Maternal Well-being and Family Relationships: Arrival of the Second Child

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Abstract

Family is one of the most important contexts in people's lives and researchers have investigated family relationships and dynamics for many years. There are certain times that require change in family dynamics such as having a second child. Driven mainly from family systems theory (M. Bowen, 1978), this thesis investigates family relationships and maternal well-being in the context of twin families and when families are expecting their second child.

This thesis consists of 4 empirical chapters. Chapter 2 examined the well-being of 158 mothers of twins ($M_{\text{child age}}$= 6.01 years, $SD_{age} = 0.50$) by using data from the Twins, Family and Behaviour Study (TFaB) -- a longitudinal UK study of twins born in 2009 and 2010. Chapters 3-5 use data from the project 'From 3 to 4; Arrival of the Second Child', that Prof. Alison Pike and I conducted. In Chapter 2, we showed that household chaos and child behaviour problems were related to maternal well-being. More specifically, higher levels of household chaos were associated with maternal internalizing symptoms of depression, anxiety and stress whereas more child behaviour problems were linked to more depressive and stress related symptoms but not anxiety. The study highlighted the importance of studying maternal internalizing symptoms separately.

We also examined internalizing problems in Chapter 3, when mothers were pregnant with their second child. Fifty-one mothers and their firstborn children were visited in their homes and mothers completed questionnaires. The results demonstrated that co-parenting and marital satisfaction were associated with maternal internalizing problems. Specifically, co-parenting was linked to depression and stress when controlling for marital satisfaction, whereas marital satisfaction was linked to anxiety. Once again, the importance of investigating maternal internalizing symptoms

distinctively was emphasized by the study, and the results may inform future intervention studies.

Chapter 4 investigated the predictors of mother-first-born child relationship quality when mothers were expecting their second child. The determinants of parenting model proposed by Belsky (1984) was tested with three domains – maternal personal resources (well-being, effortful control), child characteristics (temperament, behaviour problems), and contextual factors (household chaos, child-care support, marital satisfaction) – used to predict mother-child relationship quality. Results showed that children's easy temperament, less household chaos and more child-care support explained unique variance in positive aspects of the mother-child relationship. The findings give promise for several intervention programs such that to have more positive mother-child relationship quality, increased support for child-care, decreased household chaos as well as child temperament could be targeted.

Finally, in Chapter 5, the longitudinal predictors of first-born behaviour towards their 4-month-old sibling were investigated and we found that girls and children with easier temperaments subsequently tended to be more positive towards their newborn siblings, whereas better marital quality was linked to less sibling rivalry. The study extends the literature on early sibling relationships and suggest possible avenues for intervention.

Overall, the findings of the thesis have contributed to the literature and research on family dynamics when families are expecting their second child and give promise for several intervention studies to improve family relationships and functioning, especially during stressful transitions.

Acknowledgements

Firstly, I would like to present my deepest gratitude to my supervisor Prof. Alison Pike, for all the mentoring, guidance and support throughout my PhD. With her expertise and guidance, I was able to complete my PhD. Not only did she supervise me for my research but always supported me when I was having hard times in my personal life. We have collected so many travel memories during our visits and I always enjoyed her humour and always will do. I also want to thank my assessor, Prof. Robin Banerjee, for his guidance and feedback on the early versions of my papers. He always provided support and left his door open for me if I ever needed help. Thank you, Prof. John Drury for including me in the Crowds and Identities group and supporting me during my PhD.

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My last and sincere gratitude is to my brother Kadir Yalcintas, to whom I dedicated this thesis and all of the work I will do for as long as I can. I lost him to glioblastoma brain cancer on 26.06.2019, he was completing his own PhD. Once he was diagnosed with cancer, he did not want me to quit or freeze my PhD. He pushed me through it and always indicated that I am his biggest source of pride. I hope he is proud now, without him everything is hard, every accomplishment is bittersweet, I have lost my biggest guide but I would not be able to complete this thesis without his support.

Declaration

The thesis is an 'article format' in which Chapters 2-5 consist of articles written in a style that is submitted for publication in peer-reviewed journals and they are given as the same as they are published and under review. Chapter 1 and 6 consist of an overview and discussions of the thesis.

