionnaire.*

Primary Predictor Variables

Mother-Child Relationship Factors: Four aspects of the mother-child attachment relationship were measured at four months using the *Maternal Postnatal Attachment Scale* (Condon and Corkindale, 1998). Scales for this measure and associated Cronbach alphas for the current study sample included *'Quality of Attachment'* ($\alpha = 0.63$), *'Absence of Hostility'* ($\alpha = 0.54$), *'Pleasure in Interaction'*($\alpha = 0.49$), *and 'Overall Attachment'* ($\alpha = 0.72$). The *MPAS* has previously demonstrated acceptable psychometric properties regarding internal consistency, test-retest reliability, and construct validity (Condon and Corkindale, 1998; Van Bussel et al., 2010).

At 48 months, parents completed the *Child-Parent Relationship Scale* (*CPRS*; Driscoll & Pianta, 2011). The *CPRS* is a 15-item self-report measure of parents' perceptions of their relationship with their children and includes a *Closeness* and *Conflicts* scale. The *CPRS* has demonstrated adequate internal consistency, with a reported Cronbach's alpha $\alpha = 0.69$ for the *Closeness* subscale and $\alpha = 0.84$ for the *Conflicts* subscale (Driscoll and Pianta, 2011). Reliability analyses for the current study partially corroborated these previous psychometric findings. The *Conflicts* scale of the *CPRS* demonstrated a strong Cronbach's alpha value ($\alpha = 0.82$), while the *Closeness* scale demonstrated a weaker Cronbach's alpha value ($\alpha = 0.42$). This finding suggests that poor internal consistency was observed for the *Closeness* scale. The potential implications of this are discussed in later sections.

Existing research has suggested that these *Closeness* and *Conflicts* subscales map onto the attachment security construct. O'Connor et al. (2014) reported that the *CPRS Closeness* and *Conflicts* were associated with mother-child attachment security at 24 months. A significant positive relationship between *Closeness* and attachment security was observed, while a significant negative relationship was found between *Conflicts* and attachment security. Despite small effect sizes being observed for these associations, these findings suggested that

the mother-child *Closeness* subscale measured a child's ability to utilize their mother as a secure base while navigating the world. Lower levels of closeness may suggest that children are less confident in their caregiver's ability to protect them during times of stress.

Maternal Mental Health: Depression and anxiety symptoms at 4 months were measured using the *Edinburgh Postnatal Depression Scale* (*EPDS*; Cox et al., 1987). The *Beck Anxiety Inventory* (*BAI*; Beck et al., 1988) and the *Beck Depression Inventory-II* (*BDI-II*; Beck et al., 1996) measured anxiety and depression symptoms at 18 months. These measures have all demonstrated acceptable psychometric properties in previous research (Cox et al., 1987; Dozois et al., 1998; Fydrich et al., 1992). Current sample Cronbach alphas for the *EPDS Total* (depression) score ($\alpha = 0.83$) and *EPDS Anxiety* ($\alpha = 0.80$) were acceptable, while Cronbach alphas were not available for the *BDI-II* and *BAI*. Mental health symptoms were also measured at 48 months using the *Depression, Anxiety, and Stress Scale - 21 Items* (*DASS-21*; Lovibond & Lovibond, 1995). Excellent Cronbach alpha values were previously reported for the *Depression* ($\alpha = 0.81$), *Anxiety* ($\alpha = 0.89$) and *Stress* ($\alpha = 0.78$) scales (Coker et al., 2016). Similar Cronbach's alpha values for the *Depression* ($\alpha = 0.85$), *Anxiety* ($\alpha = 0.70$), and *Stress* ($\alpha = 0.82$) subscales were found during reliability analyses for this study.

Secondary Predictor Variables

Data regarding child gender, maternal age, parental education, employment, socio-economic status, household composition, and parent ethnicity/nationality were collected at 2 weeks. Parents provided data regarding infant sleep at 4 months and 18 months using a sleep diary developed for the *BabySMART* study (INFANT, 2020). A measure of perceived maternal *Health-Related Quality of Life* was also obtained across all time points using the *European*

Quality of Life Measure (TheEuroQoLGroup, 1990), which has been used previously for clinical and research purposes (Rabin and de Charro, 2001). For this measure, respondents grade their perceived health status from 0 (worst possible health status) to 100 (best possible health status) (Balestroni and Bertolotti, 2012). Child development indicators were measured at four and 18 months using the Griffiths-III Scales of Child Development, 3rd Edition (Green et al., 2016). Parents' participation in the original infant massage *BabySMART* intervention was also documented at two weeks and was included as a predictor variable to ensure any effects of the intervention were controlled.

Outcome Measures

Child Socio-emotional Functioning: The *Strengths and Difficulties Questionnaire Parent Report for 2-4-year-olds* (*SDQ 2-4*; Goodman, 1997) measures four domains of child socio-emotional difficulties: *Emotional Problems, Conduct Problems, Peer Problems, and Hyperactivity/Inattention.* The sum of these subscales contributes to a *Total Problems* score, while a separate *Prosocial Scale* taps into positive aspects of socio-emotional functioning. The *SDQ* has been utilized in many previous studies examining child socio-emotional functioning (Bakopolou and Dockrell, 2016; Rosenberg and Avrech Bar, 2020; Swift et al., 2021; van Poortvliet, 2021).

Previous studies have found that the preschool version of the SDQ demonstrated satisfactory Cronbach's alpha for all subscales (α range 0.71 – 0.84), although the *Peer Problems* subscale demonstrated lower alpha values (α = 0.54). However, the overall *SDQ 2-4* has demonstrated satisfactory psychometric properties for identifying psychosocial problems in very young children (Croft et al., 2015; D'Souza et al., 2017; Theunissen et al., 2013). Similar psychometric properties were observed for the current study. Cronbach's alpha values

for the *SDQ Total Problems* ($\alpha = 0.74$), *Emotional Problems* ($\alpha = 0.60$), *Conduct Problems* ($\alpha = 0.63$), *Hyperactivity* ($\alpha = 0.68$), and *Prosocial* ($\alpha = 0.61$) scales were all within the acceptable range. As observed in the previously outlined studies, poorer internal consistency was also observed for the *Peer Problems* scale ($\alpha = 0.48$) for this study.

Plan of analyses

Psychological factors were profiled and compared to reference group norms to evaluate the representativeness and distribution of the current sample. Effect size deviations were subsequently calculated from this normative data. Exploratory analyses were conducted using bivariate correlation analysis to identify variables demonstrating some level of association ($p < 0.05$) with child socio-emotional outcomes (based on the *SDQ Total Problems* and *SDQ Prosocial* scale). These variables were then sequentially entered into a hierarchical multiple regression based on the time period the data was collected. Preliminary analyses for multiple regression models revealed that the assumptions of linearity, residual normality, multicollinearity, and homoscedasticity were met. Bivariate correlational analysis was also used to evaluate the stability of maternal mental health variables over time, in conjunction with analysis of changes to 'caseness' levels observed among participants. Mental health 'Caseness' were based on the following scoring criteria: ≥6 for the *EPDS Anxiety* scale (Matthey, 2008), ≥13 for the *EPDS Total* score (Matthey et al., 2006), ≥16 for the BAI (Beck and Steer, 1993, as cited in Carney et al., 2011), ≥20 for the BDI-II (Park et al., 2020) and ≥7, ≥6, and ≥10 for DASS-21 *Depression*, *Anxiety* and *Stress* respectively (Gomez, n.d.; Thomas et al., 2016).

Results

Data Management

Data was analyzed using the IBM Statistical Package for Social Sciences (SPSS; Version 28). The final sample (*N*=124) consisted of participants who had taken part at two weeks and who had been retained at 48 months. Due to the small proportion of fathers who completed the questionnaires within the sample, only maternal health measures (health-related quality of life and mental health indicators) and relational measures completed by mothers were included in the analyses as predictor variables. This resulted in two cases being excluded from analyses of these variables.

Initial data analysis revealed that data was typically skewed. Therefore, Pearson's correlations and independent sample t-tests were performed, as well as separate bootstrap analyses, to ensure the robustness of the results (Onyesom and Aboko, 2021). Boxplot analysis revealed the presence of several significant outliers. Winsorising and trimming procedures were utilized to manage outliers (Field, 2018; Ghosh and Vogt, 2012; Miller, 1966, as cited in Wike, 2006; Reifman et al., 2010).

Sample Profile - Psychosocial Functioning

Subscale means and standard deviations relating to psychosocial factors for the current sample and associated published norms, along with effect size deviations for differences between these samples, are reported in *Table 5.3*. Regarding child socio-emotional outcomes, most mean *SDQ* subscale scores did not meet the threshold for clinical caseness (based on the 'high/low' – 'very high/very' categories outlined by Goodman, 1997). Mean scores obtained for all *SDQ* scales were closely aligned with previously reported norms (Youth in Mind, n.d.). Effect size deviations ranged from d = -.09 to d = 0.11. These characteristics suggested that the current

sample was comparable to normative profiles for non-clinical children with few socio-emotional difficulties.

Table 5.3

Psychosocial Variable Means, Standard Deviations, and Effect Size Deviations for Current and Population Samples

Variable	48 Months Mean (SD)	Effect Size Deviation	Reference Population Mean (SD)
Child Measures			
SDQ Total Problems	7.35 (4.02)	d = 0.01	7.3 (5.0)[1]
SDQ Emotional Problems	1.16 (1.37)	d = 0.05	1.1 (1.3)[1]
SDQ Hyperactivity Scale	2.77 (1.92)	d = -0.06	2.9 (2.3)[1]
SDQ Peer Problems	1.18 (1.27)	d = -0.09	1.3 (1.4)[1]
SDQ Conduct Problems	2.20 (1.57)	d = 0.11	2.0 (1.8)[1]
SDQ Prosocial Scale	8.22 (1.51)	d = 0.06	8.1 (1.8)[1]
Maternal Mental Health			
DASS-21 (Depression)	1.56 (2.44)	d = -0.33	2.83 (3.87)[2]
DASS-21 (Anxiety)	1.10 (1.82)	d = -0.26	1.88 (2.95)[2]
DASS-21 (Stress)	4.55 (3.12)	d = -0.05	4.74 (4.20)[2]
BDI-II	6.16 (6.45)	d = 0.07	5.7 (6.8)[3]
BAI	3.98 (6.25)	d = -0.02	4.09 (5.06)[4]
EPDS (Depression)	5 (4.0)	d = 0.03	4.9 (3.7)[5]
EPDS (Anxiety)	2.9 (2.27)	d = 0.05	2.8 (1.8)[5]
Child-Parent Attachment			
MPAS Quality of Attachment	42.16 (3.00)	d = 0.37	41.17 (2.67)[6]
MPAS Absence of Hostility	21.52 (2.36)	d = 0.73	19.36 (2.95)[6]
MPAS Pleasure in Interaction	22.07 (2.21)	d = 0.39	20.97 (2.85)[6]
MPAS Overall Score	85.75 (5.63)	d = 0.56	83.4 (5.15)[7]
CPRS Closeness	33.53 (1.55)	d = -1.38	37.28 (2.71)[8]
CPRS Conflicts	15.45 (5.52)	d = -0.21	16.52 (5.19)[8]

[1] = Youth in Mind (n.d.); [2] = Henry and Crawford (2005); [3] = Kjærgaard et al. (2014); [4] = Muntingh et al. (2011); [5] = Brouwers et al. (2001); [6] = Brassel et al. (2020); [7] = Petri et al. (2018); [8] = Driscoll and Pianta (2011).

With regard to the mother-child relationship measures, *CPRS* mean scores for *Conflicts* aligned with previously published community-sample means (Driscoll and Pianta, 2011). The

mean *Closeness* scores for the current study differed from these previously published findings (d = 1.38), which may have been partially explained by the poor internal consistency observed for this measure. *MPAS* scale scores partially aligned with previously published community sample data (Brassel et al., 2020; Petri et al., 2018), with effect size deviations ranging from d = 0.37 to d= 0.73. Overall, these scores suggested that the current sample was comparable to a community population of mother-child dyads, with the current sample reporting more positive mother-child attachment relationships than previous norms.

In terms of maternal mental health measures, mean *DASS-21* scale scores were consistent with previously published findings derived from a general UK population sample (Henry and Crawford, 2005). Effect size deviations ranged from d = -.05 to d = -.33. Less than 6% of participants scored within the *'moderate'* to *'extremely severe'* ranges in the current sample. *BAI* and *BDI-II* scores corroborated previously reported scores (Kjærgaard et al., 2014; Muntingh et al., 2011), with effect sizes ranging from d = -.07 to d = -.02. Similarly, *EPDS Total (Depression)* and *Anxiety* mean scores aligned with previously reported scores (Brouwers et al., 2001), and effect sizes ranged from d = .03 to d = .05. Overall, these scores suggested that the current sample was representative of mothers who were not presenting with mental health difficulties and could thus be considered a non-clinical sample.

Preliminary Exploratory Analyses – Longitudinal and Cross-Sectional Associations between Predictor Factors and Child Socio-Emotional Outcomes

Exploratory data analysis was first performed to explore associations between the predictor and outcome variables. Bivariate correlation and independent samples t-test analyses were utilized to determine associations between predictor variables and each *SDQ* subscale domain. Statistically significant associations and associated effect sizes are detailed in *Table 5.4*, while

an extended outline of all associations (including non-significant associations) is reported in *Appendix I*.

Exploratory Analyses - SDQ Total Problems

Longitudinal maternal mental health factors consistently predicted *SDQ Total Problems*, with small/medium effect sizes observed *(see Table 5.4).* These analyses suggested maternal mental health problems during infancy and toddlerhood were associated with more socio-emotional problems when children entered early childhood. The same pattern was observed for the measure of maternal *Health-Related Quality of Life*, where mothers who reported a poorer health status at 4 and 18 months were significantly more likely to report child socio-emotional problems at 48 months. A similar trend was found in cross-sectional analysis, where all *DASS-21* scales and the *Health-Related Quality of Life* measure were significantly associated with *SDQ Total Problems.* A medium effect size was observed for the association between the *DASS-21 Stress* scale at 48 months and *SDQ Total Problems*, the strongest effect size observed among all associations between maternal mental health indicators and outcomes.

In contrast, no significant longitudinal associations were found between the *MPAS* subscales at four months and *SDQ Total Difficulties at 48 months*. The same trend was observed for the remaining SDQ problem scales, except for the *Hyperactivity/Inattention* scale, where a weak significant negative association was observed with the *MPAS Pleasure in Interaction.* This suggested that our measure of early attachment experiences in infancy generally did not longitudinally predict socio-emotional problems in early childhood at 48 months. Cross-sectional bivariate analyses of mother-child relationship factors did show that higher *CPRS Closeness* at 48 months was significantly associated with *SDQ Total Problems*, although the effect size for this association was notably small. However, the strongest

independent association among all predictor variables was observed between the *CPRS Conflicts* scale and *SDQ Total Problems*.

Overall, association patterns observed on the remaining SDQ scales (*Emotional Problems*, *Conduct Problems*, and *Hyperactivity/Inattention*) did not differ distinctly from those observed on the *SDQ Total Problems* scale. One exception was the *Peer Problems* scale, where very few significant associations were observed. No statistically significant associations were found between demographic variables (parent ethnicity, nationality, income, education, employment, child gender, and maternal age), infant sleep factors, or participation in the infant massage intervention and *SDQ Total Problems* at 48 months. Surprisingly, only the *four-month Griffiths-III Foundations of Learning scale* was significantly associated with the *SDQ Total Problems* scale at 48 months.

Exploratory Analyses -SDQ Prosocial Scale

Independent samples t-tests found a significant difference in *Prosocial Scale* scores based on parental ethnicity, with white parents reporting fewer prosocial behaviors than non-white parents *(see Table 5.4).* No significant differences were found for demographic factors, infant sleep problems, or participation in the infant massage intervention. A significant negative association was found between the *Griffiths-III Eye and Hand Co-Ordination* scale at four months and the *SDQ Prosocial Scale* at 48 months, with a small effect size observed. In this regard, higher scores on this developmental scale were associated with fewer prosocial behaviors. Similarly, more hours of infant sleep at 18 months longitudinally predicted fewer prosocial behaviors at 48 months.

In contrast to the *SDQ Total Problems* bivariate analysis findings, one measure of early mother-infant attachment *(MPAS Pleasure in Interaction)* at four months significantly

predicted prosocial behavior at 48 months. Cross-sectional analyses revealed that *CPRS Closeness* and *Conflicts* at 48 months were also significantly associated with prosocial behaviors at 48 months. Medium and small effect sizes were observed for these scales, respectively. No longitudinal or cross-sectional measures of maternal mental health significantly predicted prosocial behavioral outcomes.

Table 5.4

Associations between Predictor and Outcome Variables

Predictor Variable	SDQ Total Difficulties	SDQ Emotional Problems	SDQ Conduct Problems	SDQ Hyperactivity	SDQ Peer Problems	SDQ Prosocial
2 Weeks						
Child Gender	-	-	-	-	-	-
Maternal Age	-	-	-	***r* = -.226***	-	-
Maternal Health-Related Quality of Life	-	-	-	-	-	-
Maternal Ethnicity	-	-	-	-	-	***d* = -.531*****
Paternal Ethnicity	-	-	-	-	-	***d* = -.526*****
Maternal Nationality	-	-	-	-	-	-
Paternal Nationality	-	-	-	-	-	-
Parental Education	-	-	-	-	-	-
Employment	-	-	-	-	-	-
Net Income	-	-	-	-	-	-
Participated in Baby Massage	-	-	-	-	-	-

Predictor Variable	SDQ Total Difficulties	SDQ Emotional Problems	SDQ Conduct Problems	SDQ Hyperactivity	SDQ Peer Problems	SDQ Prosocial
4 Months						
Infant Sleep Problems	-	***d* = -.628***	-	-	-	-
Hours of Infant Sleep	-	-	-	-	-	-
Maternal Health-Related Quality of Life	***r* = -.287****	-	***r* = -.221***	***r* = -.183***	-	-
EPDS Depression	***r* =.259****	-	***r* = .224***	***r* =.262****	-	-
EPDS Anxiety	***r* = .251****	***r* = .188***	-	***r* = .272****	-	-
Griffiths III – Foundations of Learning	***r* = .234***	***r* = .285****	-	-	-	-
Griffiths III – Language and Communication	-	-	-	-	-	-
Griffiths III – Eye & Hand Co-ordination	-	-	-	***r* = .185***	-	***r* = -.208***
Griffiths III – Personal, Social & Emotional	-	-	-	-	-	-
Griffiths III – Gross Motor	-	-	-	-	-	-
Griffiths III – Overall Development	-	***r* = .184***	-	-	-	-
MPAS Quality of Attachment	-	-	-	-	-	-
MPAS Absence of Hostility	-	-	-	-	-	-

Predictor Variable	SDQ Total Difficulties	SDQ Emotional Problems	SDQ Conduct Problems	SDQ Hyperactivity	SDQ Peer Problems	SDQ Prosocial
MPAS Pleasure of Interaction	-	-	-	***r* = -.196***	-	***r* = .213***
MPAS Overall Attachment	-	-	-	-	-	-
18 Months						
Infant Sleep Problems	-	-	-	-	-	-
Hours of Infant Sleep	-	-	-	-	-	***r* =-.222***
Maternal Health-Related Quality of Life	***r* = -.272****	***r* = -.216***	***r* = -.288****	-	-	-
BAI	***r* = .228***	-	-	***r* = .245****	-	-
BDI-II	***r* = .304****	***r* = .203***	***r* = .239***	***r* = .237***	-	-
Griffiths III – Foundations of Learning	-	***r* = .190***	-	-	-	-
Griffiths III – Language & Communication	-	-	-	-	-	-
Griffiths III – Eye & Hand Co-ordination	-	-	-	-	-	-
Griffiths III – Personal, Social & Emotional	-	-	-	-	-	-
Griffiths III – Gross Motor	-	-	-	-	-	-
Griffiths III – Overall Development	-	-	-	-	-	-

Predictor Variable	SDQ Total Difficulties	SDQ Emotional Problems	SDQ Conduct Problems	SDQ Hyperactivity	SDQ Peer Problems	SDQ Prosocial
48 Months						
Maternal Health-Related Quality of Life	***r* = -.230***	***r* = -.238***	-	-	-	-
CPRS Closeness	***r* = -.267****	-	-	***r* = -.294****	***r* = -.271****	***r* = .451*****
CPRS Conflict	***r* = .507*****	***r* = .233***	***r* = .606*****	***r* = .314*****	-	***r* = -.262****
DASS 21 Depression	***r* = .230***	-	***r* = .269****	***r* = .219***	-	-
DASS 21 Anxiety	***r* = .252****	-	***r* = .228***	-	-	-
DASS 21 Stress	***r* = .325*****	***r* = .244***	***r* = .324*****	-	-	-

Note: * *P* < .05 (two-tailed); ** *P* <.01 (two-tailed); ***P* < .001 (two-tailed); '-' denotes no statistically significant association.

Multivariate Analyses

Hierarchical multiple regression analyses were conducted using the predictor variables demonstrating significant association (p = <.05) with socio-emotional outcomes. Multiple regression analyses were only performed with the *SDQ Total Problems,* as similar patterns were observed among the individual *SDQ* problem scales. Multivariate analyses were also performed for the *Prosocial Scale* since this was distinct from the *SDQ* problem scales.

SDQ Total Problems

Hierarchical multiple regression analysis was utilized to evaluate the predictive value of maternal mental health indicators and mother-child relationship factors at 4, 18 and 48 months on *SDQ Total Problems* at 48 months *(see table 5.5).* The *EPDS Total* (depression) and *Anxiety* scales were entered into the first multiple regression model, along with the *Griffiths-III Foundations of Learning* scale and the *Health Related Quality of Life measure.* This model explained 15.3% of the variance in socio-emotional difficulties at 48 months $F(4, 98) = 4.43$, p = <.005. Maternal *Health-Related Quality of Life* (β = -.213, p = <.05) and the *Griffiths-III Foundations of Learning Scale* (β = .204, p = <.05) were statistically significant in this model with respect to unique variance explained. This finding suggested that mothers who rated their overall health as low at 4 months were more likely to report child socio-emotional difficulties at 48 months. Interestingly, children who scored higher on the *Griffiths-III Foundations of Learning* scale at four months were also more likely to experience socio-emotional difficulties at 48 months.

We then entered associated variables from 18 months into the second model of the multiple regression. These variables included *Health-Related Quality of Life*, *BAI*, and *BDI-II* scores. The addition of these variables contributed a further 5.1% of variance to *SDQ Total*

Problem scores at 48 months, which was not a statistically significant increase. The total variance explained by the model as a whole was 20.4%, $F(7, 95) = 3.48$, $p = .<.005$. Only the *Griffiths-III Foundations of Learning Scale* remained significant in this second model ($\beta = .205$, $p = < .01$). Since there were several measures of the same construct (e.g., depression and anxiety) in the model, it was not surprising that the parcelled out variance of each of these was not statistically significant. However, the overall model attests to the longitudinal significance of maternal mental health and health-related quality of life in predicting child socio-emotional outcomes at 48 months.

Cross-sectional variables from 48 months were entered into the final model. These variables included maternal *Health-Related Quality of Life, CPRS Closeness, CPRS Conflicts*, and the three *DASS-21* scales. The addition of these variables explained a further 18% of the variance in SDQ Total Problems at 48 months, which was a statistically significant change ($p = <.001$). The total variance explained by the model was 38.4%, $F(13, 89) = 4.27$, $p = < .001$. This combined model resulted in the *Griffiths-III* developmental measure being attenuated to non-significance, while the *CPRS Conflicts* ($\beta = .333$, $p = <.01$) and the *CPRS Closeness* ($\beta = -.224$, $p = <.05$) were statistically significant.

In sum, the overall longitudinal model, including maternal mental health and health-related quality of life factors, had longitudinal significance in predicting child socio-emotional outcomes at 48 months. Mother-child relationship variables at 48 months significantly predicted child socio-emotional outcomes at 48 months, although this cross-sectional association was perhaps not as robust as those demonstrated in longitudinal analysis.

Table 5.5

Hierarchical Multiple Regression Analysis Summary for the SDQ Total Problems Scale

Step and predictor variable	**Unstandardised Beta**	**Std. error Beta**	**Standardised Beta**	***R* Square**	**F Change**	**Change in R^2**	**Sig F Change**
Step 1	-	-	-	.153	4.43	.153**	.002
Constant	8.61	3.86	-	-	-	-	-
Maternal HRQ	-.072	.035	-.213*	-	-	-	-
EPDS Total Score	.055	.185	.058	-	-	-	-
EPDS Anxiety	.206	.332	.117	-	-	-	-
Griffiths-III Foundations of Learning Scale	.282	.129	.204*	-	-	-	-
Step 2				.204	2.02	.051	.116
Constant	9.13	4.46	-	-		-	-
Maternal HRQ (4 months)	-.046	.039	-.135	-		-	-
EPDS Total Score	.055	.183	.058	-		-	-
EPDS Anxiety	.169	.331	.095	-		-	-
Griffiths-III Foundations of Learning Scale	.283	.128	.205*	-		-	-
Maternal HRQ (18 months)	-.039	.033	-.129	-	-	-	-
BDI-11	.170	.105	.260	-	-	-	-

Step and predictor variable	Unstandardised Beta	Std. error Beta	Standardised Beta	*R* Square	F Change	Change in R^2	Sig F Change
BAI	-.123	.124	-.157	-	-	-	-
Step 3				.384	4.34	.180***	<.001
Constant	25.99	9.15	-	-		-	
Maternal HRQ (4 months)	-.021	.038	-.061	-		-	
EPDS Total Score	.003	.174	.004	-		-	
EPDS Anxiety	.044	.319	.025	-		-	
Griffiths-III Foundations of Learning Scale	.187	.123	.136	-		-	
Maternal HRQ (18 months)	-.021	.035	-.069	-		-	
BDI-11	.135	.098	.206	-		-	
BAI	-.080	.121	-.103	-		-	
Maternal HRQ (48 months)	-.037	.041	-.094	-		-	
CPRS Closeness	-.580	.228	-.224*	-		-	
CPRS Conflicts	.242	.074	.333*	-		-	
DASS-21 Depression	-.108	.245	-.053	-		-	
DASS-21 Anxiety	.111	.343	.042	-		-	
DASS-21 Stress	.089	.180	.066	-		-	

Note: * P < .05 (two-tailed); ** P <.01 (two-tailed); ***P < .001 (two-tailed). HRQ = Health Related Quality of Life.