Chapter 2 is published in Psychiatric Quarterly as:

Yalcintas, S., Pike, A. & Oliver, B. R. Household Chaos and Child Behaviour Problems Predict Maternal Well-being. *Psychiatric Quarterly.* DOI : 10.1007/s11126-021-09947-2

AP and BO conceived the study. SY analysed and interpreted the data. SY wrote the manuscript. AP provided supervision throughout the project and feedback on the manuscript.

Chapter 3 is published in Psychological Studies as:

Yalcintas, S., & Pike, A. (2021). Co-parenting and Marital Satisfaction Predict Maternal Internalizing Problems When Expecting a Second Child. *Psychological Studies, 66*, 212-219. https://doi.org/10.1007/s12646-021-00620-z

SY and AP conceived the study. SY analysed and interpreted the data. SY wrote the manuscript. AP provided supervision throughout the project and feedback on the manuscript.

Chapter 4 is currently under review for publication as:

Yalcintas, S., Pike, A. & Kilavuz, R. Predictors of Mother-Child Relationship Quality When Expecting a Second Child.

SY and AP conceived the study. SY analysed and interpreted the data. SY wrote the manuscript. AP provided supervision throughout the project and feedback on the manuscript. RK rated the mother-child interactions.

Chapter 5 is currently under review for publication as:

Yalcintas, S., & A. Pike. Early Predictors of First-born Behaviours towards Newborn Siblings.

SY and AP conceived the study. SY analysed and interpreted the data. SY wrote the manuscript. AP provided supervision throughout the project and feedback on the manuscript.

I hereby declare that this thesis has not been and will not be, submitted in whole or in part to another University for the award of any other degree.

Sumeyra Yalcintas

September 2021

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Chapter 1: General Introduction

"*Life does not make any sense without interdependence. We need each other, and the sooner we learn that the better for us all.*" Erik Erikson

"*Happy families are all alike; every unhappy family is unhappy in its own way.*" Leo Tolstoy

Family is one of the most important contexts of people's lives, family members are dependent on one another and continue to influence each other throughout the life course. Family relationships including parent-child, mother-father, and sibling relationships not only affect day-to-day happiness, but they continually influence development and adjustment. The dynamics within the family that can change, evolve, and develop can be influenced by several factors. Transitions and/or stressful times are when the dynamics in the family are more likely to change and reshape. This self-organization in the family has attracted many researchers (Sameroff, 2009), and how this organization occurs, including investigating protective and risk factors have been investigated by many. Different family structures can require different types of adaptation. For example, families with twin children may require more organization and executive functioning (Kojima et al., 2005). One of the transition periods that provokes self-organization and adaptation is having a second child (Volling, 2012, 2017). This thesis reports investigations of family dynamics around these phenomena.

This thesis includes 4 empirical chapters. Chapter 2 employs a secondary data analysis using data from a study that was conducted with families with twin children.

The 3 remaining chapters, Chapters 3-5, use data from the study, 'From 3 to 4; Arrival of the Second Child', conducted throughout my PhD years. The purpose of the thesis was to investigate the predictors of important concepts in family functioning, such as family relationships and mental health, in the context of a twin sample as well as families expecting their second child. The overarching research questions were:

- What are the correlates of maternal mental health when mothers have twins, which requires more organization and parental executive functioning?

- When mothers are expecting their second child, how are family dynamics associated with maternal mental health as well as their relationship with their first-born children and partners?

- Are maternal internalizing problems meaningfully differentiated or a monolithic construct?

- What are the protective and risk factors for the mother-child relationship during the transition to having a second child?

- What are the protective and risk factors for first-born children's behaviours toward their baby sibling?

More specifically, Chapter 2 assesses correlates of maternal internalizing problems in families with twins and in Chapter 3, these correlates were assessed among mothers expecting their second child. In Chapter 4 I aimed to understand the determinants of mother-child relationship quality when expecting a second child, and for Chapter 5 the predictors of child behaviours towards their siblings 4 months after birth were examined.

This chapter includes background theories and literature that the thesis is based on, cross-cutting themes (differentiation of maternal internalizing problems and from 3

to 4 arrival of the second child); methodology and ethical procedures, and finally a brief summary of each individual chapter.

Theoretical Background Literature

This thesis is situated primarily in these theories; Family Systems Theory (M. Bowen, 1978), and within Family Systems theory the Spillover Hypothesis (Engfer, 1988) and Social Learning Theory (Bandura, 1977), Belsky's Determinants of Parenting (Belsky, 1984), and Ecological Systems Theory (Bronfenbrenner, 1996).