SDQ Prosocial Behaviours

Hierarchical multiple regression was utilized to evaluate the predictive value of mother-child relationship factors at four, 18, and 48 months on the *SDQ Prosocial Scale* at 48 months while controlling for structural (e.g., parent ethnicity), and child developmental factors and hours of infant sleep *(see table 5.6).* Variables entered at step 1 explained 0.7% of the variance in prosocial outcomes. After variables were entered at step 2, the total variance explained by the model was 8.2%. Thus, at four months, *MPAS Pleasure in Interaction and the Griffiths-III Eye and Hand Coordination scale score*s contributed an additional 7.5% of the variance. This was a statistically significant contribution (p = <.05). Although the second overall model was not statistically significant $F(4, 107) = 2.4$, P = .055, the *MPAS Pleasure in Interaction* scale in this second model showed unique statistical significance (β = .192, p = <.05).

Hours of infant sleep was the only 18-month variable significantly associated with Prosocial outcomes. Entering this into the model contributed an additional 3.8% to the variance explained in prosocial outcomes at 48 months. Again, this change in variance was statistically significant (p = <.05). The total variance explained by the third model as a whole was 12%, $F(5, 106) = 2.90$, P = <.05. *MPAS Pleasure in Interaction* (β = .186, p = < .05) and infant sleep hours (β = -.204, p = <.05) at 18 months were unique significant predictors. Therefore, this third model suggested that positive early attachment experiences at four months remained a significant predictor of more prosocial behaviors at 48 months.

Finally, *CPRS Conflicts* and *CPRS Closeness* were added to the multiple regression in model four. These two mother-child relationship variables explained an additional 21% of the variance in prosocial outcomes at 48 months, which was a statistically significant contribution (p = <.001). This model as a whole explained 33% of the variance in prosocial outcomes $F(7, 104) = 7.32$, p = <.001. The unique variance contributed by the *MPAS Pleasure in Interaction*

scale in the overall model was non-significant. However the hours of infant sleep at 18 months remained significant (β = -.205, p = <.05). The cross-sectional measures of *CPRS Conflicts* (β = -.202, p = <.05) and *CPRS Closeness* (β = .381, p = <.001) were also statistically significant.

In sum, findings from multiple regression models regarding prosocial outcomes at 48 months suggested that mother-child relationship factors were significant longitudinal and cross-sectional predictors of prosocial outcomes at 48 months. The fact that hours of infant sleep at 18 months remained significant in the full model is perhaps unsurprising since this variable was distinct from many of the other variables in the model that measured the same construct (e.g., ethnicity, parent-child relationship/attachment). As previously outlined, the final model included cross-sectional data and may not demonstrate the same level of robustness as the longitudinal models.

Table 5.6

Hierarchical Multiple Regression Analysis Summary for the SDQ Prosocial Scale

Step and predictor variable	**Unstandardised Beta**	**Std. error Beta**	**Standardised Beta**	**R Square**	**F Change**	**Change in R^2**	**Sig F Change**
Step 1				.007	.384	.007	.682
Constant	7.38	1.17					
Maternal Ethnicity	.818	1.60	.084	-		-	
Paternal Ethnicity	.000	1.96	.000	-		-	
Step 2				082	4.40	.075*	.015
Constant	7.10	2.45	-	-		-	
Maternal Ethnicity	.680	1.56	.070	-		-	
Paternal Ethnicity	-.204	1.91	-.017				
Griffiths-III Eye-Hand Coordination	-.161	.087	-.177	-		-	
MPAS Pleasure in Interaction	.131	.064	.192*	-		-	
Step 3				.120	4.57	.038*	.035
Constant	11.12	3.05		-		-	
Maternal Ethnicity	1.06	1.54	.108	-		-	

Step and predictor variable	**Unstandardised Beta**	**Std. error Beta**	**Standardised Beta**	**R Square**	**F Change**	**Change in R^2**	**Sig F Change**
Paternal Ethnicity	-1.160	1.93	-.097	-		-	
Griffiths-III Eye and Hand Coordination	-.144	.086	-.159				
MPAS Pleasure in Interaction	.127	.063	.186*				
Hrs Infant Sleeps	-.329	.154	-.204*				
Step 4				.330	16.30	.210***	<.001
Constant	-.530	3.67					
Maternal Ethnicity	.825	1.36	.084	-		-	
Paternal Ethnicity	-.701	1.72	-.059	-		-	
Griffiths-III Eye and Hand Coordination	-.113	.076	-.124	-		-	
MPAS Pleasure in Interaction	.099	.056	.146	-		-	
Hrs Infant Sleeps	-.332	.136	-.205*	-		-	
CPRS Conflicts	-.055	.023	-.202*	-		-	
CPRS Closeness	.372	.081	.381***	-		-	

Note: * P < .05 (two-tailed); ** P <.01 (two-tailed); ***P < .001 (two-tailed)

Stability of Maternal Mental Health Factors Across Time

Given the predictive significance of maternal mental health for later child outcomes across all time points, it was deemed important to assess whether there was sample stability in participants evidencing higher mental health scores across all time points of the study. Associations between maternal depression and anxiety across each data collection point were first examined using bivariate correlation analyses (see *Table 5.7* and *Table 5.8*).

Table 5.7

Maternal Depression Measures Correlation Matrix

	EPDS Total (Depression)	**BDI-II**	**DASS-21 Depression**
EPDS Total (Depression)	-	.	-
BDI-II	.395***	-	-
DASS-21 Depression	.303**	.476***	-

Note: * P < .05 (two-tailed); ** P <.01 (two-tailed); ***P < .001 (two-tailed)

Table 5.8

Maternal Anxiety Measures Correlation Matrix

	EPDS Anxiety	**BAI**	**DASS-21 Anxiety**
EPDS Anxiety	-	.	-
BAI	.397***	-	-
DASS-21 Anxiety	.393***	.491***	-

Note: * P < .05 (two-tailed); ** P <.01 (two-tailed); ***P < .001 (two-tailed)

Overall, there were small to medium effect size correlations only between anxiety and depression measures across each time point. This suggests that there was some, but not necessarily a consistent, relationship between these measures within our sample across time. We also examined instances of caseness within the sample. Caseness incidence rates for depression were generally too low for any meaningful analyses. While 14 participants met the threshold for anxiety caseness at 4 months, only 4 of these participants remained at caseness levels by 18 months, and 2 remained at caseness by 48 months. Conversely, a small proportion of participants who were in the non-caseness range at four months entered caseness at 18 months. Overall, these analyses suggested that there was some stability of depression and anxiety over time in our sample. However, this stability was not perfect given the modest effect sizes observed in the bivariate correlations.

Discussion

The current study sought to understand how maternal mental health and mother-child relationship factors during infancy can predict child socio-emotional outcomes at 48 months. A key strength of this study was its longitudinal design, which addressed the need for more longitudinal research examining infancy through to early childhood (i.e., preschool years). The study also addressed the need for additional research examining the influence of maternal stress on child socio-emotional outcomes. Furthermore, this study incorporated additional variables relevant to child socio-emotional functioning, including structural factors (e.g., demographics), infant sleep, maternal health-related quality of life, and child development indicators. Finally, the study examined the stability of maternal mental health indicators over time within the sample to evaluate the robustness of the variable in predicting child socio-emotional outcomes.

We found that maternal mental health difficulties (depression and anxiety) at 4 and 18 months consistently predicted child socio-emotional problems at 48 months. This was observed in both exploratory data analyses and in multivariate modeling. Multivariate models with maternal mental health factors (including maternal health-related quality of life and child developmental indicators) at 4 and 18 months were significant, explaining 15.3% and 20.4% of the variance in later child socio-emotional problems, respectively. While maternal mental health variables did not emerge as uniquely significant predictors in these models, this was likely due to overlapping construct variance.

In cross-sectional analyses, maternal mental health difficulties were also significantly associated with child socio-emotional difficulties, with maternal stress demonstrating the strongest effect size. This finding is an important contribution from our study since maternal stress has been explored less often relative to depression and anxiety in child and family research. One caveat to these findings was the variation in maternal mental health difficulties across time, where some participants may have presented with different levels of depression or anxiety at different time points. Nonetheless, the consistency of these associations across analyses certainly speaks to the importance of considering the mental health status of mothers during infancy and toddlerhood.

Based on previous research (Boldt et al., 2020; Brumariu et al., 2021; Wong et al. 2020), we expected that early positive mother-child attachment at 4 months would also correlate with fewer child socio-emotional difficulties at 48 months. Surprisingly, we found no evidence to support this association. Our cross-sectional data did suggest that mother-child relationship factors may become more important in influencing socio-emotional difficulties as children develop. Higher levels of mother-child *Conflicts* at 48 months predicted more child socio-emotional problems at 48 months, while higher levels of *Closeness* predicted fewer problems. This finding provides some support for Bowlby's (1973) hypothesis that a child's perception

of caregiver availability becomes increasingly important from the age of three years onwards. During these years, children begin to make predictions about the world based on their developing internal working models, which inform their responses to frightening or threatening situations. However, this should be interpreted cautiously, given that the same participant reported these mother-child relationship factors and child socio-emotional outcomes simultaneously.

A somewhat different picture emerged when we examined longitudinal predictors of child prosocial behavior. We found that children were more likely to engage in prosocial behaviors at 48 months when they shared pleasurable interactions with their mothers during infancy. Multivariate analysis confirmed this association, where this aspect of attachment remained significant even when 4 and 18-month data were combined into the model. This 18-month model (including child development and parent ethnicity variables) was significant and explained 12% of the outcomes in child prosocial outcomes at 48 months.

Cross-sectional mother-child relationship measures were also significantly associated with prosocial behaviors. In contrast, we found no longitudinal or cross-sectional associations between maternal mental health and later prosocial outcomes. These differences were striking in comparison to the previously outlined findings regarding predictors of socio-emotional difficulties and suggested that early attachment experiences may represent a protective factor in the later development of positive behaviors, such as kindness or empathy. This interpretation makes sense in the context of attachment theory and the caregiving system. Children who have experienced attachment security from their caregivers may develop models to follow when encountering someone in need. In contrast, children who have had negative attachment experiences are likely to remain wary of others (Cassidy and Shaver, 2018).

Overall, these findings make an important contribution to the current literature base, much of which has not yet simultaneously examined mother-child relationship factors and maternal mental health during early infancy and socio-emotional outcomes in early childhood (i.e., preschool years). The findings underscore the importance of including both of these predictor variables in longitudinal analyses since this enabled us to provide a more comprehensive understanding of how children's early experiences with their mothers can influence their socio-emotional functioning. In this regard, our evidence has shown that maternal mental health difficulties during infancy may represent a stronger risk factor for the emergence of later child socio-emotional difficulties than early mother-child attachment experiences. In contrast, positive early attachment experiences may promote the development of prosocial behaviors later in early childhood.

Regarding the additional control variables we utilized in analyses, one aspect of child development at four months *(foundational learning skills)* emerged as a longitudinal predictor of child socio-emotional problems. Surprisingly, children who scored higher on indicators of this domain at four months were more likely to present with socio-emotional problems at 48 months. In contrast to previous research (Altafim et al., 2018; Cabello et al., 2017; Hysing et al., 2016; Lobermeier et al., 2022), we generally found no associations between socio-economic status, parental education or child sleep and child socio-emotional difficulties. It is worth noting that these studies did not include measures of maternal mental health and/or mother-child relationships. Thus, it is possible that some characteristics pertinent to our sample (i.e., few maternal mental health problems and close mother-child attachment relationships) protected against such risk factors. This would be an interesting avenue for future research to explore to evaluate whether relational and mental health factors exert influence on additional predictors of child socio-emotional outcomes.

It was also surprising that children who were more developmentally advanced on the *Griffiths-III Eye and Hand Coordination Scale* at four months were less likely to engage in prosocial behaviors at 48 months. This finding contradicted research from Leung et al. (2000) where positive associations were found between these variables, although this study contained a sample of children who were prone to problematic behaviors. Thus, future research is needed to expand on this finding, to examine if these associations were an idiosyncratic artifact to the current sample or whether these factors operate directly or indirectly to influence prosocial behaviors.

Our findings also suggested that non-white participants were more likely to report prosocial child behavior, although this finding should be approached cautiously since there were very few non-white participants in the sample. Previous research has also found an association between socio-emotional problems and longer sleep duration in children (Bos et al., 2009). Although our study found no association between infant sleep hours and socio-emotional problems, we did see a significant association between sleep hours and prosocial behaviors. In this regard, longer hours of sleep were associated with fewer prosocial behaviors. Again, this finding is counter-intuitive, and future research may wish to utilize different population samples to explore the impact of sleep duration on prosocial functioning in early childhood.

Limitations and Future Directions

Although several methodological strengths underpinned this study, some limitations are worth considering. Firstly, this sample was limited to mothers only. Previous research has consistently indicated that fathers play an essential and potentially unique protective role against the development of socio-emotional problems in childhood (Adamsons and Johnsons,

2013; Diniz et al., 2021; MacSweeney et el., 2022; Sarkadi et al., 2008). Secondly, it was not possible to utilize an observational measure of the mother-child attachment at 48 months due to COVID-19 restrictions. The poor internal validity of the *Closeness* scale may have also influenced findings, and thus future research may wish to use additional or alternative measures. Thirdly, although the *MPAS* has demonstrated acceptable psychometric properties in previous studies, the measure is yet to be widely validated (Dunn et al., 2022). Our findings should be interpreted within the context of these limitations since it is possible that observational measures may have yielded different findings at 48 months.

Fourth, measures of attachment-related factors, maternal mental health, and child outcomes at 48 months were obtained from the same informant simultaneously, which may be less robust than the longitudinal analyses. Thus, the cross-sectional attachment associations identified at 48 months should be interpreted within this context. Further research is required to determine whether this finding was potentially an artifact of the cross-sectional timing of these attachment associations. Moreover, the fact that we found different patterns of associations between longitudinal and cross-sectional models may highlight an important consideration for research more generally. In this regard, our study suggests that a cautious approach should be utilized when interpreting cross-sectional data where the same informant has provided predictor and outcome data. Finally, this study aimed to obtain findings applicable to a non-clinical community population. However, it is worth noting that this sample was predominantly white, well-educated, and higher-earning families. Future studies may wish to sample from a broader range of socio-economic and racial backgrounds to obtain a more nationally representative sample.

Clinical Implications

This study has provided evidence to suggest that the mental health status of mothers during early infancy plays a highly important role in the development of later child socio-emotional difficulties. As our study focused primarily on a healthy community sample, our findings highlight the necessity for healthcare professionals to conduct thorough mental health screenings with mothers who may not necessarily be presenting with a clinical mental health difficulty. For example, clinicians involved with mothers during routine perinatal appointments (e.g., Midwives, GP's and Public Health Nurses) could be trained to complete standardized mental health screening instruments to detect potentially elevated indicators of mental health problems. These clinicians could also be trained to provide psychoeducational material regarding positive mental health strategies to mothers during these appointments. Such psychoeducational material could also be consolidated and disseminated more widely to the community via educational advertising campaigns (e.g., billboards, bus-stop shelter advertisements, or leaflets). These campaigns could focus on validating the demands associated with parenting while simultaneously encouraging a focus on positive maternal mental health strategies.

While this study has utilized a non-clinical sample, the applicability of our findings may also extend to clinical populations. This evidence suggests that it is as important, if not more important, to focus on the mental health of mothers in early infancy rather than solely intervening through attachment-focused methods. This concept may be quite discomforting for child mental health services which may not see their role as having such a focus. Nevertheless, if such is predictively important for child socio-emotional development, then perhaps service design assumptions need to be challenged. This concept was exemplified in a recent systematic

review of psychotherapeutic interventions by Everett et al. (2021), which evidenced that targeting parent behavior and parent symptoms yielded positive clinical outcomes for children.

Conclusion

The current study examined the longitudinal significance of maternal mental health and the mother-child relationship (at 4 months and 18 months) in predicting child socio-emotional outcomes at 48 months of age. Existing methodological issues in the research base were addressed by utilizing a longitudinal design, measuring maternal mental health and mother-child relationship factors at several time points across infancy and early childhood, and including a measure of stress as an additional indicator of mental health. Our evidence suggested that maternal mental health difficulties during infancy, rather than attachment factors, were longitudinal predictors of child socio-emotional problems at 48 months. In contrast, positive early attachment experiences at 4 months predicted more child prosocial behaviors at 48 months. These findings suggest that early intervention and infant mental health services should consider including thorough screenings of maternal mental health indicators during assessment or intervention. Future research recommendations based on limitations for the current study were the inclusion of fathers, multiple sources of data, and utilizing nationally representative samples.

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Chapter Six: Major Research Project Supplementary Chapter

The primary aim of this study was to examine whether there was evidence that early indicators of maternal mental health and the mother-child attachment relationship were predictive of later child socio-emotional functioning. The study also sought to determine whether these factors added to the variance in outcomes explained by additional variables. These additional variables included structural factors, early child developmental indicators, maternal health-related quality of life, and infant sleep factors. This secondary question was addressed to disentangle the effects of maternal mental health and the mother-child relationship from the effects of additional relevant variables. Furthermore, the stability of maternal mental health indicators (depression and anxiety) across time was examined to determine whether maternal mental health remained a consistent and robust predictor variable. The following chapter provides an extended critical account of the methodological approaches utilised to meet these outlined research aims, which could not be incorporated into the research article. This chapter also provides a reflective account of conducting child and family research within the context of the COVID-19 pandemic.

Establishing the Study Focus and Theoretical Framework

The decision to pursue and develop an empirical research project within the field of child developmental psychology was strongly influenced by the area of clinical interest for the researcher. This process aligned with the scientist-practitioner approach (Jones and Mehr, 2007) since the research focus was derived from the researchers' experiences of working clinically with children and families. Such work motivated the researcher to provide a novel contribution to the current evidence base regarding factors that may support positive child socio-emotional functioning.

The overarching aim of this thesis was to examine how children's experiences of early parental factors can contribute to their socio-emotional development. Therefore, this research was primarily informed by attachment theory (Ainsworth, 1969; Bowlby, 1969; 1973) since the core tenants of this theory provided an opportunity to understand how early-life relational experiences influence children's socio-emotional functioning. Furthermore, the empirical application of attachment theory has yielded substantial findings and benefits in developmental research. For example, existing research has explored the significance of early attachment by quantifying the association between attachment and adaptation in developmental domains. Studies have also explored the dynamic nature of these associations to establish whether the predictive significance of attachment factors endures or diminishes over time (Cassidy and Shaver, 2018; Forslund and Duschinsky, 2021).

Research Design

This study utilised a longitudinal and quantitative research design to address the previously outlined primary and secondary research questions. We also utilised cross-sectional methodology to determine whether data collected at 48 months could add further significance or context to our longitudinal analyses. Longitudinal designs have been encouraged as an optimal methodological approach for researching and understanding changes in family relationships over time (Miller and Wright, 1995). Longitudinal research involves collecting data for one or more variables on at least two separate time points. Our study utilised a longitudinal panel design since data was collected from the same participants at four different time points (2 weeks, 4 months, 18 months, and 48 months). A key methodological advantage of a longitudinal design is that it is possible to detect changes over time and offer potential interpretations of such changes (Menard, 2007). These inherent advantages of longitudinal methodology were an essential component of our study since we hoped to determine whether

children's early experiences with their mothers could contribute to socio-emotional outcomes later in early childhood.

In contrast, cross-sectional designs measure participant responses on one occasion. One limitation of a cross-sectional design is that it is not possible to infer temporal associations between a risk factor and an associated outcome (Sedgwick, 2014). Thus, had we attempted our research aims with cross-sectional data alone, we would have only been able to infer association rather than causation between parental and child variables. However, cross-sectional studies have advantages over longitudinal designs since they are less expensive and more convenient to conduct. Moreover, cross-sectional studies can provide preliminary evidence that informs a future more advanced study, and cross-sectional data can identify associations between exposures and outcomes (Wang and Cheng, 2020). These advantages were important considerations for this study since we collected data from a previous longitudinal sample during the fourth wave of data collection. Thus, we established new outcome variables for comparison with previous longitudinal data (i.e., to infer causation) while simultaneously exploring new associations on a cross-sectional level. Furthermore, there was a need to collect additional mother-child relationship data within this longitudinal sample, which could subsequently be utilised during future data collection waves as a predictor variable should it be required.

Data Preparation and Quality Assurance

Once data collection was completed, 48 months data was exported from Qualtrics (Provo, UT) into an excel file and stored on a server at the INFANT Research Centre. This file was subsequently exported into an SPSS database and stored securely on a password-encrypted, two-factor authentification webserver *(MedCloud).* Participant names, child date of birth (DOB), and gender data were cross-referenced with the existing participant information

directory database (also stored on a secure server at the INFANT Research Centre). This process facilitated the linking of 48-month data to data from previous study phases for each participant. Two participants from 48 months could not be linked to previous data, which was likely due to a combination of incorrect DOB's being provided by one parent on Qualtrics and incorrect ID labeling for another participant in the existing participant information directory database. Since this data could not be confidently linked, these two participants were removed from the overall data file. The 48-month SPSS data file was then combined with an SPSS file containing data from previous collection waves. This file was also stored on *MedCloud*.

Based on data preparation recommendations by Pallant (2020), the data file was checked for any inconsistencies or errors. Data file checking involved randomly screening a sample of participant data and cross-referencing information across each time point to ensure that participant data had been accurately linked. A sample of participant measure scores were also hand-scored and checked against the coded scoring performed within SPSS. Moreover, Pallant (2020) recommended that the internal consistency of measures is checked by analysing the Cronbach's alpha values associated with measurement scales. These alpha values were examined for as many predictor and outcome measures as possible. Previous individual item scores for the BDI-II and BAI were unavailable in the existing dataset. As such, Cronbachs alpha values could not be calculated for these measures.

Ethical Considerations

Informed Consent

In line with the Psychological Society of Ireland's Code of Professional Ethics (PSI, 2019), several steps were taken to ensure that informed consent was obtained from all participants before allowing them to participate in the study. An information poster *(see Appendix J)* was included in the email sent to participants, which provided an outline of the

study, what would be involved in participation, and any potential risks associated with participating. The email also contained additional information about the study and why prospective participants were being contacted.

Participants were then invited to click the URL link if they were interested in participating, which directed them to the detailed study information sheet. This sheet provided participants with further details about the study, why they were asked to participate, the study procedure, associated risks, and data protection information. The voluntary nature of participation was emphasised on the study information page, and participants were informed that they had the right to withdraw their decision to participate until their data had been fully anonymised. Contact emails were provided for members of the research team should participants have any questions regarding the study. Participants were then directed to an informed consent statement, and they were invited to indicate their agreement with this statement by clicking a circle at the end of the page. This page was digitally constructed to ensure that participants could not proceed with the study unless consent was provided.

Participant Safety and Well-being

As outlined by the PSI Code of Professional Ethics (PSI, 2019), psychologists must avoid causing any harm to those who participate in research activities. Although the overall risk to participants in the current research was considered low, it was acknowledged that some questions outlined within the survey were sensitive. For example, questions asked participants to reflect on aspects of their mental health status, the socio-emotional functioning of their child, and their relationship with their child. The possibility that such questions could result in participant upset or distress was a key consideration throughout all stages of the research process. Participants were informed of this risk within the information sheet provided at the start of the study. As previously outlined, this information sheet also contained contact details

for relevant mental health support resources available. The contact information sheet ensured that participants had an opportunity to self-refer themselves to the appropriate services should they be adversely affected by any elements of their participation. This sheet also contained contact details for the research team, should participants wish to contact the team members with any queries or concerns following their participation.

Once responses were screened, some participants were identified as having scored within elevated ranges on either parent or child measures at 48 months. Following supervision with the Principal Investigator (Professor Deirdre Murray, Consultant Paediatrician), follow-up telephone calls were carried out by the Primary Researchers with participants who had obtained highly elevated scores on the *DASS-21* and/or the "*Total Problems*" scale on the *SDQ*. These telephone calls included a brief discussion of any historical and/or current mental health difficulties and any supports currently being used by the participant. Participants were directed to appropriate support and services, including their GP or community mental health services if deemed necessary. In some cases where child scores were elevated, participants were also invited to attend a check-in appointment with the Principal Investigator for additional support. A follow-up email was also sent to participants who could not be reached by phone or who had some elevated scores. This email reminded them of available supports and contact information relating to the INFANT Research Centre.

A specific protocol was also developed to aid responses to parents who may have experienced a child bereavement since their previous contact with the research centre and who may have been adversely affected by receiving an invitation to participate in this data collection phase. This protocol included the notification of such reports to the Principal Investigator and the development of a standard email (including contact details regarding relevant support services) which would be sent to the relevant participant.

Participant Confidentiality

All participants were assigned a unique ID code at two weeks, and participants retained this ID across all subsequent stages of data collection. During the fourth phase of data collection (48 months), participants were initially required to provide their child's name and date of birth so that their data could be linked with previous data collection phases. Participant identifiers (such as parent's name, contact information, their child's DOB, and associated unique ID) were stored in an excel file located on a secure server at the INFANT Research Centre. Hard copies of identifiable participant information obtained during previous data collection phases were retained in a locked cabinet within the INFANT Research Centre. These identifiers were only used to contact previous participants to invite them to the fourth phase of data collection, to accurately link data to previous phases of data collection (using child's name and DOB), and to contact participants where necessary to ensure participant wellbeing. Once these objectives were achieved, only a separate anonymised SPSS database containing participant unique ID codes was utilised.