Family Systems Theory

Family systems theory suggests that individuals within the family are interdependent and the relationships influence each other (M. Bowen, 1978) (see Figure 1). The theory conceptualizes the family as a whole unit that is greater than its parts and further divides it into sub-systems including parent-child, parental system (mother and father), marital system (husband and wife), and sibling system. Thus, the family unit is the sum of relationships of family members and their behaviours (White et al., 2019). The subsystems can be studied separately, however subsystems are also interdependent and all components influence each other, therefore a change in one sub-system affects the entire family. The theory further states the whole family unit is also open to outside effects. Researchers have benefitted from family systems theory to study psychopathology, psychotherapy, mother-child relationships, partner relationships and sibling relationships. According to family systems theory, an individual's psychopathology is often a result of disturbed relationships within the family (Kerig, 2011). Several findings have supported this, by demonstrating that problems in the marriage are related to parental depression and are linked to concurrent depression in parents (Beach et al., 2003; Walker et al., 2013). The theory postulates that families must be able to self-organize in response to changes in the environment. One of the

normative changes can be the birth of a sibling, which would influence the family on different levels sometimes resulting in vulnerabilities in the re-organized system (Sameroff, 2009). Therefore, understanding this transition is a particularly useful window into family functioning. Figure 2 demonstrates what happens when a second child is introduced to the existing family composed of a mother, father and child. The second child arrives in the middle, potentially affecting/disturbing all of the existing family subsystems.

The Spillover Hypothesis (Engfer, 1988) is worth mentioning when explaining family systems theory, as it proposes a mechanism to understand how family members influence each other within the family systems theory. The Spillover Hypothesis postulates an emotional transference, in which the relationship quality of one dyad within the family can influence the quality of other relationships (Nelson et al., 2009). In other words, behaviour and emotions from one family relationship can transfer to another relationship in the family with the same valence of negativity or positivity. Therefore, when predicting a specific subsystem relationship dynamic, other familial relationships are likely to play a role. For example, marital quality plays a significant role in mother-child relationship quality (Cox et al., 2001; Cox & Paley, 2003) as well as in the sibling relationship (Bank et al., 2004; Pike et al., 2005). Specifically, positive marital relationships predicted more positive parent-child relationships several years later (Tanner Stapleton & Bradbury, 2012), whereas conflict in the marital relationship is associated with poorer parent-child relationship quality (Krishnakumar & Buehler, 2000). The pattern is similar for sibling relationships, such that negative parent-child relationships and marital relationships are associated with negativity in sibling relationships (Feinberg et al., 2005; Patterson, 1984).

Similar to the spillover hypothesis, children can emotionally transfer their parental relationship to their behaviours toward the sibling through social learning. Children can learn from their own relationship with the parent, such that loving and affectionate behaviour from mothers can be imitated by children towards their siblings. As social learning theory proposes children are social actors in their environment, they acquire new behaviours through observation, modelling, imitation and reinforcement (Bandura, 1977). Children's emotions and relationships are affected by their experiences and interactions. Family members are important models for social learning, especially for younger children, such that hostile and aggressive members can be role models and the opposite is true too. Thus children observe the interaction between their mothers and fathers and can acquire these interactional styles in their own relationships (Whiteman et al., 2011). Researchers investigating sibling relationships indicated that parent-child relationships influence the sibling relationship (Pike et al., 2005), such that through social learning, children can learn the affectionate behaviour from one partner to another and can adapt this towards their siblings, as well as when they are reinforced such as getting praised for positive interactions with a sibling (Pike et al., 2005; Whiteman et al., 2011). In addition, marital satisfaction is linked with closeness and support among siblings (Milevsky, 2004) and marital relationship quality predicted less jealous behaviours from first-born children to their new sibling (Volling et al., 2002). However, children can also imitate negative behaviours such that divorce and marital hostility are associated with poorer quality sibling relationships (Dunn et al., 1999; Riggio, 2000).