Data Analysis

Reducing Bias – Managing Outliers

As Field (2018) describes, outliers are a potential source of bias in statistical analysis. Outliers refer to datapoints that are well beyond the norm regarding any particular variable or population. These data points can have a disproportionate influence over the general dataset. Outliers can be problematic for statistical analyses since they can lead to inflated error rates and reduce the overall power of analyses (Osborne and Overbay, 2004). As such, efforts were made to identify and appropriately handle outliers within the data from the current study. Based on procedures for outlier-checking outlined by Pallant (2020), box plots were utilised to

identify significant outliers (i.e., three box lengths away from the box edge). Samples of examined boxplots are included in *(Appendix L).*

Winsorising and trimming are considered useful approaches in responding to outliers since they are relatively simple to achieve and have robust performance (Jose and Winkler, 2008). The approach used to handle outliers differed depending on their origin. Winsorising describes the process of converting outliers to the same value as the next highest values within the dataset that is not considered an outlier. Winsorising has the advantage of preserving information while simultaneously ensuring that data points do not exert undue influence (Reifman and Keyton, 2010). Winsorising was applied to data points that were most likely legitimate but may not have accurately reflected the nature of the overall data.

In contrast, some data points within a small number of variables were identified as likely originating in measurement error. For example, a small number of participants had recorded their response as '9' on the Maternal *Health-Related Quality of Life* measure. In this case, it was likely these participants had intended to record '90' since the scale was rated out of 100. Trimming was utilised in such cases, whereby these data points were removed as they likely did not represent a legitimate value within the dataset (Ghosh and Vogt, 2012).

Bivariate Correlation Analyses

Bivariate analyses were guided by recommendations and descriptions of assumption procedures from Pallant (2020) and Gignac (2019).

Assumptions

Gignac (2019) highlighted that the first assumption of bivariate correlations (the assumption of random sampling) is always violated since it is impossible to ensure that every

individual in the population has had an opportunity to be sampled. Generally, variables must be interval or ratio to be included in correlational analysis. The only exception here is if there is one dichotomous independent variable (with two levels) and one continuous dependent variable. Gignac (2019) noted that data that has been measured using an ordinal scale with at least 5-points is appropriate for use in correlations. Data on all scales used in bivariate analysis were either continuous or were measured on a scale containing at least five points. As such, the assumption of level of measurement was not violated. Bivariate correlations were performed for variables where predictor and outcome data were available, ensuring the assumption of related pairs was met. Regarding the assumption of independence of observations, the observations within the current study sample consisted of mothers from individual families and their singleton birth children. Therefore, observations were independent in this study sample.

The normality of data was checked by producing histograms for a sample of variables *(see Appendix M)* and examining the Kolmogorov-Smirnov statistic. Inspection of histograms revealed that the data for the majority of variables were skewed. Furthermore, the Kolmogorov-Smirnov statistic was significant ($P < .005$) for many variables. Thus, robust methods were utilised (based on procedures outlined by Field, 2018) to ensure results from the statistical analysis were robust to violations of assumptions. In this regard, parametric Pearson *r* bivariate correlations were performed in conjunction with Pearson *r* bivariate correlations with bootstrapping and 95% *'bias-corrected accelerated'* confidence intervals. Upper and lower confidence interval data were inspected to determine whether these corroborated the level of statistical significance. While bootstrapping is a robust estimation technique, it is acknowledged that it is not perfect and the researcher must ultimately determine which estimation technique to utilise (i.e., bootstrapping or normal theory estimation) (Gignac, 2019). Thus, in order to minimise the risk of type II error, associations were accepted and reported as

significant where bootstrapped confidence intervals overlapped zero on a marginal basis, in conjunction with a level of statistical significance (p = <.05).

Scatterplots were produced for a sample of predictor and outcome variables to ensure that the relationship between predictor and outcome variables was linear (i.e., not curvilinear). Inspection of these scatterplots revealed that the relationships between variables were primarily linear. Examples of scatterplots are outlined in *(see Appendix N).*

Procedure

The direction of the relationship between variables was determined by examining whether Pearson correlation coefficients were positive or negative (Pallant, 2020). All correlations were checked to determine whether they met the level of statistical significance (p <.05). Finally, the size of the correlation coefficient (i.e., the strength of the association) was determined based on the interpretation provided by Cohen (1988; as cited in Pallant, 2020). In this regard, coefficient sizes were considered to be small (r = .10 to .29), medium (r = .30 to .49) or large (r = .50 to 1.00).

Group Comparison Analyses

Independent samples T-Tests were utilised to determine statistically significant differences between groups relevant to child socio-emotional outcomes. Assumption checks and procedures underpinning these analyses were based on recommendations from Pallant (2020).

Assumptions

Assumptions regarding random sampling and independence of observations were outlined previously. Since the normality assumption was violated, the same bootstrapping procedure as outlined for the correlational analyses was applied for t-test analysis. The independent variables were categorical, and thus the assumption of the level of measurement was met. Levene's Test for Equality of Variances was inspected to determine whether the assumption of homogeneity of variance had been met.

Procedure

The 2-tailed level of significance was utilised to determine whether there was a statistically significant difference between groups. Where the assumption of homogeneity and variance was violated, the '*Equal Variance not Assumed*' statistic was utilised. Finally, the Cohens *d* point estimate was inspected to determine the differences regarding standard deviation units between groups.

Multiple Regression Analyses

In order to address the secondary research questions of this study, it was necessary to consider the influence of confounding variables (e.g., demographic or existing child development factors) in the association between predictors and socioemotional outcomes. It was also necessary to investigate the separate and interactional effects of predictor variables and outcomes.

Linear models (i.e., regression analyses) attempt to explain an outcome within the context of another factor or variable. Regression models may be used to determine the effect

of one variable on another, predict outcomes, establish predictors of a factor, or adjust outcomes to account for additional factors. The simple regression model includes one exploratory variable. Although this model facilitates the identification of association, it does not account for additional potentially influencing factors. A linear model with several predictor variables (i.e., a multiple linear regression) was utilised to address this limitation since the influence of additional factors may be reduced or eliminated (Arkes, 2019; Field 2018). The overall process underlying the multiple regression analyses, including assumption checking, was carried out based on the statistical procedures recommended by Pallant (2020).

Assumptions

As outlined by Pallant (2020), it is recommended that there are approximately 15 participants per predictor variable in the sample to obtain optimum generalisability. The multiple regression model with the most predictors (13 variables) in our study, therefore, required an optimal sample size of $N = 195$. The sample size for the current study ($N = 124$) fell somewhat short of this recommended sample size and thus was acknowledged as a limitation in the multiple regression analyses.

The correlational coefficients between independent variables and collinearity statistics were inspected to ensure that the assumption of multicollinearity and singularity was met. In terms of collinearity statistics, the output was examined to ensure that no '*Tolerance'* values were below .10, and that no '*VIF'* values were above 10. The '*Normal Probability Plot (P-P) of the Regression Standardised Residual*' and the '*Scatterplot'* were inspected to ensure that assumptions regarding outliers, normality, linearity, homoscedasticity, and independence of residuals were met *(see Appendix O).* Based on recommendations from Field (2013), Cook's

Distances were checked to ensure values did not exceed 1. This ensured that no outliers exerted undue influence over the regression analysis.

Procedure

Hierarchical multiple regression analysis was conducted using the variables that had demonstrated a level of statistically significant associations with the *SDQ Total Problems* or the *SDQ Prosocial Scale* (p = <.05). These variables were entered in blocks, which corresponded to each phase of data collection (i.e., two weeks, four months, 18 months, and 48 months).

The first step in interpreting results from the multivariate analysis was to evaluate the model. In this regard, the variance in the dependent variable explained by the model was determined by examining the '*R* Square' value. The statistical significance of this result was then determined. Next, each predictor variable was inspected to determine whether it made a statistically significant unique contribution to the variance explained. The *SDQ Total Problems* and *SDQ Prosocial* scales were the key outcome variables of interest in this study. Thus, only multiple regression results pertaining to these variables were conducted.

To ensure that multivariate analyses were consistent and robust, separate multiple regressions were performed for each of the previously outlined blocks. Results regarding both *SDQ Total Problems* and the *SDQ Prosocial* scale were consistent with the initial multivariate analyses. High Mahalanobis distance values were observed in multivariate analyses for the *Prosocial* scale, which were identified as having originated from the first model block (including maternal and paternal ethnicity). Thus, a separate multiple regression was performed for the *Prosocial* scale, which only included Block 2, Block 3, and Block 4. These results were consistent with the original multivariate analyses. Taken together, these additional analyses

confirmed that the multiple regression models conducted for this study were robust and consistent.

Reflections on Conducting Child and Family Research during the COVID-19 Pandemic

The COVID-19 pandemic permeated all aspects of the current study, from early planning stages beginning in May 2020 to data collection and analysis in late 2021 and early 2022. These stages were impacted by COVID-19 restrictions, which resulted in off-site research meetings, remote data collection, and limited access to hospital settings for non-urgent activities. There is minimal literature available regarding the impact of COVID-19 on research within the field of clinical psychology at present. Discussing these issues, in conjunction with emerging empirical evidence, may highlight important considerations for future clinical psychology research. Moreover, Stiles-Shields et al. (2020) postulated that researchers should provide details regarding any methodological changes made due to COVID-19. It is also noted that researchers should describe any study limitations associated with COVID-19, along with how factors related to the pandemic may have influenced findings.

COVID-19 restrictions on travel, socialising, and funding have significantly impacted research worldwide. Such restrictions have made it difficult for researchers to recruit participants or delayed data entry into databases (Harper et al., 2020) and required researchers to change their data collection approaches (Bratan, 2021; Obschonka et al. 2022). Similar methodological issues were encountered during the completion of the current study. Regarding data collection, the research team had initially hoped that 48-month data collection could mirror previous waves by inviting participants on-site to the research lab. This would have enabled us to utilise observational methodology to assess mother-infant interactions and measure aspects of attachment security. However, conducting in-person research during the COVID-19

pandemic would have potentially placed participants and researchers at risk of infection, thus violating the ethical principle of 'Benefice and Nonmaleficence' outlined within the APA (2017) code of ethics (Chenneville and Scwartz-Mette, 2020).

Stiles-Shields et al. (2020) recommended adapting existing measures and consent forms for online delivery when conducting clinical research with paediatric populations during a pandemic. We utilised this approach to collect data for our study, and piloted our online measures with friends and family based on survey development recommendations by Robson and McCartan (2016). Feedback was sought regarding accessibility, completion time, and experience of individual items. We had some additional considerations while utilising such methodology with our population sample. For example, we made additional efforts to develop rapport with participants since we could not meet with them in person. This was achieved by creating and disseminating a colourful reader-friendly information poster, providing participants with researcher contact details, answering calls or responding to participants' queries in an approachable manner, and contacting participants by email to thank them for their participation. Interestingly, we observed that our attrition rates were lower than might have been expected at the fourth phase of a longitudinal study. It is possible that by removing the requirement to attend on-site data collection, our participation rates may have increased. Thus, utilising an online survey may have been a methodological strength in our study.

Shoss (2021) argued that researchers might need to consider that factors relating to the pandemic may affect how they generalise their findings. This was an important consideration for the current study since research has suggested that parents and their children may have been particularly adversely affected by the pandemic in terms of parent or child mental health and parent-child relationships (Alonzo et al., 2021; Bate et al., 2021; Clark et al., 2021; Fegert et al., 2020; Meherali, 2021; Olliver et al., 2021; O'Sullivan et al., 2021; Russel et al., 2020; Westrupp et al., 2021). We contrasted data collected at 48 months with available norm data

from studies conducted prior to the pandemic. Small effect size deviations from these norms were observed for all mental health measures at 48 months. This finding suggested that mothers in the current sample did not report feeling more stressed, depressed, or anxious than expected, irrespective of COVID-19.

Similarly, small effect size deviations were observed for all child socioemotional outcome measures, suggesting that the children in this sample did not experience any more social, emotional, or behavioural problems than expected in non-pandemic circumstances. Although a large effect size deviation was observed for mother-child *Closeness* at 48 months, this may be partially understood within the context of the poor internal reliability reported for this scale. This interpretation was supported by the small effect size deviation seen for the mother-child *Conflict* mean scores.

Overall, these analyses indicated that the current sample remained representative of mothers and young children, irrespective of the fact that data at 48 months was gathered during the COVID-19 pandemic. Nevertheless, considering the potentially confounding effect of COVID-19 remains an essential recommendation for future research. Our sample was possibly more resilient to the impact of COVID-19 due to specific sample characteristics. For example, mothers in this sample were generally in good mental health, and the sample mainly comprised white Irish families who were generally well educated and high earners. This is an important consideration in the context of emerging literature suggesting that low and middle-income families or people from Black, Asian, and Minority Ethnic (BAME) groups may have been at an increased vulnerability to adverse consequences of the pandemic (Chen et al., 2022, Pieh et al., 2020; Smith et al., 2020).

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Chapter Seven: Overall Conclusions

The overarching purpose of this thesis was to explore the factors that can contribute to socio-emotional outcomes in early childhood. Two research projects have been presented in this regard: a systematic review and an empirical research study. Both projects were informed by the theoretical underpinnings of attachment theory. Overall, these projects have provided evidence to suggest that children's early experiences with their mothers *and* fathers can have significant longitudinal implications for their future socio-emotional functioning. This evidence was particularly robust since both projects utilised longitudinal methodology, which facilitated the identification of temporal change in variables and inference of causation.

The systematic review synthesised findings from 16 longitudinal studies and made a novel contribution to the research base by including maternal involvement as an additional control or comparator variable. A key finding from this systematic review was that 12 of the 16 included studies reported that higher father involvement was significantly associated with reduced child behavioural problems. The systematic review also found some evidence to suggest that fathers can have a particularly beneficial influence on their children's lives through their engagement in playful or enjoyable activities. While some studies suggested that perhaps maternal involvement was more salient in predicting prosocial outcomes than father involvement, the evidence in this regard remained equivocal. Moreover, variations in significant associations made it difficult to conclude whether father involvement was more strongly associated with improvements in one behavioral domain (i.e., externalising, internalising, and psychosocial adjustment) over another.

Overall, these findings have important implications for clinicians working with non-clinical populations, where increased father involvement, particularly in play and positive activities, may be promoted as a protective factor. Information regarding father involvement could also inform systemic treatment with clinical populations, whereby efforts are either made

to increase levels of father involvement or capitalise on existing levels of involvement. Similarly, services could ensure that operational guidelines are updated to ensure that fathers are included in the initial referral process as they are likely to be important sources of information regarding their level of involvement with their children.

The major research project in this thesis complemented the paternal focus of the systematic review by examining mother-child dyads. We were specifically interested in exploring experiences of maternal mental health and the mother-child attachment relationship in infancy (4 months) and toddlerhood (18 months) as predictors of child socio-emotional functioning at 48 months. We conducted a fourth phase of follow-up data collection with the *BabySMART* study sample. Methodological strengths of our study were its longitudinal design, our inclusion of additional relevant control variables (e.g., mother's health-related quality of life, child developmental indicators, child sleep variables, and structural factors), and our inclusion of maternal stress as an additional mental health indicator.

We found evidence to suggest that maternal mental health difficulties and the mother-child attachment relationship during infancy and toddlerhood contributed to later child socio-emotional functioning in different ways. Maternal depression or anxiety during infancy or toddlerhood appeared to be a risk factor for the emergence of child socio-emotional problems by 48 months. Conversely, the early mother-child attachment relationship was observed to be a protective factor for the development of later prosocial behaviours. Based on cross-sectional multivariate analysis, we also found some evidence to suggest that mother-child relationship factors may become a more important predictor of socio-emotional problems as children develop. However, we acknowledged the caveat of these analyses being potentially less robust than our longitudinal findings.

In terms of implications, our findings suggest that clinicians working in perinatal, early intervention or infant mental health services should consider conducting a detailed assessment of maternal mental health status. Although our findings regarding maternal stress and associated outcomes were obtained from cross-sectional data, these findings suggest that it is also important for clinicians to include a measure of maternal stress in their assessments. Conversely, our findings suggest that positive mother-infant interactions could be considered protective factors in the emergence of later child prosocial behaviours. It is important to consider such evidence to ensure that a strengths-based approach to positive child socio-emotional outcomes is utilised in clinical appointments, where protective factors are highlighted and reinforced.

Finally, although not the primary focus of these research projects, this thesis has provided an account of conducting child and family psychological research during the COVID-19 pandemic. In this regard, a synthesis of emerging literature has been outlined, which focused on the implications of the pandemic on research and on the well-being of families. This literature was mapped onto the current major research project to provide an extended discussion and interpretation of the findings. We noted that participant scores on 48 month measures in our study did not deviate substantially from pre-pandemic norm data. This suggested that our sample remained representative despite the study being conducted during a pandemic. Overall, it was hoped that this chapter could make a novel contribution to the research base since there was limited literature available describing clinical psychology research during COVID-19.

Appendices

Appendix A: *Parenting* Journal Author Guidelines

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At the point of submission, you will be asked if there is a data set associated with the paper. If you reply yes, you will be required to provide the DOI, pre-registered DOI, hyperlink, or other persistent identifier associated with the data set(s). If you have selected to provide a pre-registered DOI, please be prepared to share the reviewer URL associated with your data deposit, upon request by reviewers.

Where one or multiple data sets are associated with a manuscript, these are not formally peer reviewed as a part of the journal submission process. It is the author's responsibility to ensure the soundness of data. Any errors in the data rest solely with the producers of the data set(s).

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Appendix B – PRISMA Checklist

Section/topic	#	Checklist item	Reported on page #
TITLE			
Title	1	Identify the report as a systematic review, meta-analysis, or both.	
ABSTRACT			
Structured summary	2	Provide a structured summary including, as applicable: background; objectives; data sources; study eligibility criteria, participants, and interventions; study appraisal and synthesis methods; results; limitations; conclusions and implications of key findings; systematic review registration number.	
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of what is already known.	
Objectives	4	Provide an explicit statement of questions being addressed with reference to participants, interventions, comparisons, outcomes, and study design (PICOS).	
METHODS			
Protocol and registration	5	Indicate if a review protocol exists, if and where it can be accessed (e.g., Web address), and, if available, provide registration information including registration number.	
Eligibility criteria	6	Specify study characteristics (e.g., PICOS, length of follow-up) and report characteristics (e.g., years considered, language, publication status) used as criteria for eligibility, giving rationale.	
Information sources	7	Describe all information sources (e.g., databases with dates of coverage, contact with study authors to identify additional studies) in the search and date last searched.	
Search	8	Present full electronic search strategy for at least one database, including any limits used, such that it could be repeated.	
Study selection	9	State the process for selecting studies (i.e., screening, eligibility, included in systematic review, and, if applicable, included in the meta-analysis).	

Data collection process	10	Describe method of data extraction from reports (e.g., piloted forms, independently, in duplicate) and any processes for obtaining and confirming data from investigators.	
Data items	11	List and define all variables for which data were sought (e.g., PICOS, funding sources) and any assumptions and simplifications made.	
Risk of bias in individual studies	12	Describe methods used for assessing risk of bias of individual studies (including specification of whether this was done at the study or outcome level), and how this information is to be used in any data synthesis.	
Summary measures	13	State the principal summary measures (e.g., risk ratio, difference in means).	
Synthesis of results	14	Describe the methods of handling data and combining results of studies, if done, including measures of consistency (e.g., I^2) for each meta-analysis.	

Section/topic	**#**	**Checklist item**	**Reported on page #**
Risk of bias across studies	15	Specify any assessment of risk of bias that may affect the cumulative evidence (e.g., publication bias, selective reporting within studies).	
Additional analyses	16	Describe methods of additional analyses (e.g., sensitivity or subgroup analyses, meta-regression), if done, indicating which were pre-specified.	
RESULTS			
Study selection	17	Give numbers of studies screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally with a flow diagram.	
Study characteristics	18	For each study, present characteristics for which data were extracted (e.g., study size, PICOS, follow-up period) and provide the citations.	
Risk of bias within studies	19	Present data on risk of bias of each study and, if available, any outcome level assessment (see item 12).	
Results of individual	20	For all outcomes considered (benefits or harms), present, for each study: (a) simple summary data for each	

studies		intervention group (b) effect estimates and confidence intervals, ideally with a forest plot.	
Synthesis of results	21	Present results of each meta-analysis done, including confidence intervals and measures of consistency.	
Risk of bias across studies	22	Present results of any assessment of risk of bias across studies (see Item 15).	
Additional analysis	23	Give results of additional analyses, if done (e.g., sensitivity or subgroup analyses, meta-regression [see Item 16]).	
DISCUSSION			
Summary of evidence	24	Summarise the main findings including the strength of evidence for each main outcome; consider their relevance to key groups (e.g., healthcare providers, users, and policy makers).	
Limitations	25	Discuss limitations at study and outcome level (e.g., risk of bias), and at review-level (e.g., incomplete retrieval of identified research, reporting bias).	
Conclusions	26	Provide a general interpretation of the results in the context of other evidence, and implications for future research.	
FUNDING			
Funding	27	Describe sources of funding for the systematic review and other support (e.g., supply of data); role of funders for the systematic review.	

Appendix C: Framework of 'Behavior Problems' used to guide Inclusion/Exclusion of studies

Externalizing Behaviors	Internalizing Behaviors	Psychosocial adjustment (with example operationalizations)
Aggression	Fearfulness	Behavioral Competence: • *Social competence* • *Under socialization* • *Peer relations* • *Family Relations* • *Prosocial behaviors*
Conduct Problems	Anxiety	Achievement/Performance/Functioning: • *Schoolwork* • *Hobbies* • *Task Mastery/Performance* • *Underachievement*
Delinquent/Rule-breaking/Anti-Social	Sadness/Depression	Self-relations: • *Self-assurance* • *Self-neglect* • *Poor self-esteem/diffident* • *Inadequate/excessive self-regulation*
Oppositionality	Social Withdrawal	Internal Status: • *Sense of wellbeing* • *Disturbed feelings (e.g., anxiety/depression)* • *Disturbed Thinking (e.g., phobias and obsessions)*
Hyperactivity/Impulsivity	Somatic Complaints	Coping: • *Adaptive/effective coping style* • *Avoidance* • *Substance use*
Attention Problems		Physiological Symptoms: • *Sleep problems* • *Eating problems* • *Pains* • *Tics* • *Gender and Sex* • *Other somatic problems*

Appendix D: Study Screening and Selection Tool

Father Involvement and Behavioral Problems in Children aged from 0 to 17 years – Study Selection Tool.

Reviewer Name: **Date:**

Author Name/Study ID:

Year:

Title:

Journal:

Father Involvement	**Include** ☐ Study focus is to explore specific concept of "father involvement". ☐ Measure of father involvement is used and described. ☐ Father involvement measure explores domains outlined in father involvement models (see protocol).	**Exclude** ☐ Study does not examine father involvement as a predictor variable or explores/measures general/vague/ambiguous/similar parenting characteristics/behaviors (e.g., "warmth", "parenting", "co-parenting".) ☐ Measure of father involvement is vague or unclear. ☐ Proxy measures (i.e., "present/absent, child support" are exclusively reported. ☐ Father involvement in an intervention program. ☐ Evaluation/development of a father involvement measure. ☐ Father involvement examined solely within the context of breastfeeding, labour/birth and pregnancy.
Population	**Include** ☐ Children aged 0-17 years. ☐ Father figures (including non-resident, non-biological etc.)	**Exclude** ☐ Fathers or children living outside of natural setting (i.e., incarcerated, residential care). ☐ Father diagnosed with physical/mental illness or engages in substance abuse. ☐ Children with a clinical physical/mental health diagnosis. ☐ Outcome population aged 18+ years ☐ Father/Mother aged under 18 years
Behavior Problems	**Include**	**Exclude**
	☐ Internal/External/Adjustment Behavior problems correspond to those outlined within the protocol. ☐ Outcome measure(s) of child behavior problems is/are reported.	☐ Behavioral difficulties are not measured. ☐ Behavioral problems are not explored as outcome variable. ☐ Measure(s) of behavioral problem not reported. ☐ Psychometric properties of outcome measure not reported or evident.
Study Design	☐ Longitudinal (longer than 6 months) ☐ Measure of maternal involvement	☐ Study is not longitudinal ☐ No measure of maternal involvement
Overall Decision	☐ Include	☐ Exclude
Notes		

Appendix E: Systematic Review Quality Appraisal Tool

The National Institute of Health (NIH) Quality Assessment Tool for Observational Cohort and Cross-Sectional Studies (NIH, 2014.)

Criteria	Yes	No	Other (CD, NR, NA)*
1. Was the research question or objective in this paper clearly stated?			
2. Was the study population clearly specified and defined?			
3. Was the participation rate of eligible persons at least 50%?			
4. Were all the subjects selected or recruited from the same or similar populations (including the same time period)? Were inclusion and exclusion criteria for being in the study prespecified and applied uniformly to all participants?			
5. Was a sample size justification, power description, or variance and effect estimates provided?			
6. For the analyses in this paper, were the exposure(s) of interest measured prior to the outcome(s) being measured?			

Criteria	Yes	No	Other (CD, NR, NA)*
7. Was the timeframe sufficient so that one could reasonably expect to see an association between exposure and outcome if it existed?			
8. For exposures that can vary in amount or level, did the study examine different levels of the exposure as related to the outcome (e.g., categories of exposure, or exposure measured as continuous variable)?			
9. Were the exposure measures (independent variables) clearly defined, valid, reliable, and implemented consistently across all study participants?			
10. Was the exposure(s) assessed more than once over time?			
11. Were the outcome measures (dependent variables) clearly defined, valid, reliable, and implemented consistently across all study participants?			
12. Were the outcome assessors blinded to the exposure status of participants?			

Criteria	Yes	No	Other (CD, NR, NA)*
13. Was loss to follow-up after baseline 20% or less?			
14. Were key potential confounding variables measured and adjusted statistically for their impact on the relationship between exposure(s) and outcome(s)?			

Quality Rating (Good, Fair, or Poor)
Rater #1 initials:
Rater #2 initials:
Additional Comments (If POOR, please state why):

Appendix F: Systematic Review Quality Assessment

	Aldous and Mulligan (2002)	Cookston and Finlay (2006)	Davis et al. (2021)	Flouri et al. (2016)	Ramchandani et al. (2010)	Lang et al. (2014)	Jia et al. (2012)	Ochi and Fujiwara (2021)	Hawkins (2007)	Slaughter and Nagoshi (2020)
Primary Reviewer rating	Fair	Fair	Good	Good	Good	Fair	Good	Good	Good	Good
Second Reviewer rating	Fair	Fair	Fair	Good	Good	Good	Good	Good	Good	Good
Final Decision	Fair	Fair	Good	Good	Good	Good	Good	Good	Good	Good

Appendix G: PubMed Search String

Search Number	Terms Used
S1	Father* OR paternal OR dad
S2	involv* OR engag* OR avail* OR respon* OR interact* OR warm* OR play* OR care OR caring OR support* OR contact* OR “quality time” OR “one-to-one” OR “one-on-one”
S3	child* OR teen* OR adolescen* OR youth* OR toddler* OR infan* OR minor* OR baby OR babies OR juvenile* OR young* OR kid OR schoolboy* OR schoolgirl* OR schoolchild* OR tween* OR preteen*
S4	behav* OR psychosocial OR “peer relations” OR adjustment
S5	S1 AND S2 AND S3 AND S4

Appendix H: Ethical Approval Letters

UCC
University College Cork, Ireland
Coláiste na hOllscoile Corcaigh

Coláiste na nEalaíon, an Léinn Cheiltigh agus na nEolaíochtaí Sóisialta
College of Arts, Celtic Studies and Social Sciences

Scoil an Síceolaíochta Feidhmí
School of Applied Psychology

University College Cork,
Cork, Ireland.

T +353 (0)21 490 4551 / 4552
E infoapsych@ucc.ie
http://www.ucc.ie/en/apsych/

2nd March 2021

Clinical Psychology Research and Ethics

Dear Shane,

Early Attachment and Maternal Mental Health: An Exploration of the Longitudinal Impact on Child Socio-Emotional Development

Shane MacSweeney-Mahon

Thank you for your ethics application and subsequent changes. Your application has been approved by the Clinical Psychology Research and Ethics Committee and you have full ethical approval for the above named project.

Yours sincerely,

Dr Mike Murphy
Chair Clinical Psychology Research and Ethics Panel

Dr Carol Linehan
Head of School of Applied Psychology

Ollscoil na hÉireann, Corcaigh
National University of Ireland, Cork

COISTE EITICE UM THAIGHDE CLINICIÚIL

Clinical Research Ethics Committee of the Cork Teaching Hospitals

Tel: +353-21-4901901
Email: crec@ucc.ie

University College Cork
Lancaster Hall
6 Little Hanover Street
Cork
Ireland

Our Ref: ECM 3 (ggg) 04/04/17 & ECM 3 (lll) 09/03/2021

8th April 2021

Professor Geraldine Boylan
Director of INFANT
INFANT Centre
5th Floor
Cork University Maternity Hospital
Wilton
Cork

Re: BABY SMART (Study of massage therapy, sleep and neurodevelopment).

The following documents have been approved:

- Cover Letter dated 4th March 2021
- Amendment Application Form signed 4th March 2021
- Follow Up Email Version 1.0
- 48 Month Poster Version 3.0 dated 6th April 2021.

Yours sincerely

Professor David Kerins
Chairman
Clinical Research Ethics Committee
of the Cork Teaching Hospital

Appendix I: Bivariate Analyses Results

Predictor Variable	SDQ Total Difficulties	SDQ Emotional Problems	SDQ Conduct Problems	SDQ Hyperactivity	SDQ Peer Problems	SDQ Prosocial
2 Weeks						
Child Gender	d = -.019	d = -.097	d = .026	d = .028	d = .131	d = -.025
Maternal Age	r =-.184	r = -.144	d = -.157	**r = -.226***	r = -.016	*r* = -.162
Maternal Health Related Quality of Life	r = -.039	r =.090	r = -.032	r = -.031	r = -.150	r = -.033
Maternal Ethnicity	d = -.080	d = .386	d = -.301	d = -.299	d = .146	**d = -.531*** **
Paternal Ethnicity	d = -.671	d = .523	d = -1.17	d = -.917	d = .145	**d = -.526*** **
Maternal Nationality	d = .186	d = .309	d = -.013	d = .309	d = -.224	d = -.162
Paternal Nationality	d = .098	d =.501	d = -.269	d = .205	d = -.238	d = .222
Parental Education	d = .039	d = .225	d = -.053	d = -.151	d = .269	d = -.244
Employment	d = .029	d =.344	d = -.033	d = .156	d = -.504	d = .099
Net Income	d = .224	d =.065	d = .296	d = .259	d = .261	d = .195
Participated in Baby Massage	d = -.227	d =.017	d = .086	d = -.310	d = -.337	d = .023
4 Months						
Infant Sleep Problems	d = -.465	**d = -.628***	d = -.131	d = -.232	d = -.242	d = -.324
Hours of Infant Sleep	r = .043	r = .046	r = -.095	r = -.046	r = -.038	r = -.037

Predictor Variable	SDQ Total Difficulties	SDQ Emotional Problems	SDQ Conduct Problems	SDQ Hyperactivity	SDQ Peer Problems	SDQ Prosocial
Maternal Health Related Quality of Life	**r = -.287****	r = -.155	**r = -.221***	**r = -.183***	r = -.153	r = .095
EPDS Depression	**r =.259****	r = .132	**r = .224***	**r =.262****	r = .027	r = -.020
EPDS Anxiety	**r = .251****	**r = .188***	r = .143	**r = .272****	r = .033	r = -.051
Griffiths III – Foundations of Learning	**r = .234***	**r = .285****	r = .061	r = .134	r = .044	r = -.158
Griffiths III – Language & Communication	r = .080	r = .058	r = .055	r = .060	r = -.040	r = -.136
Griffiths III – Eye and Hand Co-ordination	r =.166	r = .108	r = .019	**r = .185***	r = .016	**r = -.208***
Griffiths III – Personal, Social & Emotional	r = .050	r = .034	r = -.067	r = .144	r = -.013	r = -.133
Griffiths III – Gross Motor Scale	r = .017	r = .044	r = -.016	r = .024	r = -.061	*r* = -.132
Griffiths III – Overall Development	r =.142	**r = .184***	r = .028	r = .119	r = -.035	r = -.164
MPAS Quality of Attachment	r = -.057	r = .041	r = -.055	r = -.090	r = -.084	r = .077
MPAS Absence of Hostility	r = -.072	r = -.051	r = -.117	r = -.133	r = .091	r = -.004
MPAS Pleasure of Interaction	r = -.088	r = .144	r = .069	**r = -.196***	r = -.124	**r = .213***
MPAS Maternal Attachment	r = -.093	r = .053	r = -.054	r = -.177	r = -.053	r = .118
18 Months						
Infant Sleep Problems	d = -.172	d = -.111	d = -.195	d = -.077	d = -.167	d = -.388
Hours of Infant Sleep	r = -.151	r = -.094	r = -.130	r = -.160	r = -.018	***r* =-.222***
Maternal Health Related Quality of Life	**r = -.272****	**r = -.216***	**r = -.288****	r = -.119	r = -.083	r = .053

Predictor Variable	SDQ Total Difficulties	SDQ Emotional Problems	SDQ Conduct Problems	SDQ Hyperactivity	SDQ Peer Problems	SDQ Prosocial
BAI	**r = .228***	r = .133	*r* = .186	**r = .245****	r = .053	r = -.062
BDI	**r = .304****	**r = .203***	**r = .239***	**r = .237***	r = .093	r = -.083
Griffiths III – Foundations of Learning	r = .079	**r = .190***	r = .065	r = -.046	r = -.020	r = .114
Griffiths III – Language & Communication	r = -.060	r = .080	r = -.075	r = -.058	r = -.110	r = .022
Griffiths III – Eye & Hand Co-ordination	r = .032	r = .137	r = .005	r = .006	r = -.096	r = .053
Griffiths III – Personal, Social & Emotional	r = -.012	r = .036	r = -.001	r = -.055	r = -.096	r = .022
Griffiths III – Gross Motor	r =.044	r = -.087	r = .100	r = .078	r = -.024	r = .109
Griffiths III – Overall Development	r =.028	r = .128	r = .003	r = .004	r = -.097	r = .048
48 Months						
Maternal Health Related Quality of Life	**r = -.230***	**r = -.238***	r = -.108	r = -.166	r = -.130	r = .006
CPRS Closeness	**r = -.267****	r = -.112	r = -.086	**r = -.294****	**r = -.271****	**r = .451*****
CPRS Conflict	**r = .507*****	r = **.233***	**r = .606*****	**r = .314*****	r = .136	**r = -.262****
DASS 21 Depression	**r = .230***	r = .048	**r = .269****	**r = .219***	r = .005	r = -.128
DASS 21 Anxiety	**r = .252****	r = .127	**r = .228***	r = .164	r = .109	r = .021
DASS 21 Stress	**r = .325*****	**r = .244***	**r = .324*****	r = .151	r = .083	r = -.080

Note: * *P* < .05 (two-tailed); ** *P* <.01 (two-tailed); ***P* < .001 (two-tailed); '-' denotes no statistically significant association.

Appendix J: Participant Information Poster

ENRICH Infant Sleep Study

Infant
Irish Centre for Maternal and Child Health Research

4 year Follow-up with BabySMart participants

Researchers from Infant and UCC are interested in the development of all the children and parents who took part in the initial BabySmart study now they are pre-schoolers.

What we are interested in?

1. Your child's social & emotional development.
2. Parental wellbeing.
3. Child-parent relationships.

Are there any risks?

The study has been reviewed and approved by the Clinical Research Ethics Committee of the Cork Teaching Hospitals.

What is involved?

1. Following this link to complete our online questionnaire, which will take approximately 15 minutes.

More information can be received by emailing:
babysmart@ucc.ie

Version 3.0 06 APR 2021

Appendix K: Information Sheet, Consent form and Survey

Study Information

Participant Information Leaflet

Study Title:	**BabySMART (Study of Massage therapy, sleep And neurodevelopMenT)**
Supplemental PIL/ICF:	**48 Month Follow-Up of Baby SMART Study Participants**
Principal Investigator:	Prof Geraldine Boylan,
Sites of Investigation:	Cork University Hospital (CUH)

INTRODUCTION

You are being invited to take part in a research study. Before you decide whether to take part it is important for you to understand why we are doing this research and what is involved. Please take time to read this leaflet, and if you want to, discuss it with your doctor, midwives, family, or friends. Please feel free to ask us if anything is not clear, or if you would like more information. Thank you for taking the time to read this.

ABOUT THE STUDY

Some time ago you participated in the BabySMART study which examined your child's sleep and development. Your child is now approximately 4 years of age and the research team is following up all families who participated in the BabySMART study to evaluate early childhood outcomes. Through this research we will be able to see how children's social and emotional development progresses across time and if early family and infant characteristics in infancy affect these outcomes. Exploring this can help us to understand more about the different factors that contribute to healthy child development, which is essential for future child and parent healthcare.

WHY HAVE I BEEN CHOSEN?

You have been invited to participate because you and your child participated in the BabySMART study when your child was an infant. All families who were involved in the original research are being invited to participate in this follow-up study. Your invitation to participate is not because your child was doing any better or worse than others in the original study.

DO I HAVE TO TAKE PART?

Participation in this study is completely voluntary. There is no obligation to participate, and should you choose to do so, you can refuse to answer specific questions in the online survey and to withdraw from the research, up until the time your data is fully anonymised. You will not be asked to give a reason for withdrawing. This research is entirely independent from any treatment services you may be receiving.

-

WHAT WILL HAPPEN TO ME IF I TAKE PART?

Should you choose to participate, you will be asked to answer some questions on our online questionnaires.

Online Questionnaires:
Part 1 of the questionnaire requires you to answer multiple-choice questions that ask about your own experiences as a parent, as well as experiences with your child.
Part 2 of the questionnaire will present a few common parenting situations and ask you how you would respond in each.

In total we expect that completion of the questionnaires will take about 15-20 minutes. We hope that you will enjoy participation.

ARE THERE ANY RISKS INVOLVED IN PARTICIPATING?

We do not anticipate any adverse outcomes to you from your participation, and this study has received ethical approval from the UCC Clinical Research Ethics Committee. It is worth noting that some topics we will be exploring throughout the study may be sensitive in nature. For example, we are interested in exploring different aspects of emotional functioning and how this influences people's experience of parenting. To explore this, we will ask some questions about how you feel, your relationship with your child and your child's development. Sometimes, people find that these questions can bring up difficult or surprising emotions for them. If this were to happen, we have made sure to include some contact information for services and supports at the end of the survey. We will also include details so that you can get in touch with the research team directly, should you need further guidance around who to contact for support.

-

WHAT HAPPENS TO THE INFORMATION COLLECTED?

By participating in this study, information from you (also called "personal data") will be collected for the purposes mentioned above in this Participant Information Leaflet. This personal data includes, for example:

- Information that directly identifies you (such as your name, and your year of birth)
- Information on your health and medical condition including your medical history
- Information contained in the results after analysis.

To ensure confidentiality, the data generated during this follow -up study will be coded with the unique Study ID Number that you were allocated in the original BabySMART study. Any information that leaves the clinical site will be labelled with this Study ID Number only. Every person that has access to your uncoded data (that is kept at the INFANT Centre, Cork University Hospital) is subject to professional secrecy and confidentiality. Data that directly identifies you (uncoded data) is stored in a locked filing cabinet separate to study documentation. Only study personnel can match your name to your unique Study ID Number.

This data will solely be accessible to the study research team, the study Sponsor and their representatives to check if the study is conducted properly and that your rights are being respected. If this occurs all personal information made available for inspection will be handled in the strictest confidence and in accordance with legal data protection requirements. All information collected about you will be kept private and confidential and will be stored in a secure web based database. The information will be pseudo-anonymised (coded) and any information that could identify you will not be stored on the database. Only fully anonymised data will be shared with external study collaborators for analysis and possible publications.

All data will be shared with the INFANT Centre at Cork University Hospital (CUH). The information collected will be included as part of fulfilling the theses requirements of the Doctor of Clinical Psychology programme at UCC and may be published in peer reviewed journals or presented at relevant conferences. However, you or your child will never be identified individually during these presentations and will not be revealed in any reports or publications. Names or anything else identifiable to you or your child will not be released or published.This data will also be used to inform the development of perinatal services in the future.

WHAT HAPPENS TO THE INFORMATION FROM THE STUDY?

University College Cork (UCC) is the study's Sponsor and will act as the data controller for this study. Any personal data which you provide to the University will be treated with the highest standards of security and confidentiality, in accordance with Irish and European Data Protection legislation.

Any personal data you provide to us during the study will be processed fairly and lawfully. Signing the Informed Consent Form means that your personal data will be used for the purposes outlined in this Participant Information Leaflet (PIL).

The clinical site, the study investigators and the members of the study team will use your personal data within the scope defined above. The General Data Protection Regulation allows us to process your data because you have provided your consent. You have a right to request access to this information and to have a copy of it. You have the right to have any incorrect or inaccurate data deleted unless this request makes it impossible or very hard to conduct the study.

You are entitled to withdraw your consent at any time. If you do withdraw your consent, we will keep your coded personal data collected prior to withdrawal, for processing along with other data collected as part of the study to preserve the integrity of the study.

Your personal information will be stored securely at the INFANT Centre. A pseudo-anonymised database (where only your assigned unique numbers are used and there is no identifiable information) will also be stored on researcher's password protected encrypted computers at UCC. All information management will adhere to the Data Protection Act and GDPR.

We are also obliged to ensure the safety and welfare of our participants. This means that if the information you provide suggests that you, your child, or another person is at risk of harm, then we may need to break the confidentiality agreement. If this were to happen, we would try to contact you first, to discuss any concerns we have identified. This would give us the opportunity to provide you with additional information about available resources or supports. Where necessary, we may also contact the appropriate organisations or services on your behalf to ensure you are fully supported.

WHAT WILL HAPPEN TO THE RESULTS OF THIS RESEARCH?

Results of this research study may be published in medical journals and presented at scientific meetings. However, you will never be identified individually during these presentations and will not be revealed in any reports or publications. Your name or anything else identifiable to you will not be released or published. If you would like to receive a summary of the study findings please indicate this on the consent form attached. The findings will be shared in 2022/23. The data provided may also be used by INFANT Centre research team for future research projects.

FOR HOW LONG WILL THIS DATA BE KEPT?

We will keep identifiable information about you from this study for a minimum of 10 years after the study has concluded, as per UCC Code of Research Conduct document. We would like your permission to allow us to store your de-identified data for future related research for a period of 10 years. Further research analyses may be performed but this will be subject to further ethics approval if applicable.

If you have any complaints in connection with our processing of your personal data, you can contact UCC's Information Compliance Manager:
Office of Corporate & Legal Affairs,
University College Cork,
Western Road, Cork
E: foi@ucc.ie Tel: +353 21 4903949

You also have the right to lodge a complaint with the Data Protection Commission if you are unhappy with our processing of your personal data. Details of how to lodge a complaint can be found on the Data Protection Commission's website (www.dataprotection.ie), or by telephoning 1890 252 231.

WHO HAS REVIEWED THIS STUDY?

All research in Ireland is carefully reviewed by an independent group of people, called a Research Ethics Committee, to protect your safety, rights, wellbeing, and dignity. This study has been approved by the Clinical Research Ethics Committee of the Cork Teaching Hospitals (CREC).

WHAT WILL HAPPEN IF I DO NOT WISH TO CARRY ON IN THIS STUDY?

You are free to withdraw at any time, to any reason without giving a reason. This will not affect the high level of care you will expect for yourself. We would however like your permission to use the information that has already been collected up to the point of withdrawal.

WHO IS CONDUCTING THIS RESEARCH?

This research is being conducted by a team of researchers from the INFANT centre and the School of Applied Psychology at University College Cork (UCC) as outlined below. Emma O'Byrne and Shane MacSweeney are completing this research as part of a Doctoral Clinical Psychology Training Programme.

SUPPORTS AND RESOURCES

You may wish to approach your family doctor (GP) in relation to any mental health concerns you may have. Your GP may refer you to a mental health professional or provide information about supports and resources available to you.

If you require urgent help in relation to your mental health and your GP is unavailable, you can contact a GP out-of-hours service, or mental health services through your local mental health unit or hospital. If you or someone needs urgent emergency assistance, please phone 999 or 112.

Please call the YourMentalHealth Information Line on freephone 1800 111 888 to find out information about mental health services operating in your area. You can also send a text to 50808. Visit https://text50808.ie/ to find out more.

ADDITIONAL RESOURCES:

Samaritans - Phone 116 123
Pieta House - http://www.pieta.ie/ or phone 1800 247 247
'Text About It' - https://text50808.ie/
Aware - 1800 80 48 48
Women's Aid – Phone 1800 341 900
Men's Aid – Phone 0818 222 240

Search for available services delivered online, by phone or face-to-face –
https://www2.hse.ie/services/mental-health/services-search/

WHERE CAN I GET MORE INFORMATION?

The study will be fully explained to you and any questions answered before you decide if you want to take part. If you have any further questions regarding this study, please contact the Principal Investigator: Professor Geraldine Boylan, email: g.boylan@ucc.ie or a member of the study team;

- Emma O'Byrne, Trainee Clinical Psychologist, 119224672@umail.ucc.ie
- Shane MacSweeney, Trainee Clinical Psychologist, 119224718@umail.ucc.ie
- Dr. Chris McCusker, Senior Lecturer in Clinical Psychology, christopher.mccusker@ucc.ie

- Professor Deirdre Murray, Consultant Paediatrician, email: d.murray@ucc.ie
- Dr Leanna Fogarty, Clinical Research Psychologist, leannafogarty@yahoo.com

Consent Form

Participant Informed Consent Statement

Study Title: BABYSMART (Study of Massage therapy, sleep And neurodevelopMenT) 48 month follow-up

I have read the information leaflet about this study and have been given a copy to keep. The information has been fully explained to me and I have been able to ask questions and have them answered satisfactorily. I understand why the research is being done and any risks involved.

I agree to participate in a 4-year follow up study based on my participation in the BabySMART study with the INFANT Centre at Cork University Hospital.

I am aware that participation is voluntary, and I may withdraw my consent at any time. If I withdraw from the study, I agree that the coded personal data collected prior to withdrawal may still be processed along with other data collected as part of the study to preserve the integrity of the study. I am aware that my decision not to continue participation at any stage will not restrict my access to health care services normally available to me.

I am aware that confidentiality of records concerning my involvement in this study will be maintained according to national and EU Data Protection Laws. When required by law, the records of this study may be reviewed by government agencies, ethics committee and sponsors of the study.

I understand that the sponsors and Investigators have such insurance as is required by law in the event of injury resulting from this research.

I agree that I can be contacted in the future in relation to this and other research studies

I would like to receive a summary of the research findings by email when available in 2022/2023

I give permission for the information collected from me to be stored for possible future related commercial or collaborative research *without my further consent being required* but subject to approval of a Research Ethics Committee.

I consent that data collected for this study may be used, now or in the future, and understand that I will not benefit financially if this research leads to the development of a new treatment, drug, or device.

I agree that data can be anonymised and used by University College Cork for training and research purposes. I agree to my anonymised data being used in future research presentations, peer reviewed journals and other methods of dissemination.

I understand some of the questionnaires used throughout this project contain items which might be sensitive in nature and measure various aspects of emotional health. I understand that if the information I provide suggests that I, my child, or another person is at risk of harm, that there may be a need to break the confidentiality agreement. I understand if this were to happen, the researchers will try to contact me first, to discuss any concerns they have identified, but in the event I am uncontactable I understand that under these circumstances' confidentiality may be breached.

I understand if I have further queries concerning my rights in connection with the research, I can contact the Clinical Research Ethics Committee of the Cork Teaching Hospitals, Lancaster Hall, Little Hanover Street, Cork (Tel 021 4901901).

By clicking this circle, I am consenting to the above and would like to take part in this study.

○

Demographic Information

First Name

Surname

Child's date of birth (dd/mm/yyyy)

Child's gender

- ○ Male
- ○ Female
- ○ Prefer not to say

Relationship with the child

- ○ Mother
- ○ Father
- ○ Guardian
- ○ [ ] Other (Please Specify)

Marital status

- ○ Married/Civil partnership
- ○ Co-habiting
- ○ In a relationship (not living together)
- ○ Single

General Health

Under each heading, please tick the ONE box that best describes your health TODAY.

Mobility

- ○ I have no problems in walking about
- ○ I have some problems in walking about
- ○ I am confined to a bed

Self-Care

- ○ I have no problems with self-care
- ○ I have some problems washing or dressing myself
- ○ I am unable to wash or dress myself

Usual Activities *(e.g. work, study, housework, family or leisure activities)*

- ○ I have no problems with performing my usual activities
- ○ I have some problems with performing my usual activities
- ○ I am unable to perform my usual activities

Pain/Discomfort

- ○ I have no pain or discomfort
- ○ I have moderate pain or discomfort
- ○ I have extreme pain or discomfort

Anxiety/Depression

- ○ I am not anxious or depressed
- ○ I am moderately anxious or depressed
- ○ I am extremely anxious or depressed

- In your own opinion how good or bad is your own health today on a scale of 0-100 (where 100 is the best imagineable health state and 1 is the worst).

Strengths and Difficulties Questionnaire (2-4) © Robert Goodman, 2005

Strengths and Difficulties Questionnaire (2-4)

© Robert Goodman, 2005

For each item please mark the box for Not True, Somewhat True or Certainly True. It would help us if you answered all items as best you can even if you are not absolutely certain or the

item seems daft! Please give your answers on the basis of the child's behaviour over the last six months or this school year.

	Not True	Somewhat True	Certainly True
Considerate of other people's feelings	○	○	○
Restless, overactive, cannot stay still for long	○	○	○
Often complains of headaches, stomach-aches or sickness	○	○	○
Shares readily with other children (treats, toys, pencils etc.)	○	○	○
Often has temper tantrums or hot tempers	○	○	○
Rather solitary, tends to play alone	○	○	○
Generally obedient, usually does what adults request	○	○	○
Many worries, often seems worried	○	○	○
Helpful if someone is hurt, upset or feeling ill	○	○	○
Constantly fidgeting or squirming	○	○	○
Has at least one good friend	○	○	○
Often fights with other children or bullies them	○	○	○
Often unhappy, down-hearted or tearful	○	○	○

	Not True	Somewhat True	Certainly True
Generally liked by other children	○	○	○
Easily distracted, concentration wanders	○	○	○
Nervous or clingy in new situations, easily loses confidence	○	○	○
Kind to younger children	○	○	○
Often argumentative with adults	○	○	○
Picked on or bullied by other children	○	○	○
Often volunteers to help others (parents, teachers, other children)	○	○	○
Can stop and think about things before acting	○	○	○
Can be spiteful to others	○	○	○
Gets on better with adults than with other children	○	○	○
Many fears, easily scared	○	○	○
Sees tasks through to the end, good attention span	○	○	○

Parental Wellbeing

Please read each of the 21 statements and select a number 0, 1, 2 or 3 which indicates how much the statement applies to you **over the past week**. There are no right or wrong answers.

Do not spend too much time on any statement.