Therefore, in Chapters 3-5, in order to understand family relationships during the transition to having a second child, such as when we were investigating first-born

children's behaviours toward their newborn siblings, we benefited from family system

theory, the spillover hypothesis and social learning theory and related literature.
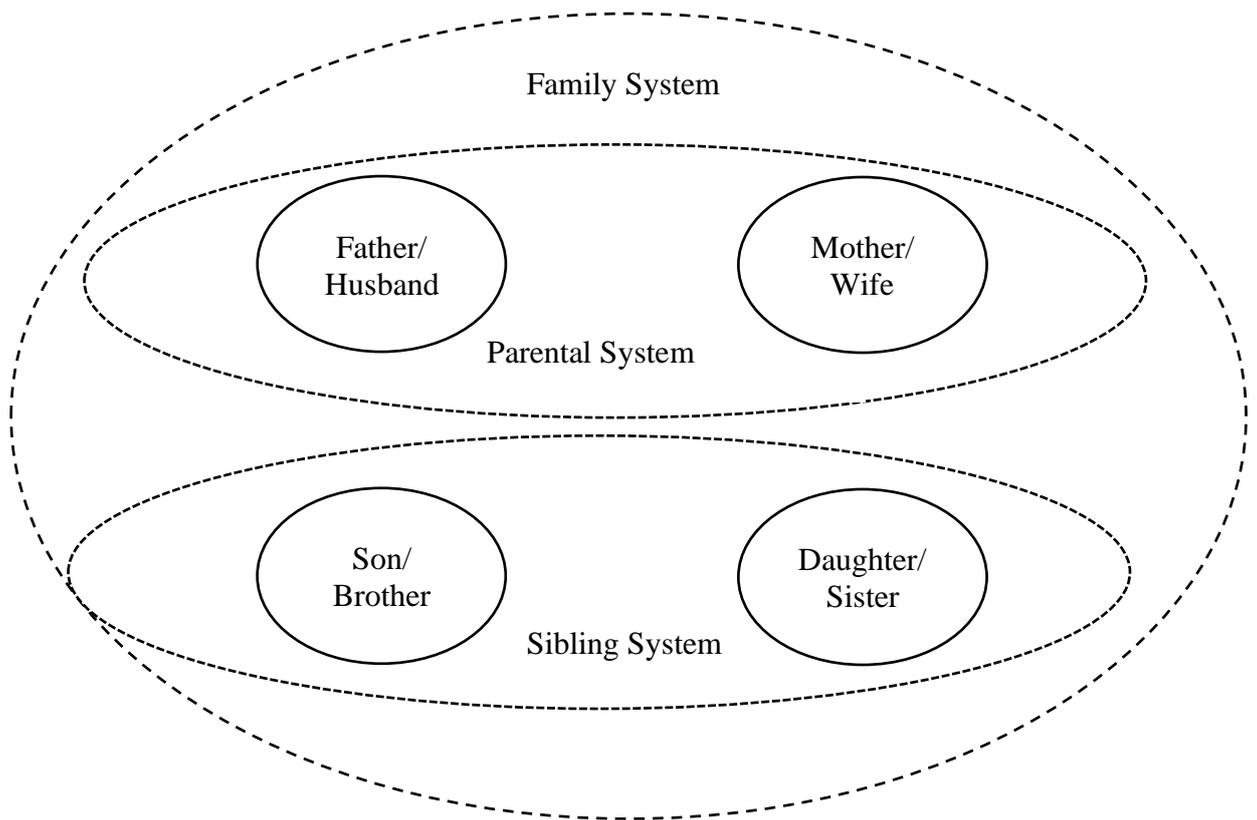
Figure 1

Family Systems Theory

Note. There are also pairings between father to son, daughter and mother to son/daughter Source adapted from

https://www.researchgate.net/publication/340628054_HUMAN_BEHAVIOURS_IN_PROMOTING_BALANCE_OF_FAMILY_ACCORDING_T