I found it hard to wind down

- 0 - Did not apply to me at all
- 1 - Applied to me to some degree, or some of the time
- 2 - Applied to me to a considerable degree or a good part of the time
- 3 - Applied to me very much or most of the time

I was aware of dryness of my mouth

- 0 - Did not apply to me at all
- 1 - Applied to me to some degree, or some of the time
- 2- Applied to me to a considerable degree or a good part of the time
- 3 - Applied to me very much or most of the time

I couldn't seem to experience any positive feeling at all

- 0 - Did not apply to me at all
- 1 - Applied to me to some degree, or some of the time
- 2- Applied to me to a considerable degree or a good part of the time
- 3 - Applied to me very much or most of the time

I experienced breathing difficulties (e.g. excessively rapid breathing, breathlessness in the absence of physical exertion)

- 0 - Did not apply to me at all
- 1 - Applied to me to some degree, or some of the time
- 2- Applied to me to a considerable degree or a good part of the time
- 3 - Applied to me very much or most of the time

I found it difficult to work up the initiative to do things

- ○ 0 - Did not apply to me at all
- ○ 1 - Applied to me to some degree, or some of the time
- ○ 2- Applied to me to a considerable degree or a good part of the time
- ○ 3 - Applied to me very much or most of the time

I tended to over-react to situations

- ○ 0 - Did not apply to me at all
- ○ 1 - Applied to me to some degree, or some of the time
- ○ 2- Applied to me to a considerable degree or a good part of the time
- ○ 3 - Applied to me very much or most of the time

I experienced trembling (e.g. in the hands)

- ○ 0 - Did not apply to me at all
- ○ 1 - Applied to me to some degree, or some of the time
- ○ 2- Applied to me to a considerable degree or a good part of the time
- ○ 3 - Applied to me very much or most of the time

I felt that I was using a lot of nervous energy

- ○ 0 - Did not apply to me at all
- ○ 1 - Applied to me to some degree, or some of the time
- ○ 2- Applied to me to a considerable degree or a good part of the time
- ○ 3 - Applied to me very much or most of the time

I was worried about situations in which I might panic and make a fool of myself

- ○ 0 - Did not apply to me at all
- ○ 1 - Applied to me to some degree, or some of the time
- ○ 2- Applied to me to a considerable degree or a good part of the time

- ○ 3 - Applied to me very much or most of the time

I felt that I had nothing to look forward to

- ○ 0 - Did not apply to me at all
- ○ 1 - Applied to me to some degree, or some of the time
- ○ 2- Applied to me to a considerable degree or a good part of the time
- ○ 3 - Applied to me very much or most of the time

I found myself getting agitated

- ○ 0- Did not apply to me at all
- ○ 1- Applied to me to some degree, or some of the time
- ○ 2- Applied to me to a considerate degree or a good part of the time
- ○ 3- Applied to me very much or most of the time

I found it difficult to relax

- ○ 0 - Did not apply to me at all
- ○ 1 - Applied to me to some degree, or some of the time
- ○ 2- Applied to me to a considerable degree or a good part of the time
- ○ 3 - Applied to me very much or most of the time

I felt down-hearted and blue

- ○ 0 - Did not apply to me at all
- ○ 1 - Applied to me to some degree, or some of the time
- ○ 2- Applied to me to a considerable degree or a good part of the time
- ○ 3 - Applied to me very much or most of the time

I was intolerant of anything that kept me from getting on with what I was doing

- ○ 0 - Did not apply to me at all
- ○ 1 - Applied to me to some degree, or some of the time
- ○ 2- Applied to me to a considerable degree or a good part of the time
- ○ 3 - Applied to me very much or most of the time

I felt I was close to panic

- ○ 0 - Did not apply to me at all
- ○ 1 - Applied to me to some degree, or some of the time
- ○ 2- Applied to me to a considerable degree or a good part of the time
- ○ 3 - Applied to me very much or most of the time

I was unable to become enthusiastic about anything

- ○ 0 - Did not apply to me at all
- ○ 1 - Applied to me to some degree, or some of the time
- ○ 2- Applied to me to a considerable degree or a good part of the time
- ○ 3 - Applied to me very much or most of the time

I felt I wasn't worth much as a person

- ○ 0 - Did not apply to me at all
- ○ 1 - Applied to me to some degree, or some of the time
- ○ 2- Applied to me to a considerable degree or a good part of the time
- ○ 3 - Applied to me very much or most of the time

I felt I was rather touchy

- ○ 0 - Did not apply to me at all
- ○ 1 - Applied to me to some degree, or some of the time
- ○ 2- Applied to me to a considerable degree or a good part of the time

- ○ 3 - Applied to me very much or most of the time

I was aware of the action of my heart in the absence of physical exertion (e.g. sense of heart rate increase, heart missing a beat)

- ○ 0 - Did not apply to me at all
- ○ 1 - Applied to me to some degree, or some of the time
- ○ 2- Applied to me to a considerable degree or a good part of the time
- ○ 3 - Applied to me very much or most of the time

I felt scared without any good reason

- ○ 0 - Did not apply to me at all
- ○ 1 - Applied to me to some degree, or some of the time
- ○ 2- Applied to me to a considerable degree or a good part of the time
- ○ 3 - Applied to me very much or most of the time

I felt that life was meaningless

- ○ 0 - Did not apply to me at all
- ○ 1 - Applied to me to some degree, or some of the time
- ○ 2- Applied to me to a considerable degree or a good part of the time
- ○ 3 - Applied to me very much or most of the time

Parent-Child Relationship

The next 15 questions ask about how you feel about the relationship you have with your child. Please reflect on the degree to which each of the following statements currently applies to your relationship with your child. Using the scale below, select the appropriate number for each item.

I share an affectionate, warm relationship with my child.

- ○ 1 - Definitely does not apply
- ○ 2 - Not really
- ○ 3 - Neutral, not sure
- ○ 4 - Applies somewhat
- ○ 5 - Definitely applies

My child and I always seem to be struggling with each other.

- ○ 1 - Definitely does not apply
- ○ 2 - Not really
- ○ 3 - Neutral, not sure
- ○ 4 - Applies somewhat
- ○ 5 - Definitely applies

If upset, my child will seek comfort from me

- ○ 1 - Definitely does not apply
- ○ 2 - Not really
- ○ 3 - Neutral, not sure
- ○ 4 - Applies somewhat
- ○ 5 - Definitely applies

My child is uncomfortable with physical affection or touch from me.

- ○ 1 - Definitely does not apply
- ○ 2 - Not really
- ○ 3 - Neutral, not sure
- ○ 4 - Applies somewhat
- ○ 5 - Definitely applies

My child values his/her relationship with me.

- ○ 1 - Definitely does not apply
- ○ 2 - Not really
- ○ 3 - Neutral, not sure
- ○ 4 - Applies somewhat
- ○ 5 - Definitely applies

When I praise my child, he/she beams with pride.

- ○ 1 - Definitely does not apply
- ○ 2 - Not really
- ○ 3 - Neutral, not sure
- ○ 4 - Applies somewhat
- ○ 5 - Definitely applies

My child spontaneously shares information about themselves.

- ○ 1 - Definitely does not apply
- ○ 2 - Not really
- ○ 3 - Neutral, not sure
- ○ 4 - Applies somewhat
- ○ 5 - Definitely applies

My child easily becomes angry at me.

- ○ 1 - Definitely does not apply
- ○ 2 - Not really
- ○ 3 - Neutral, not sure
- ○ 4 - Applies somewhat
- ○ 5 - Definitely applies

It is easy to be in tune with what my child is feeling.

- ○ 1 - Definitely does not apply
- ○ 2 - Not really
- ○ 3 - Neutral, not sure
- ○ 4 - Applies somewhat
- ○ 5 - Definitely applies

My child remains angry or is resistant after being disciplined.

- ○ 1 - Definitely does not apply
- ○ 2 - Not really
- ○ 3 - Neutral, not sure
- ○ 4 - Applies somewhat
- ○ 5 - Definitely applies

Dealing with my child drains my energy.

- ○ 1 - Definitely does not apply
- ○ 2 - Not really
- ○ 3 - Neutral, not sure
- ○ 4 - Applies somewhat
- ○ 5 - Definitely applies

When my child is in a bad mood, I know we're in for a long and difficult day.

- ○ 1 - Definitely does not apply
- ○ 2 - Not really
- ○ 3 - Neutral, not sure
- ○ 4 - Applies somewhat
- ○ 5 - Definitely applies

My child's feelings towards me can be unpredictable or can change suddenly.

- ○ 1 - Definitely does not apply
- ○ 2 - Not really
- ○ 3 - Neutral, not sure
- ○ 4 - Applies somewhat
- ○ 5 - Definitely applies

My child is sneaky or manipulative with me.

- ○ 1 - Definitely does not apply
- ○ 2 - Not really
- ○ 3 - Neutral, not sure
- ○ 4 - Applies somewhat
- ○ 5 - Definitely applies

My child openly shares their feelings and experiences with me.

- ○ 1 - Definitely does not apply
- ○ 2 - Not really
- ○ 3 - Neutral, not sure
- ○ 4 - Applies somewhat
- ○ 5 - Definitely applies

Scenarios

Did you complete the infant massage group at INFANT?

- ○ Yes
- ○ No

What are your memories from the infant massage experience?

Do you think it impacted your parenting at the time? If yes, how?

The final part of this questionnaire includes the description of a brief and common scenario that most parents have likely experienced.

We would like you to tell us how you have or would respond to this situation. Try and answer by recalling what actually happened rather than what you think should have happened. All details are relevant.

Scenario

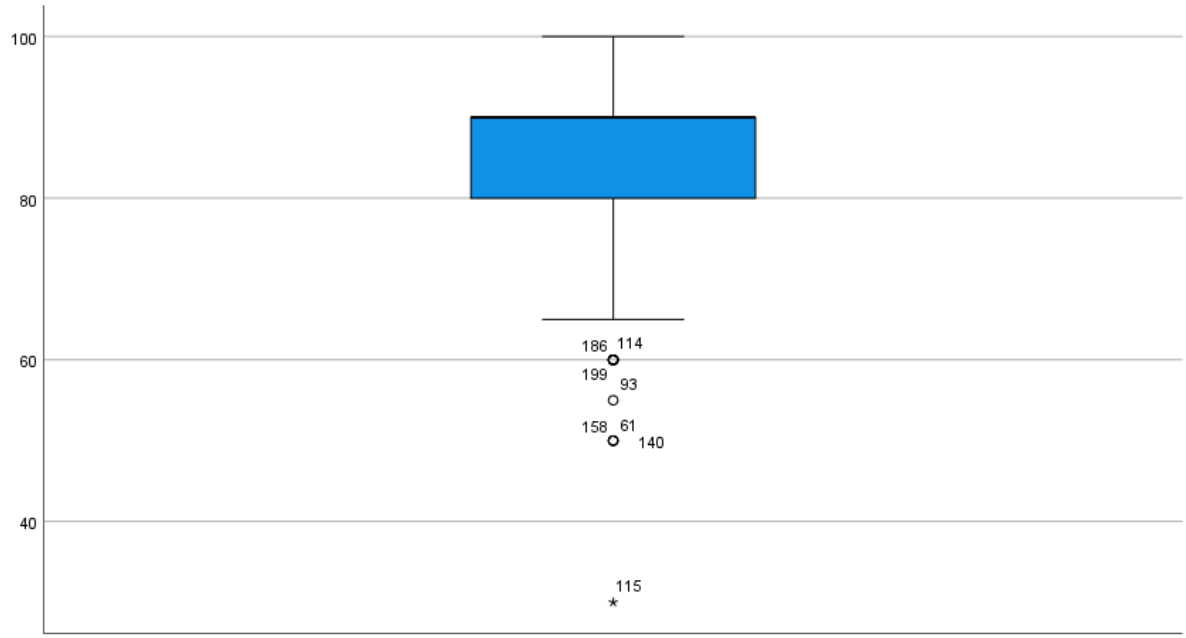
Imagine you are having dinner and your child is refusing to eat. They are becoming more irritable and tearful the more you encourage them to take another bite. They are responding "No, no, no." You know they are tired, having just returned from a few hours in the park. You are also tired and in a hurry to finish dinner. We would like you to tell us;

1. What strategies do you usually use in this situation?

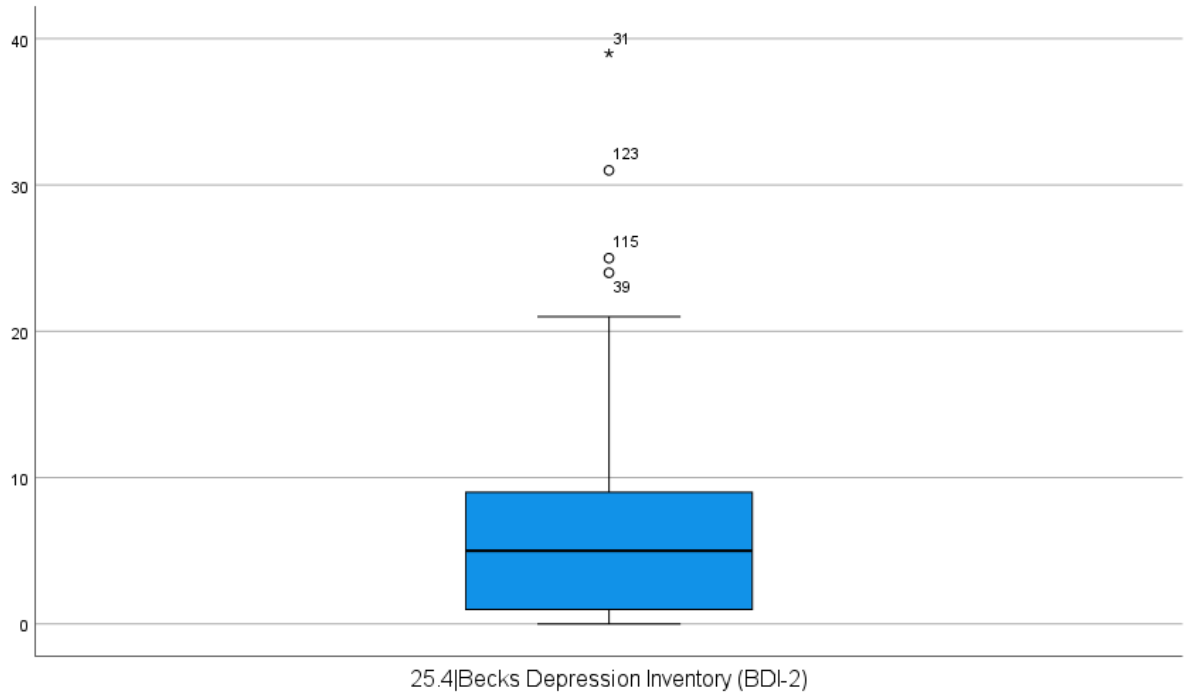
2. What do you usually say to your child when this happens?

3. How does the situation usually end?

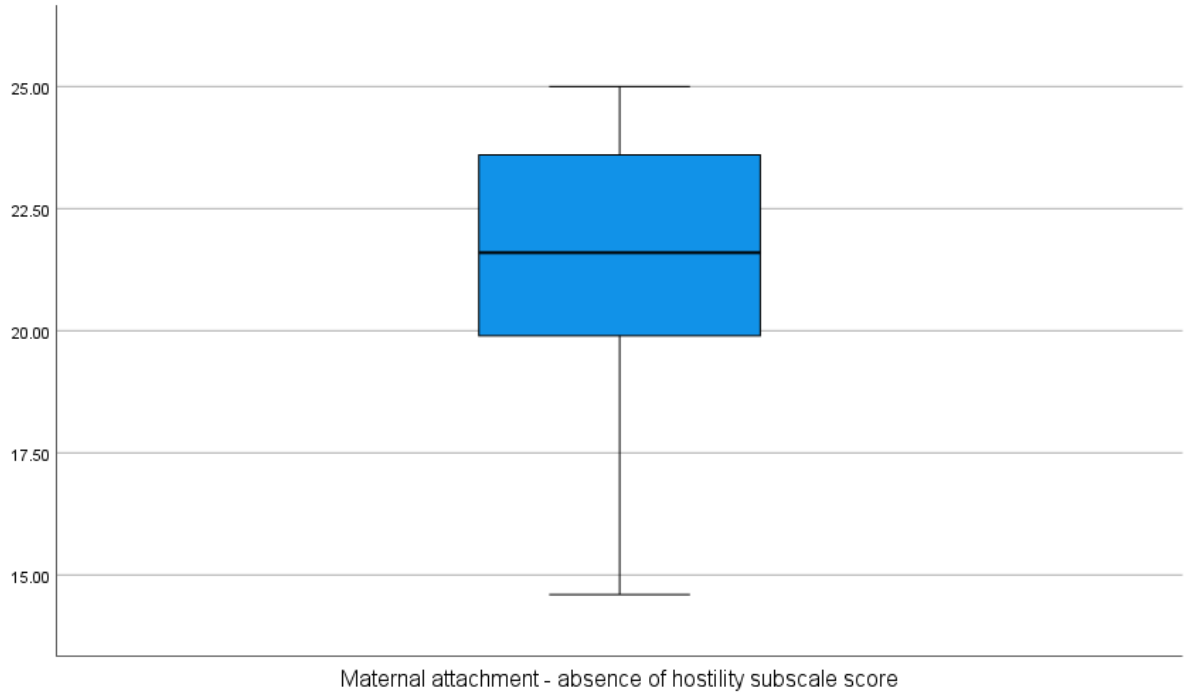
Appendix L: Sample of Boxplots Utilised to Check for Outliers



.7|In your own opinion, how good or bad is your own health today?



25.4|Becks Depression Inventory (BDI-2)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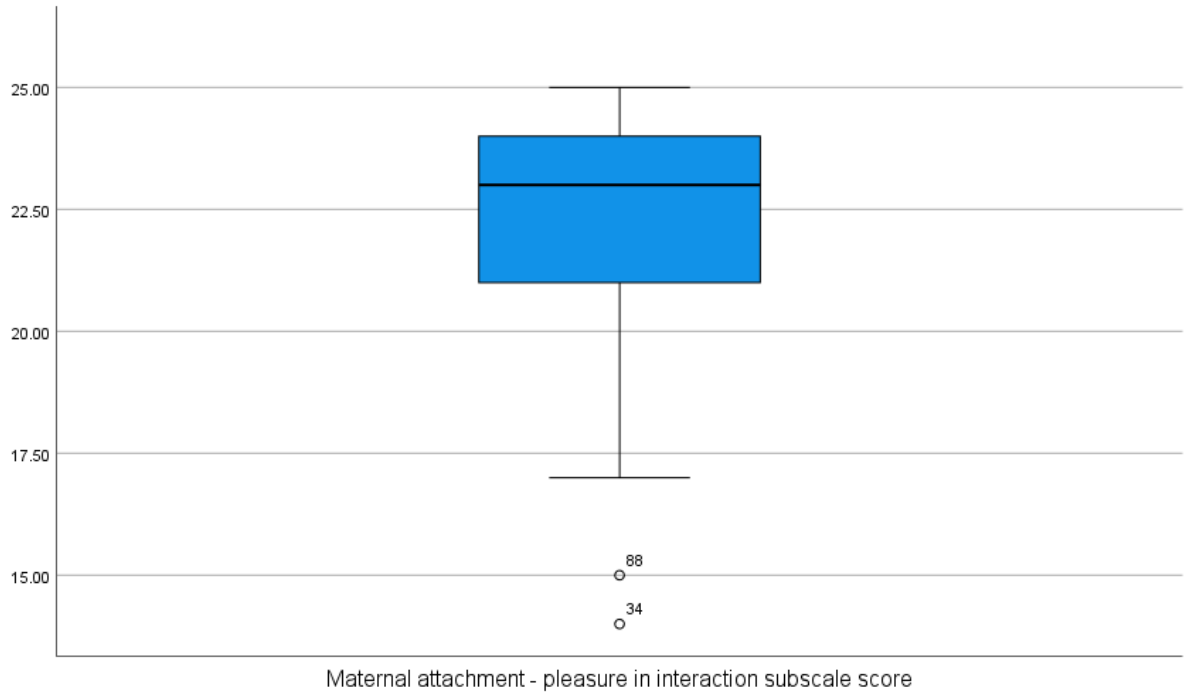
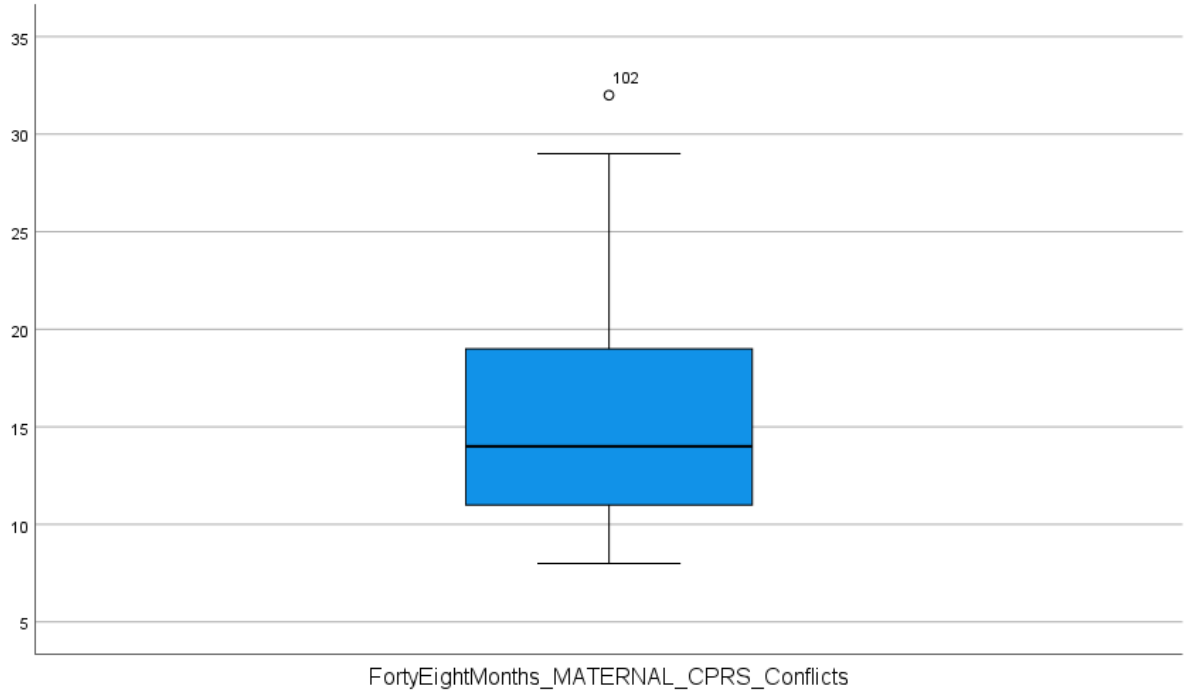
22.50
20.00
17.50
15.00
Maternal attachment - absence of hostility subscale score


25.00
22.50
20.00
17.50
15.00
88
34
Maternal attachment - pleasure in interaction subscale score


35
30
25
20
15
10
5
102
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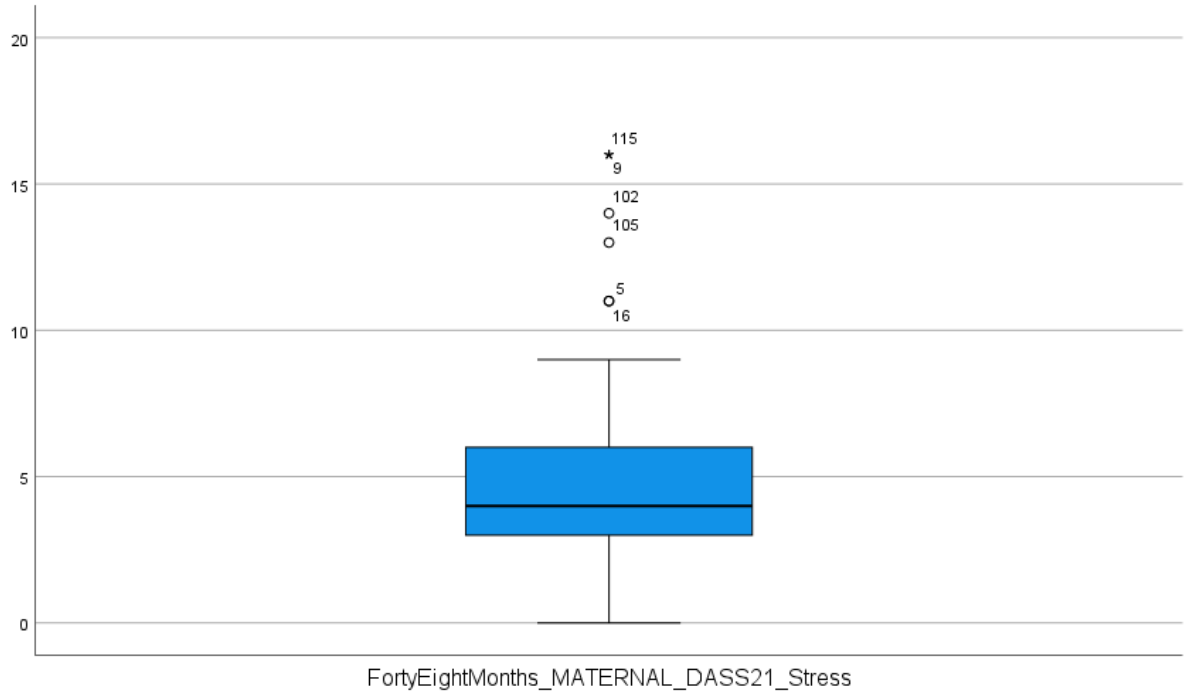
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0
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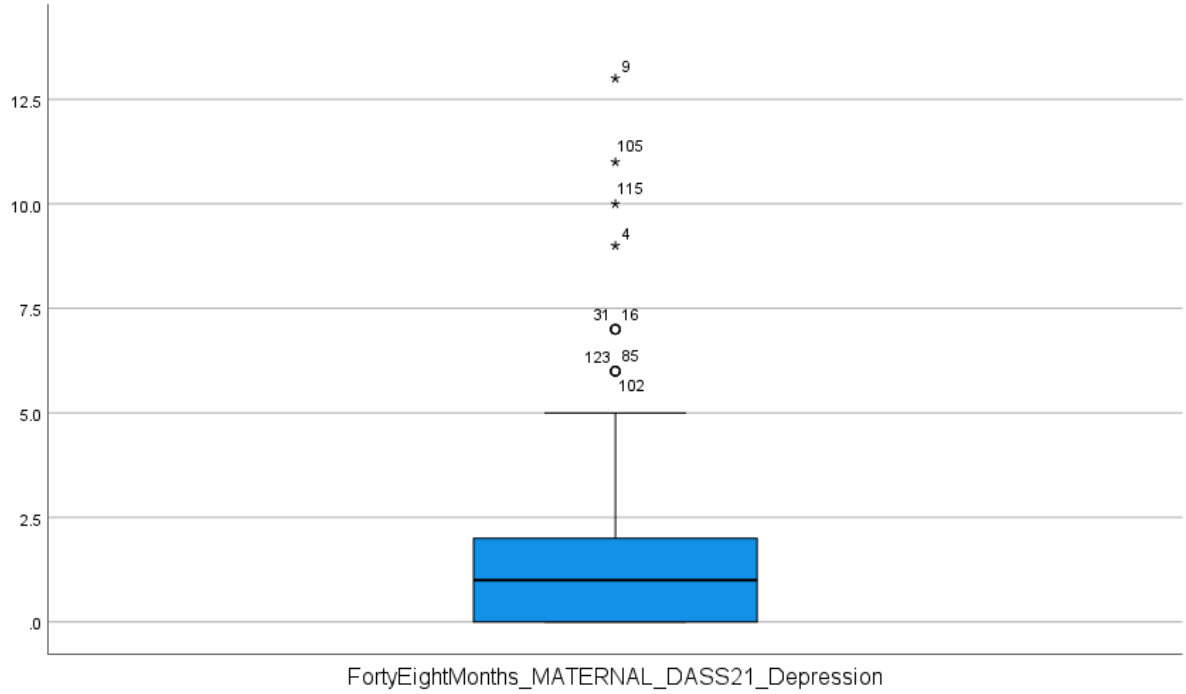
9
102
105
5
16
FortyEightMonths_MATERNAL_DASS21_Stress