O_BUDDHIST_PSYCHOLOGY/figures?lo=1
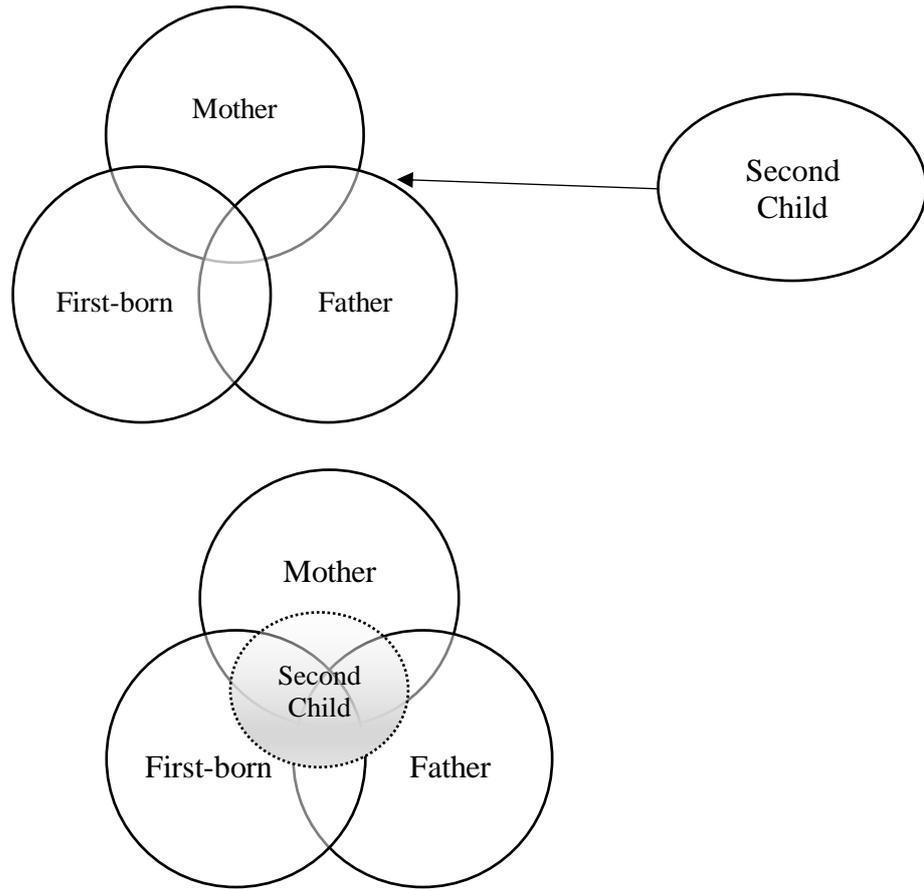
Figure 2

The Arrival of the Second Child

The Determinants of Parenting

Belsky's model of determinants of parenting suggests that parental functioning is determined by three domains, parental characteristics (e.g., mental health, psychological resources, and attachment history), child characteristics (e.g., age, gender, and temperament) and contextual factors (e.g., support, marital quality, and stress) (Belsky, 1984). According to the model, parental personality, child characteristics, marital relationship, as well as a social network and work environment directly influence parenting. Parental developmental history further influences personality, which then, in turn, predicts child development through parenting together with child characteristics (see Figure 3). Belsky further proposes a hierarchy of these domains such that parental personal resources have the greatest influence on the mother-child relationship, followed by contextual resources and support, which is then followed by child characteristics, particularly temperament (Belsky, 1984). The theory suggests that parents' developmental history and marital relationship influence psychological well-being, which in return influences parenting, followed by support and child characteristics. In his later review, Belsky further emphasizes that better mental health of mothers predicts better quality parenting and is the most important predictor; a psychologically stable parent can cope with difficult temperamental features of the child (Belsky & Jaffee, 2015). In fact, according to the model, difficult child characteristics and less favourable contextual factors can be buffered by parents' psychological well-being.

When the determinants of mother-child relationship quality were investigated in Chapter 4, whether the determinants of parenting theory would apply to the sample of pregnant mothers and their first-born children was tested, and whether the hierarchy Belsky suggests predicts mother-child relationship in this context was further examined.
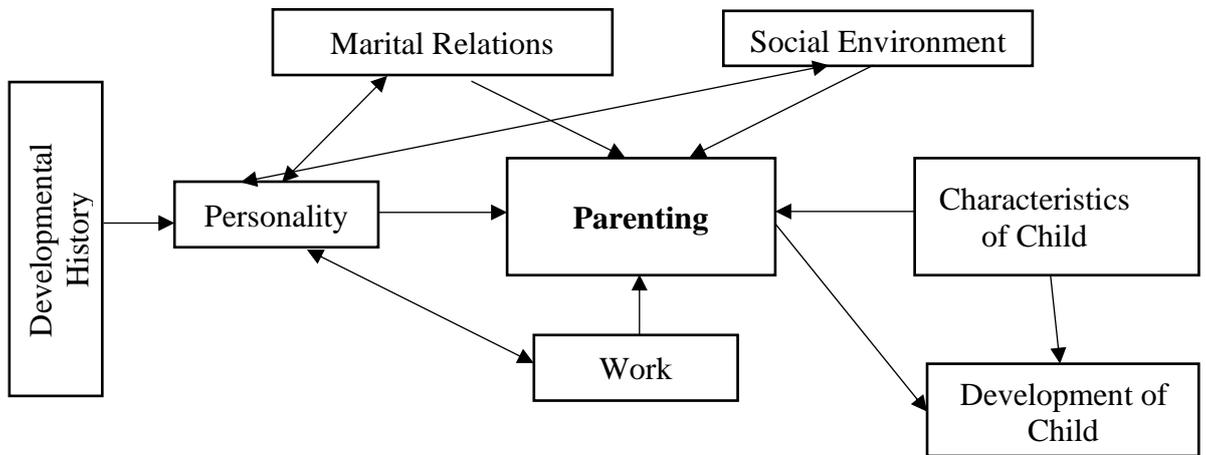
Figure 3