12.5
10.0
7.5
5.0
2.5
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9
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115
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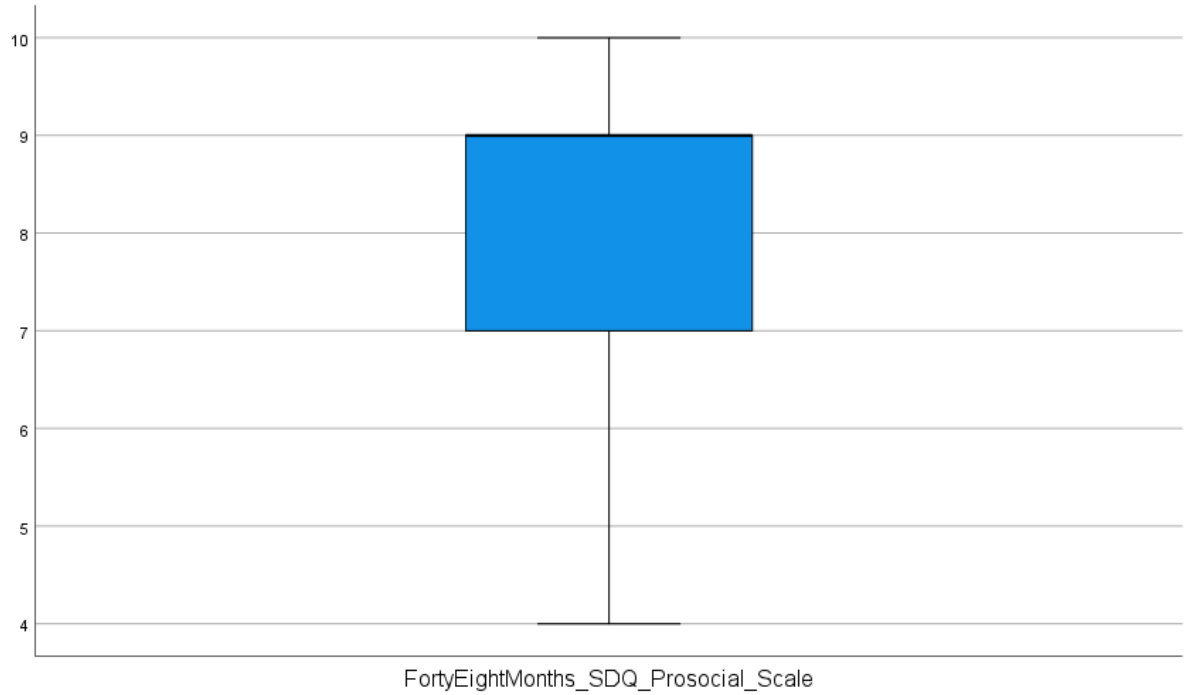
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6
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4
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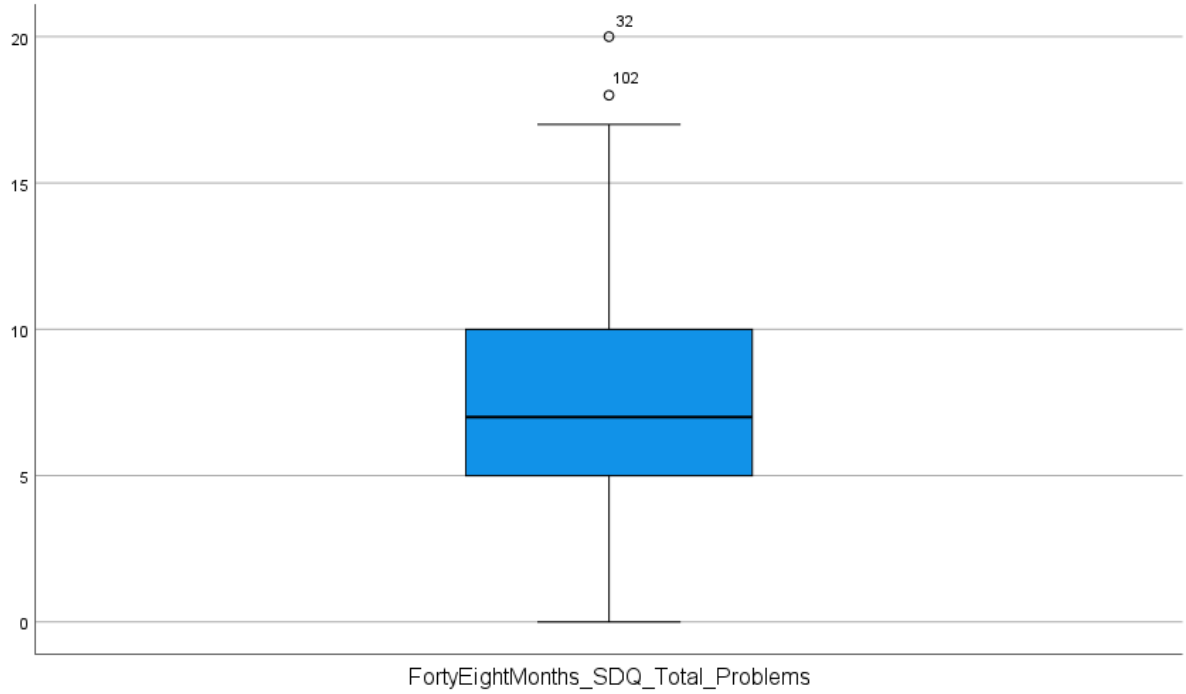
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20
15
10
5
0
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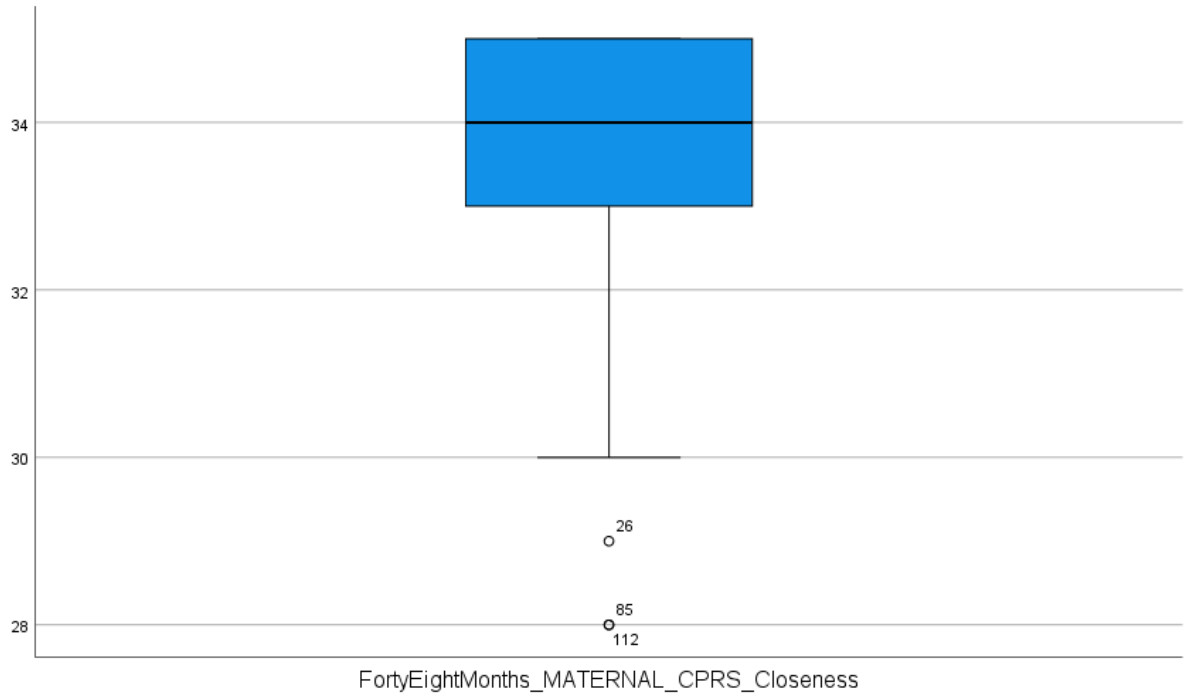
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30
28
26
85
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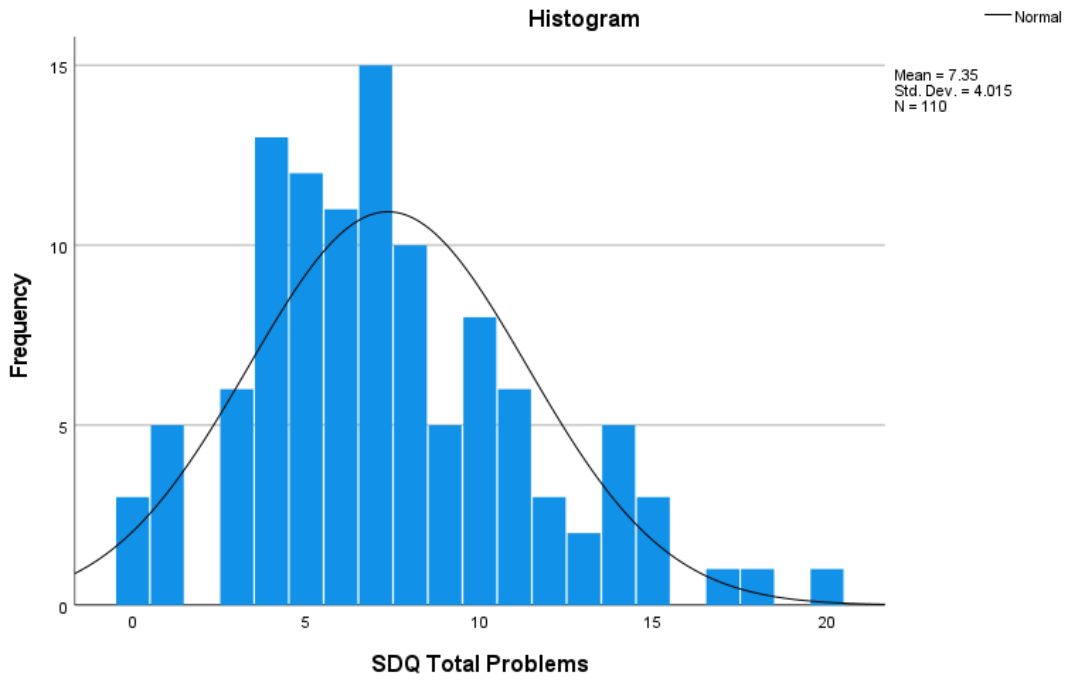
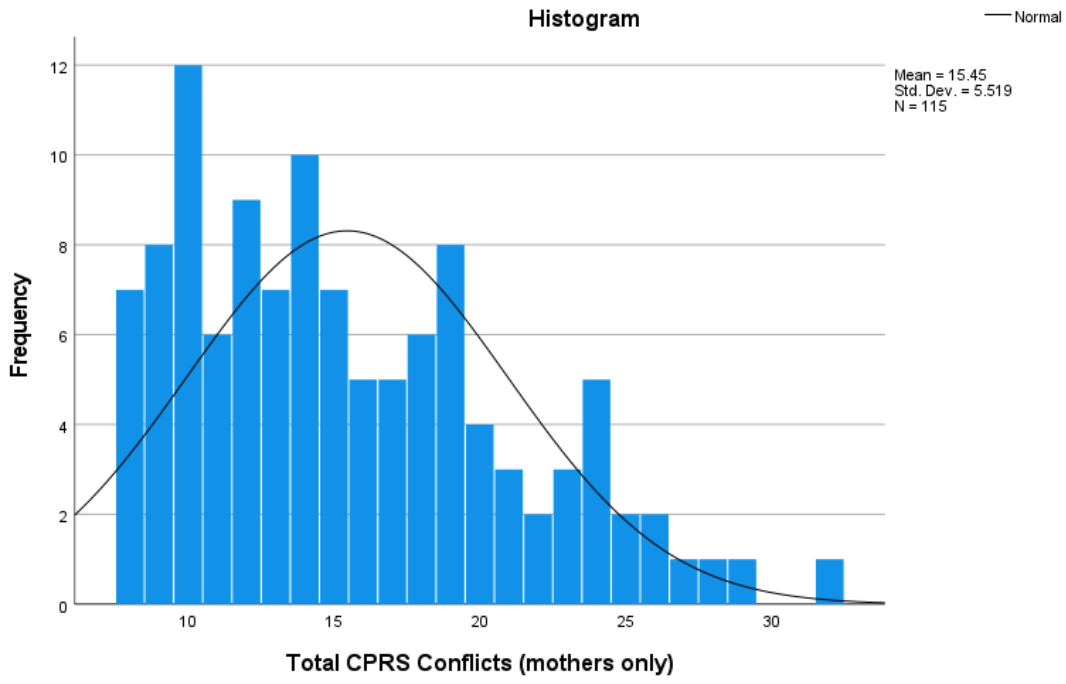
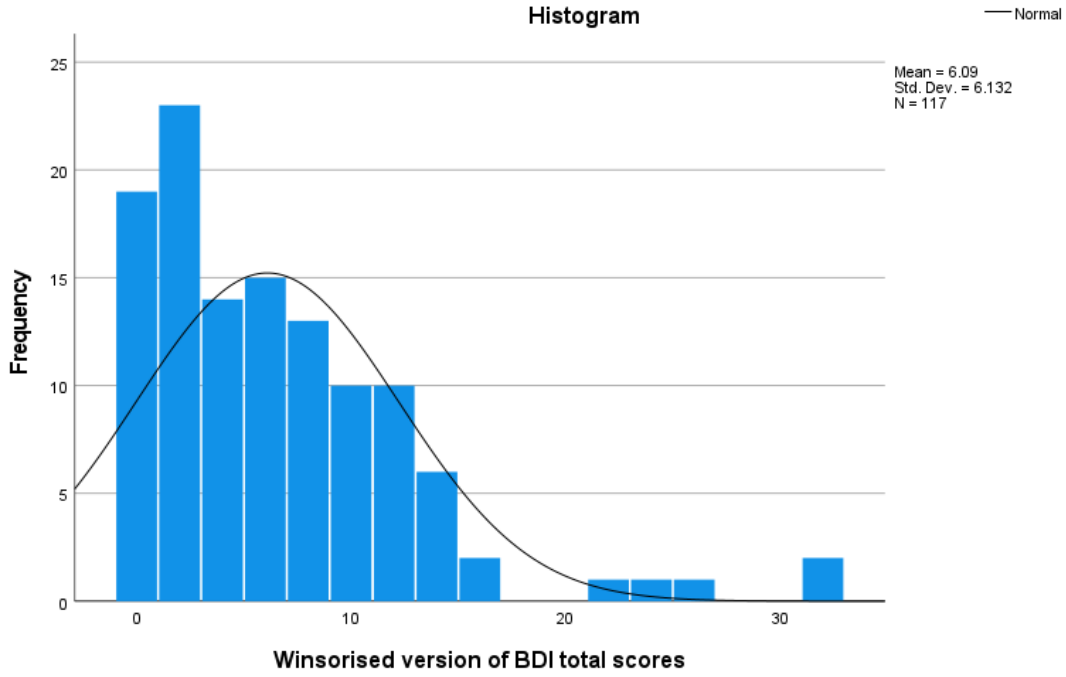
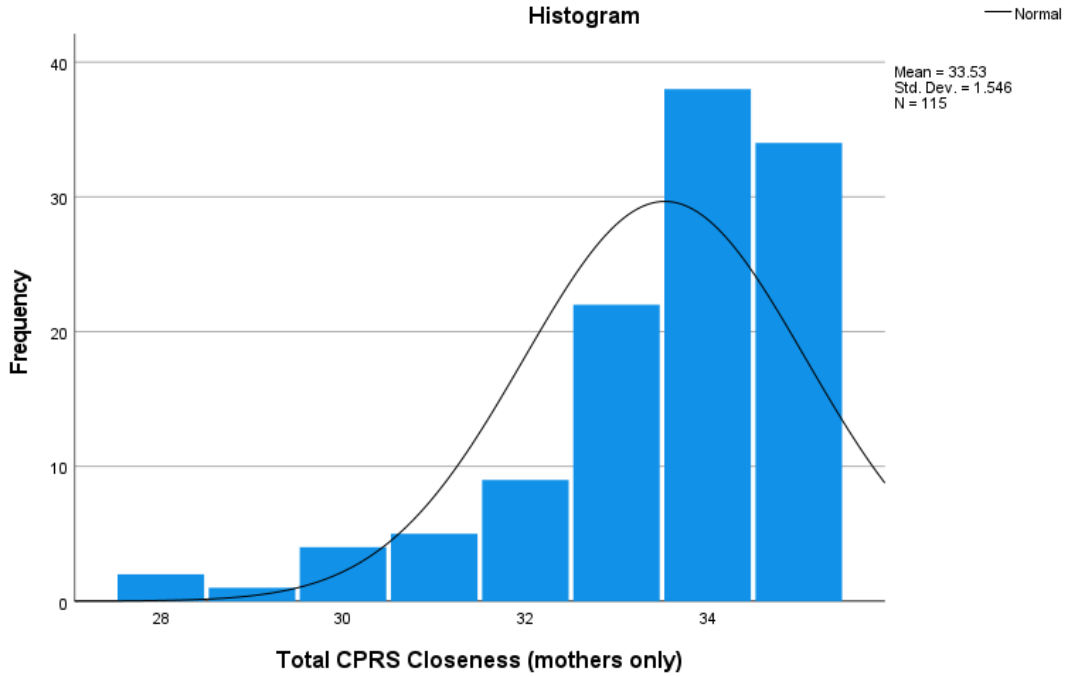
FortyEightMonths_MATERNAL_CPRS_Closeness

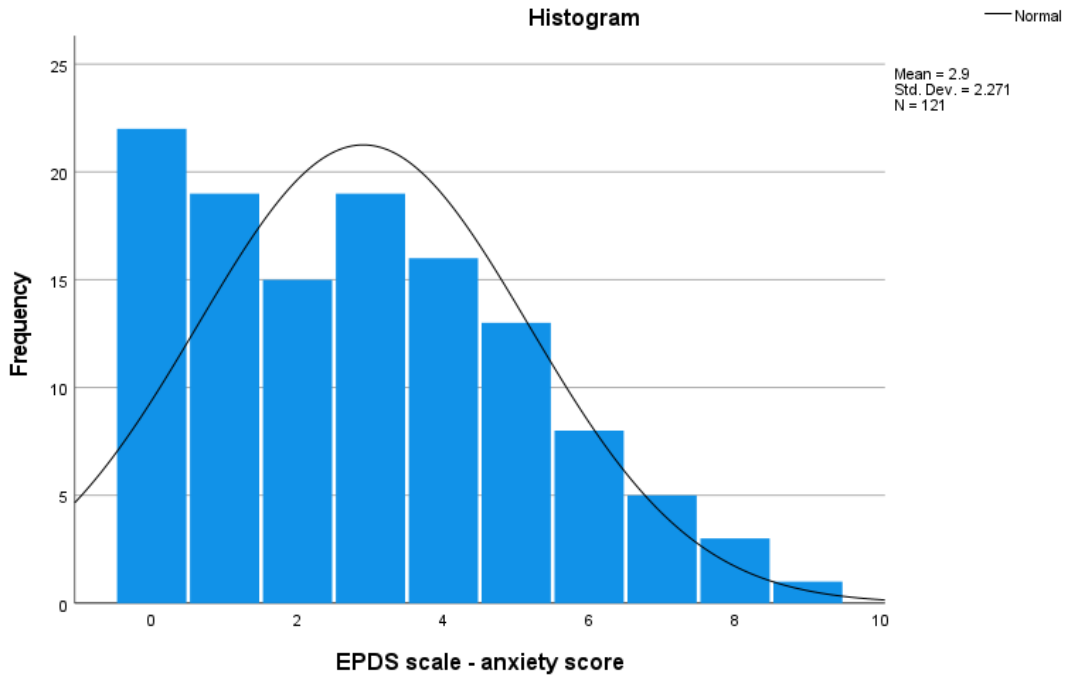
Appendix M: Sample of Histograms Utilised to Check Assumption of Normality

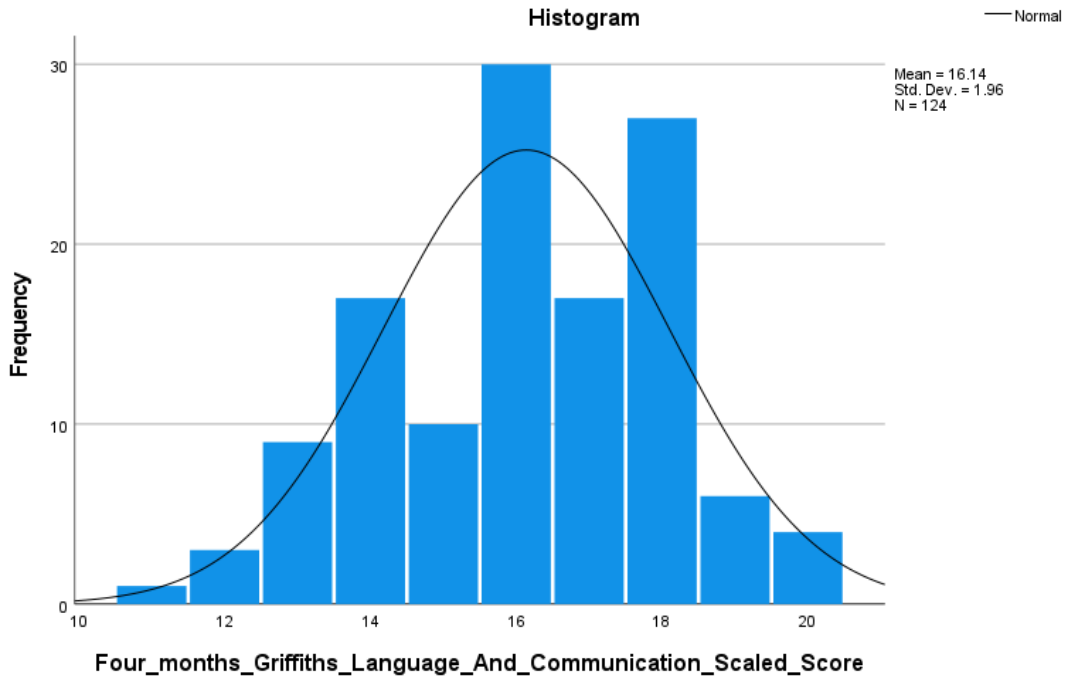


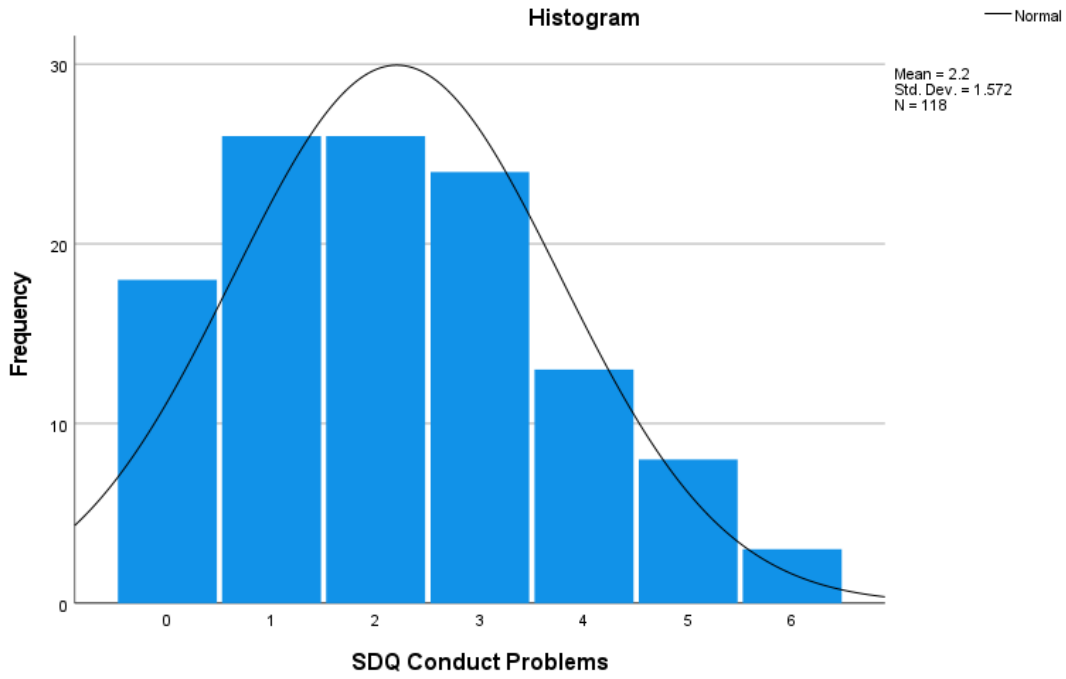


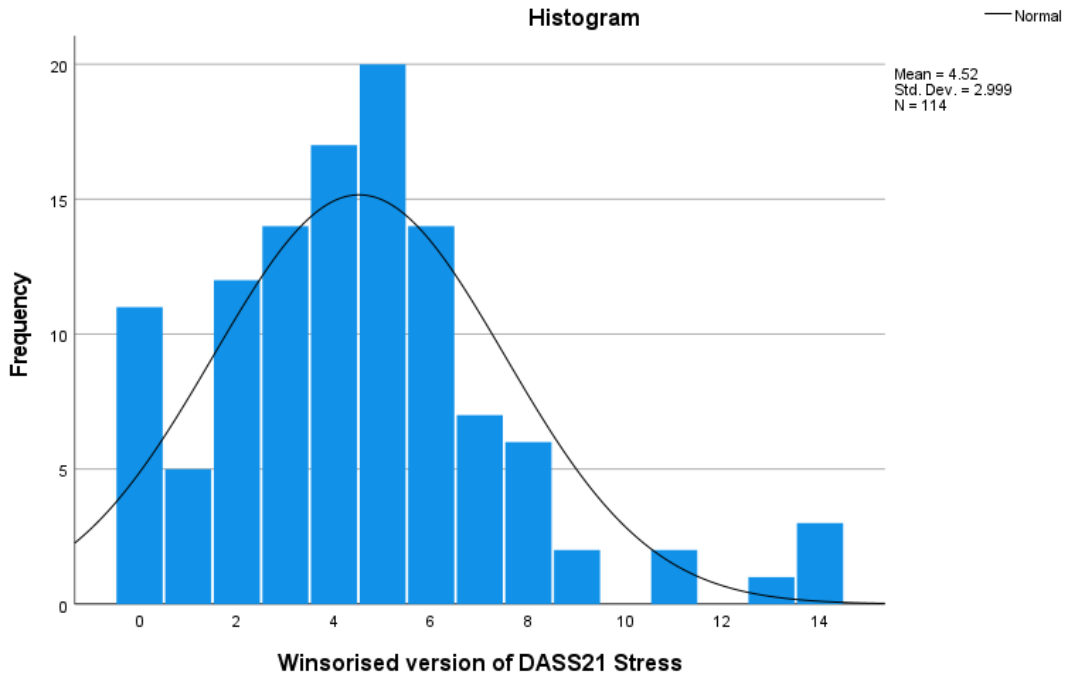

Histogram
Normal
Mean = 6.09
Std. Dev. = 6.132
N = 117
Frequency
25
20
15
10
5
0
0
10
20
30
Winsorised version of BDI total scores

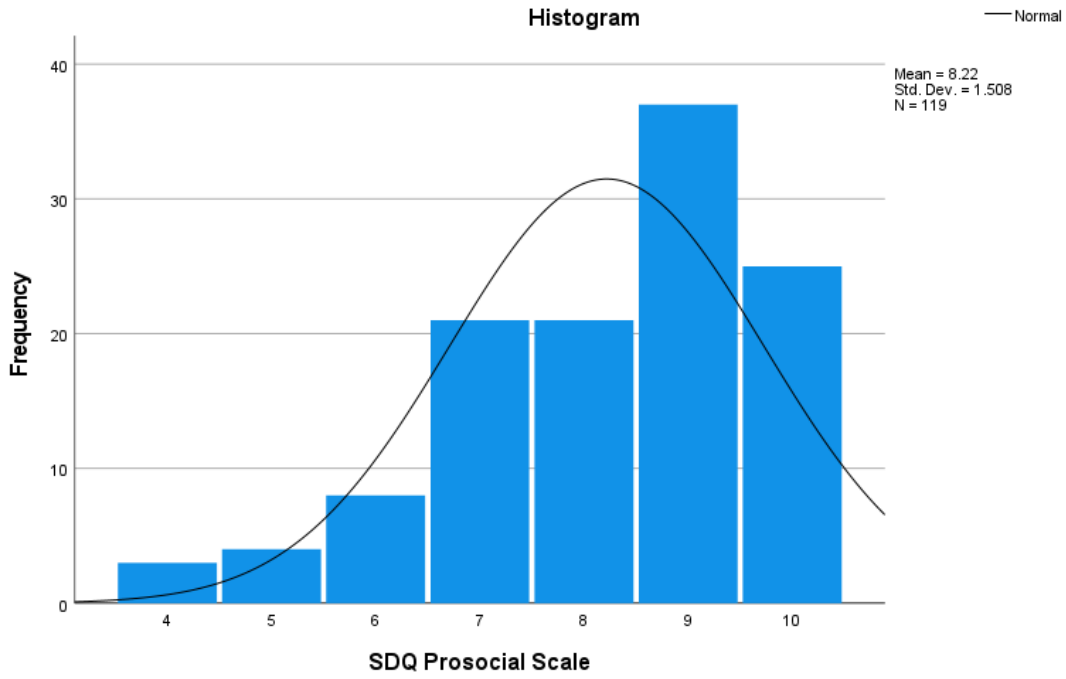

Histogram
Normal
Mean = 33.53
Std. Dev. = 1.546
N = 115
Frequency
40
30
20
10
0
28
30
32
34
Total CPRS Closeness (mothers only)

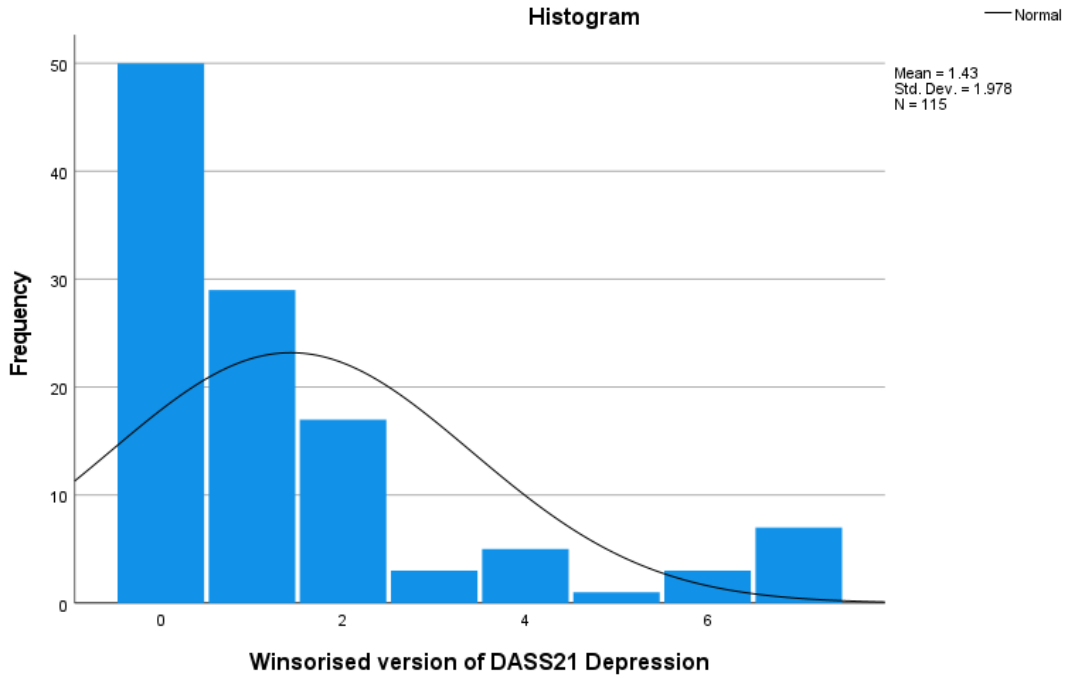

Histogram
Normal
Mean = 2.9
Std. Dev. = 2.271
N = 121
Frequency
25
20
15
10
5
0
0
2
4
6
8
10
EPDS scale - anxiety score


Histogram
Normal
Mean = 16.14
Std. Dev. = 1.96
N = 124
Frequency
30
20
10
0
10
12
14
16
18
20
Four_months_Griffiths_Language_And_Communication_Scaled_Score

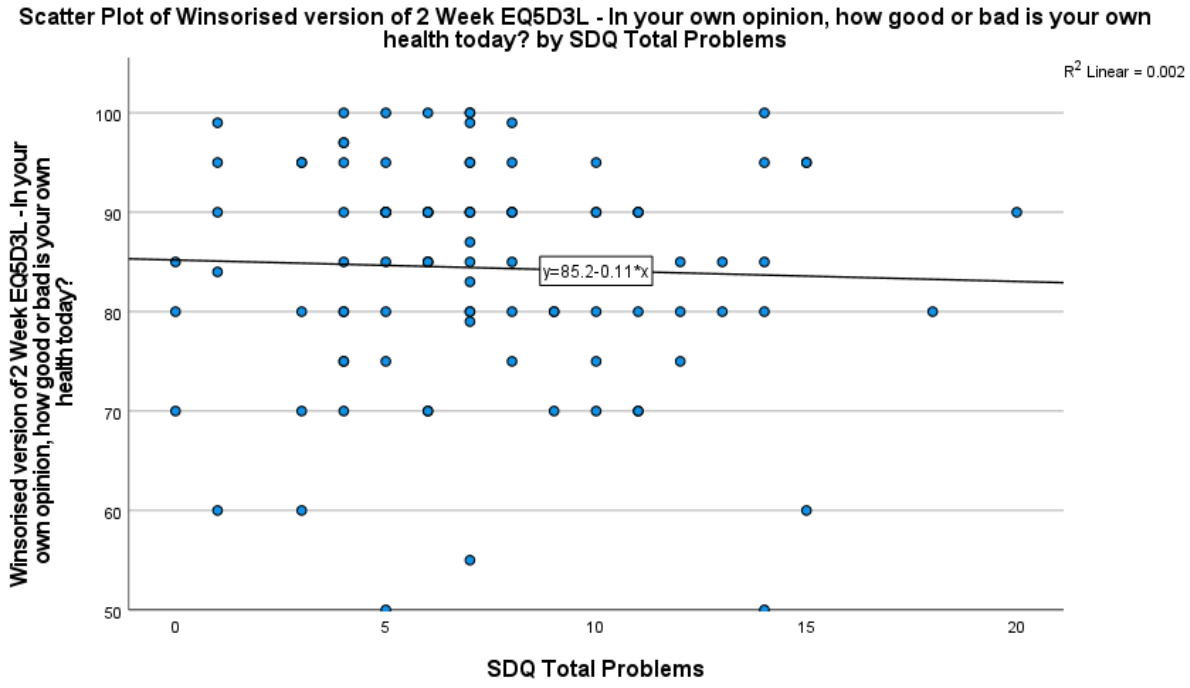

Histogram
Normal
Mean = 2.2
Std. Dev. = 1.572
N = 118
Frequency
30
20
10
0
0
1
2
3
4
5
6
SDQ Conduct Problems

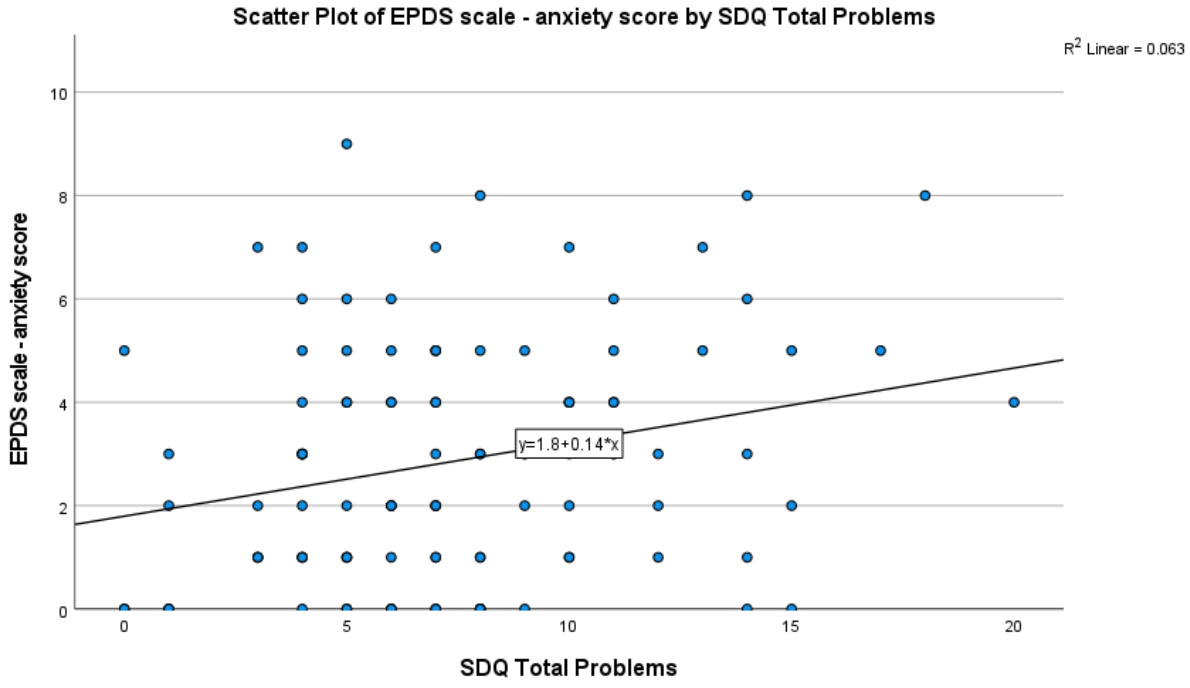

Histogram
Normal
Mean = 4.52
Std. Dev. = 2.999
N = 114
Frequency
20
15
10
5
0
0
2
4
6
8
10
12
14
Winsorised version of DASS21 Stress

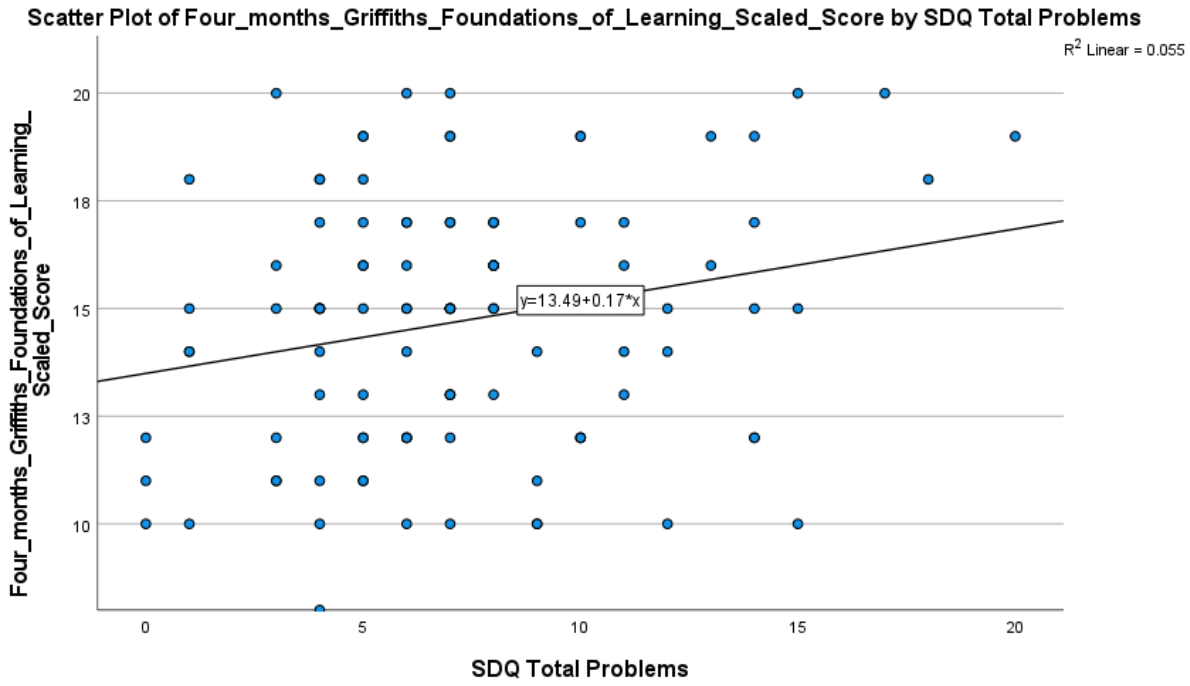

Histogram
Normal
Mean = 8.22
Std. Dev. = 1.508
N = 119
Frequency
40
30
20
10
0
4
5
6
7
8
9
10
SDQ Prosocial Scale

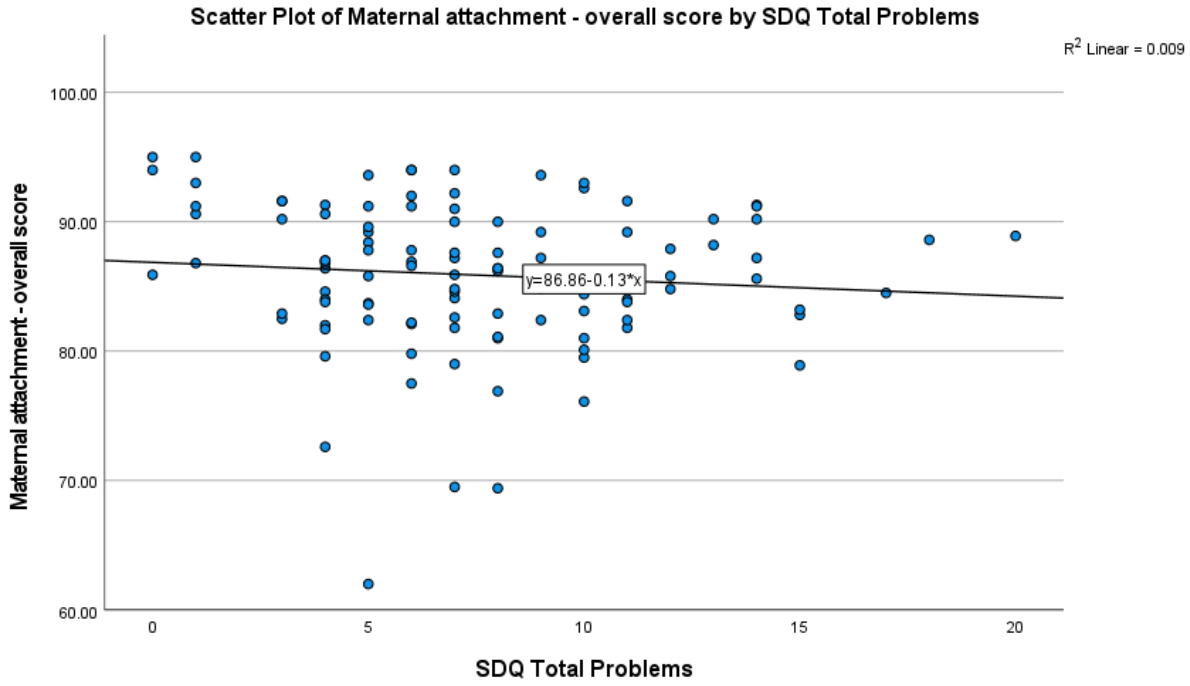

Histogram
Normal
Mean = 1.43
Std. Dev. = 1.978
N = 115
Frequency
50
40
30
20
10
0
0
2
4
6
Winsorised version of DASS21 Depression

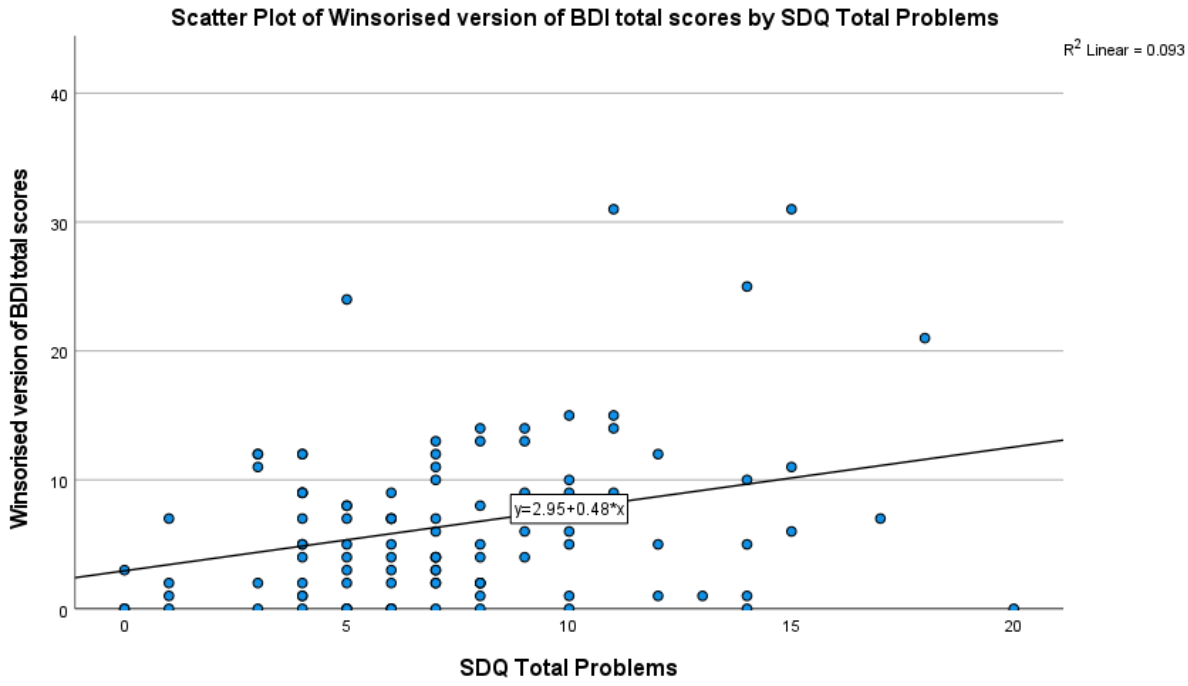
Appendix N: Sample of Scatterplots Utilised to Check for Linearity

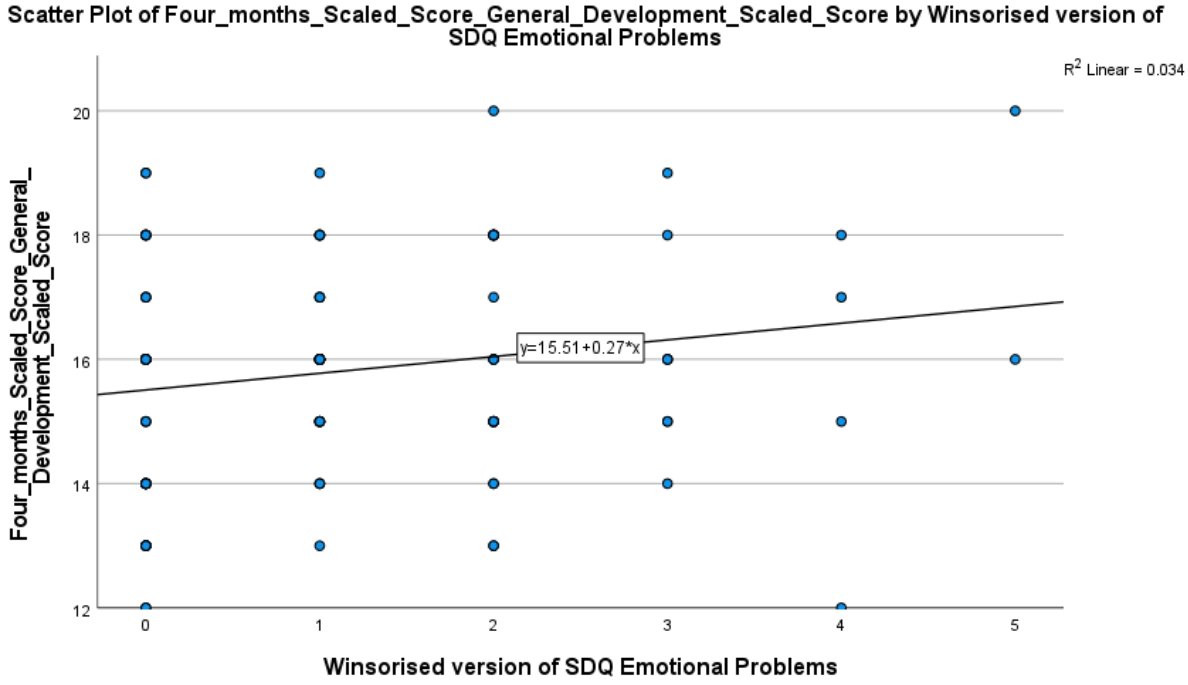


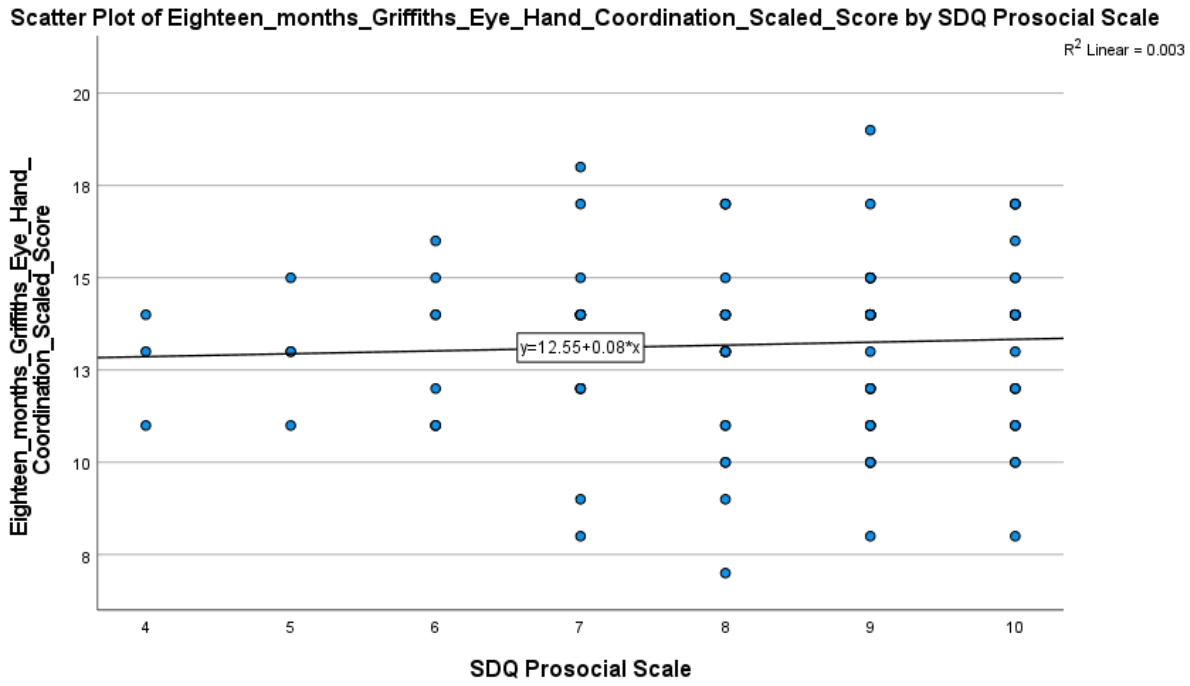


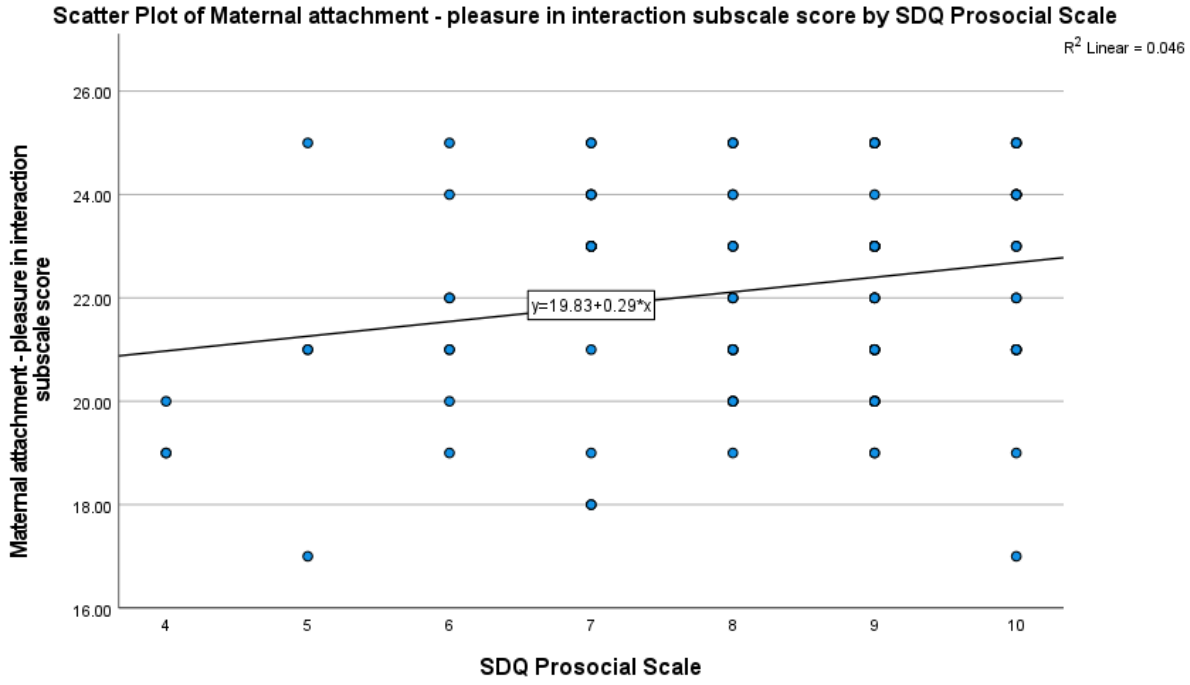

Scatter Plot of Four_months_Griffiths_Foundations_of_Learning_Scaled_Score by SDQ Total Problems
R² Linear = 0.055
Four_months_Griffiths_Foundations_of_Learning_Scaled_Score
y=13.49+0.17*x
SDQ Total Problems

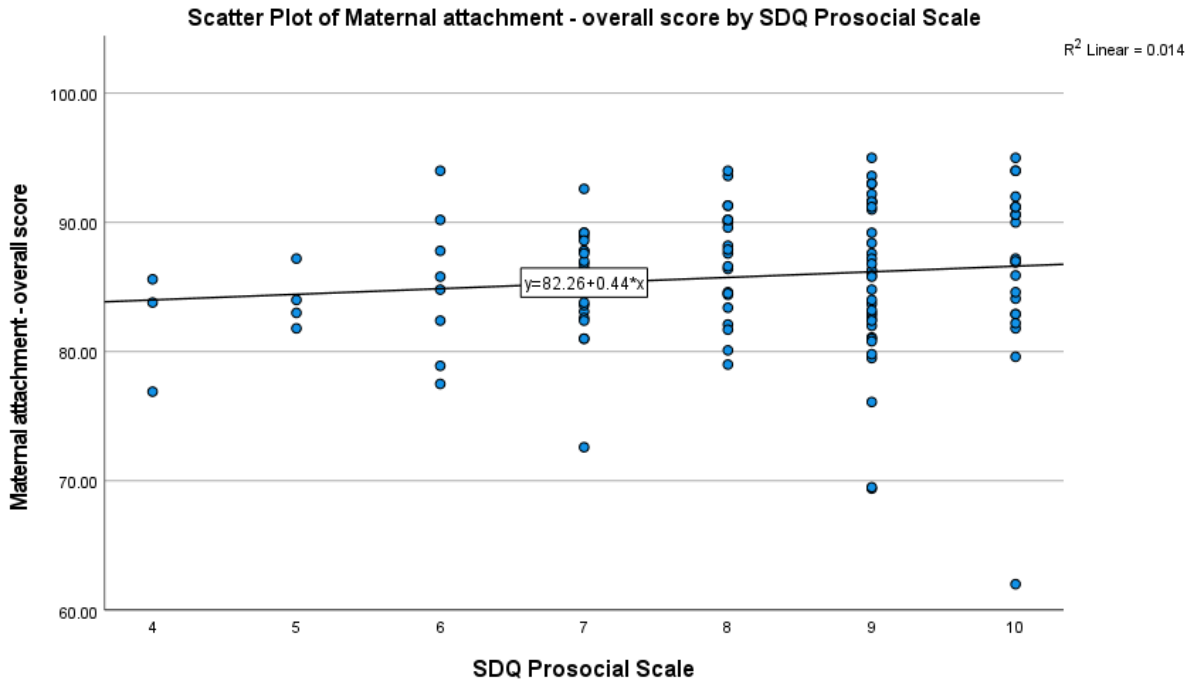

Scatter Plot of Maternal attachment - overall score by SDQ Total Problems
R² Linear = 0.009
Maternal attachment - overall score
y=86.86-0.13*x
SDQ Total Problems

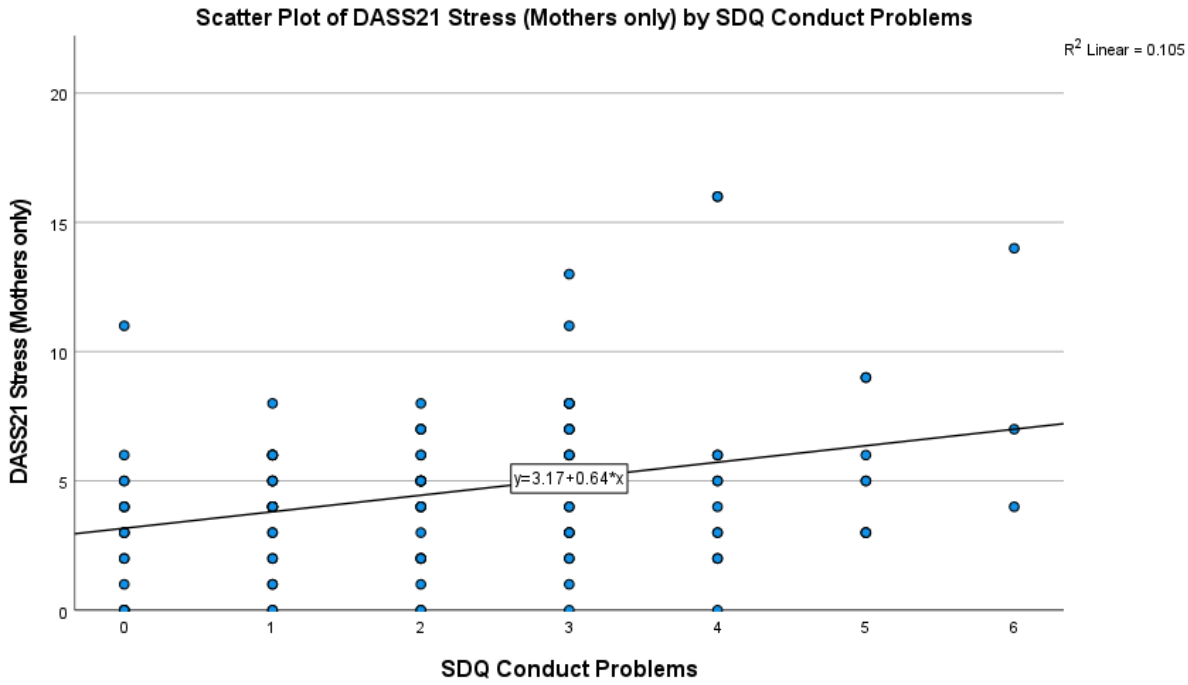

Scatter Plot of Winsorised version of BDI total scores by SDQ Total Problems
R² Linear = 0.093
Winsorised version of BDI total scores
SDQ Total Problems
y=2.95+0.48*x
0
10
20
30
40
0
5
10
15
20


Scatter Plot of Four_months_Scaled_Score_General_Development_Scaled_Score by Winsorised version of SDQ Emotional Problems
R² Linear = 0.034
Four_months_Scaled_Score_General_Development_Scaled_Score
Winsorised version of SDQ Emotional Problems
y=15.51+0.27*x
12
14
16
18
20
0
1
2
3
4
5

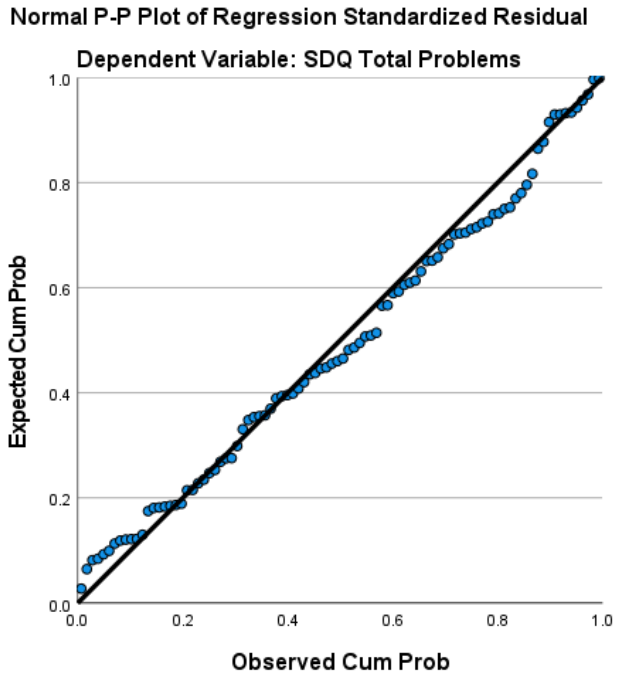

Scatter Plot of Eighteen_months_Griffiths_Eye_Hand_Coordination_Scaled_Score by SDQ Prosocial Scale
R² Linear = 0.003
Eighteen_months_Griffiths_Eye_Hand_Coordination_Scaled_Score
y=12.55+0.08*x
SDQ Prosocial Scale

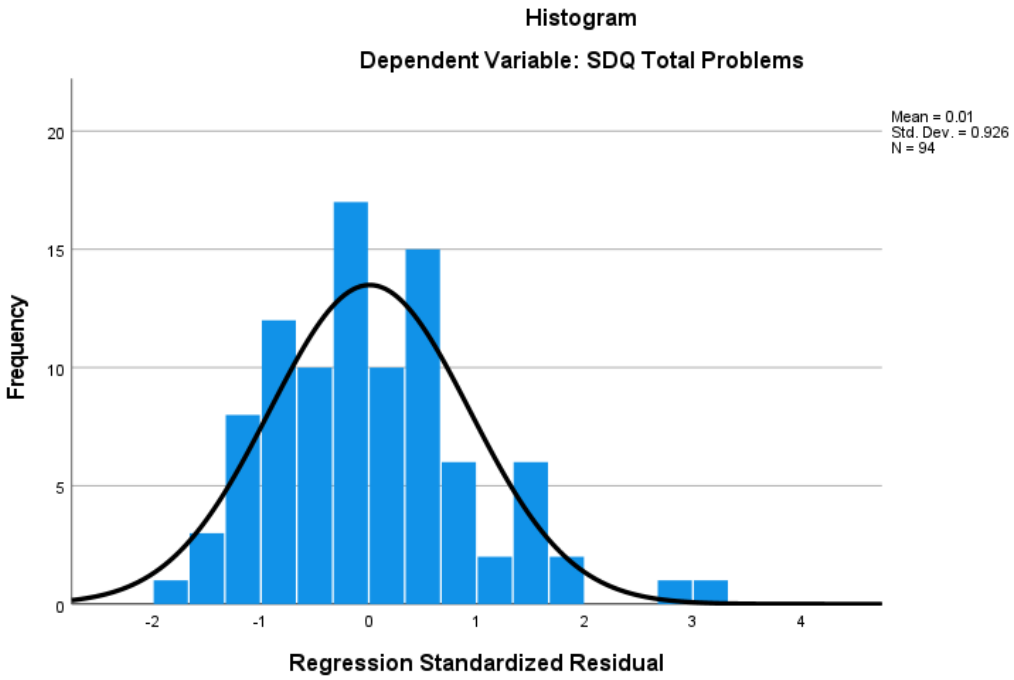

Scatter Plot of Maternal attachment - pleasure in interaction subscale score by SDQ Prosocial Scale
R² Linear = 0.046
Maternal attachment - pleasure in interaction subscale score
y=19.83+0.29*x
SDQ Prosocial Scale

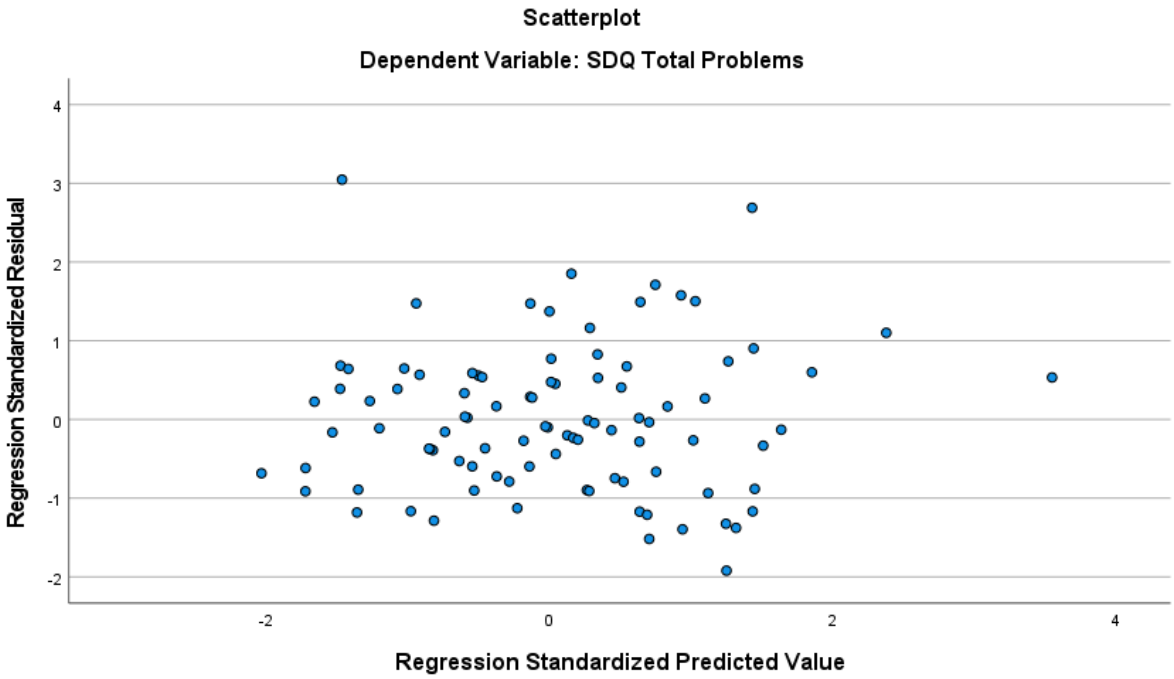

Scatter Plot of Maternal attachment - overall score by SDQ Prosocial Scale
R² Linear = 0.014
y=82.26+0.44*x
Maternal attachment - overall score
100.00
90.00
80.00
70.00
60.00
4
5
6
7
8
9
10
SDQ Prosocial Scale

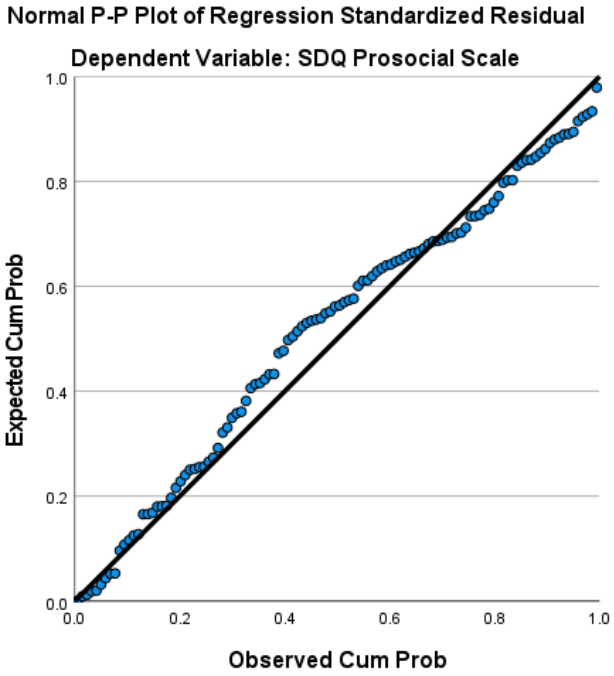

Scatter Plot of DASS21 Stress (Mothers only) by SDQ Conduct Problems
R² Linear = 0.105
y=3.17+0.64*x
DASS21 Stress (Mothers only)
20
15
10
5
0
0
1
2
3
4
5
6
SDQ Conduct Problems

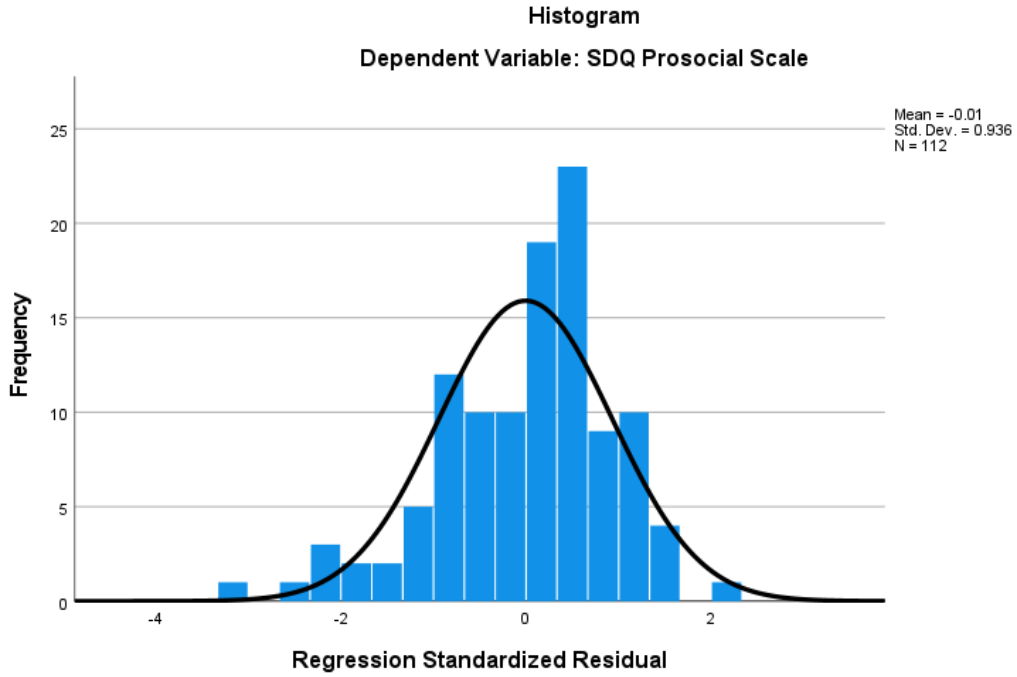
Appendix O: Multiple Regression Normality Plots and Scatterplots

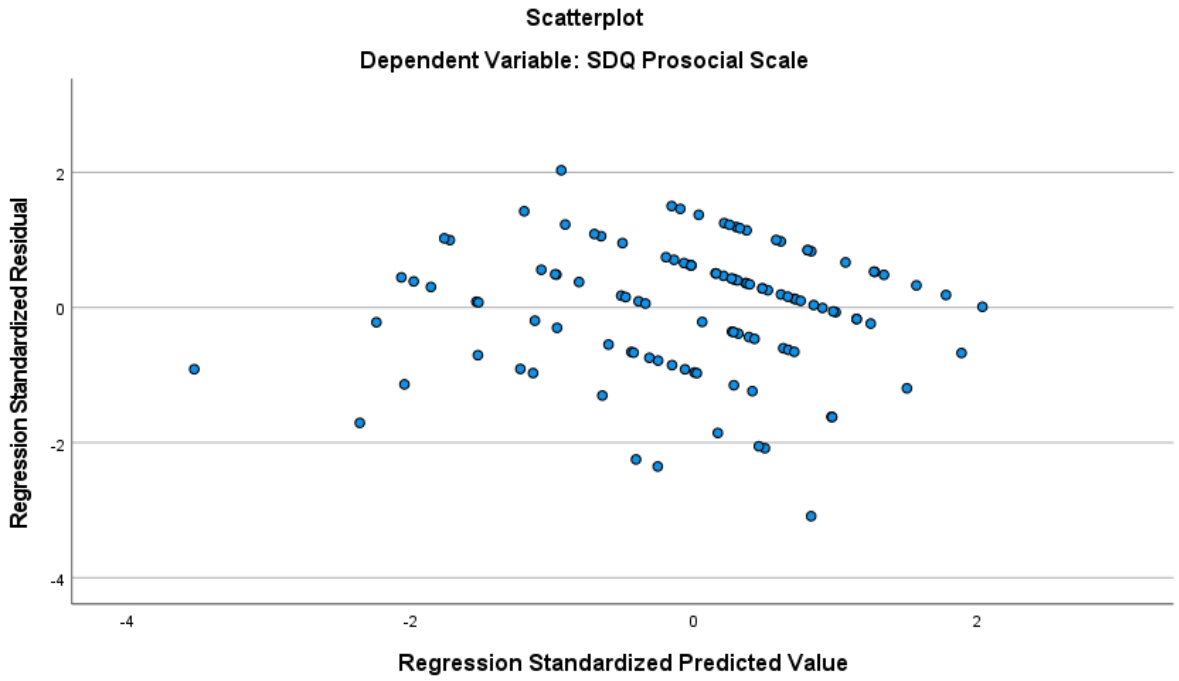





Scatterplot
Dependent Variable: SDQ Total Problems
Regression Standardized Residual
Regression Standardized Predicted Value
4
3
2
1
0
-1
-2
-2
0
2
4


Normal P-P Plot of Regression Standardized Residual
Dependent Variable: SDQ Prosocial Scale
Expected Cum Prob
Observed Cum Prob
1.0
0.8
0.6
0.4
0.2
0.0
0.0
0.2
0.4
0.6
0.8
1.0


Histogram
Dependent Variable: SDQ Prosocial Scale
Mean = -0.01
Std. Dev. = 0.936
N = 112
Frequency
25
20
15
10
5
0
-4
-2
0
2
Regression Standardized Residual


Scatterplot
Dependent Variable: SDQ Prosocial Scale
Regression Standardized Residual
2
0
-2
-4
-4
-2
0
2
Regression Standardized Predicted Value