Belsky's model of Determinants of Parenting

Source is adapted from (Belsky, 1984) https://doi.org/10.2307/1129836

Ecological Systems Theory

According to Bronfenbrenner's (1979) ecological systems approach (see Figure 4), understanding human behaviour is possible through understanding people's surroundings and interactions. The theory proposes a nested structure that influences children's development. The child is at the centre. The *microsystem* is closest to the child and includes components that directly affect children such as parents and school, the *mesosystem* is the interactions between different microsystems such as the interface between parents and teachers; the *exosystem* is the social settings such as the parental workplace, and neighbourhood that do not directly affect children, but has its influence via the microsystem, the *macrosystem* consists of attitudes, beliefs, customs and other aspects of the wider culture and finally, the *chronosystem* reflects environmental events on a historical context such as wars. In terms of a developmental perspective, the theory proposes that the family is at the heart of a child's microsystem, the first and most important system that influences child development. Although the exosystem does not directly influence the child, contexts like the workplace affect parents who in turn affect their children. Several components of the macrosystem such as different cultural norms can moderate the effects of parenting. The systems are dynamic and the dyadic family relationships should be understood within the larger environmental context.

The most direct application of the ecological model can be seen in Chapter 5 where first-born children's behaviours toward their newborn siblings were investigated. Children were at the centre and the mother-child relationship and marital quality were considered as aspects of the microsystem.

However, in Chapters 2-3, the mother can be considered the individual at the centre of the model, since the main outcome variable was maternal internalizing

problems. In this model, household chaos, child behaviour problems, marital relationship, and co-parenting can be considered as aspects of the microsystem.

Important environmental factors that can influence individuals and relationships within the family can include, social support, household chaos, parental work environments and several other factors that may be salient in specific situations. Household chaos, defined as low regularity, disorganization and noise in the home environment, has been studied in relation to family dynamics (Pike et al., 2005). Household chaos is an important variable in the family environment, perhaps particularly for families facing challenges, such as families with twins, and pregnant mothers with their young children, both of which would require a higher level of organization around the house. Household chaos is related to maternal depression, poorer parent-child relationship quality, as well as less maternal supportiveness and closeness (Marsh et al., 2020; Pike et al., 2006). Therefore, household chaos as an independent variable, within the microsystem, was used in the analysis to understand maternal internalizing problems in Chapter 2 as well as in relation to mother-child relationship quality in Chapter 4.

Another important factor when explaining relationship quality between pregnant mothers and their first-born children would be social support, especially support in relation to childcare. This type of support would fit in the microsystem considering its direct relationship with mothers. For example, more social support given to pregnant women is linked to maternal efficacy and satisfaction (Angley et al., 2015). In addition, the microsystem element of co-parenting (e.g., the child-care agreement between parents, appraising each other's parenting as well as making decisions about a child together) is important in family functioning (Feinberg, 2003). Co-parenting behaviour such as less co-parenting alliance is linked to parenting stress and when parents

undermine each other's parenting and have conflict about parenting, they tend to report more depression (Morrill et al., 2010; Solmeyer & Feinberg, 2011). Similarly, marital quality is also related to maternal well-being such that marital problems are related to maternal depression (Davila et al., 2003) whereas better marital quality has been linked to less depression and highlighted positive aspects of personal well-being (Proulx et al., 2007). Of course, there are lots of other factors that can be contextual factors when studying family dynamics, however, in this thesis, the aspects of chaos, support, marital relationship and co-parenting were used to investigate maternal internalizing problems in Chapter 2-3 and family relationships in Chapters 4-5.
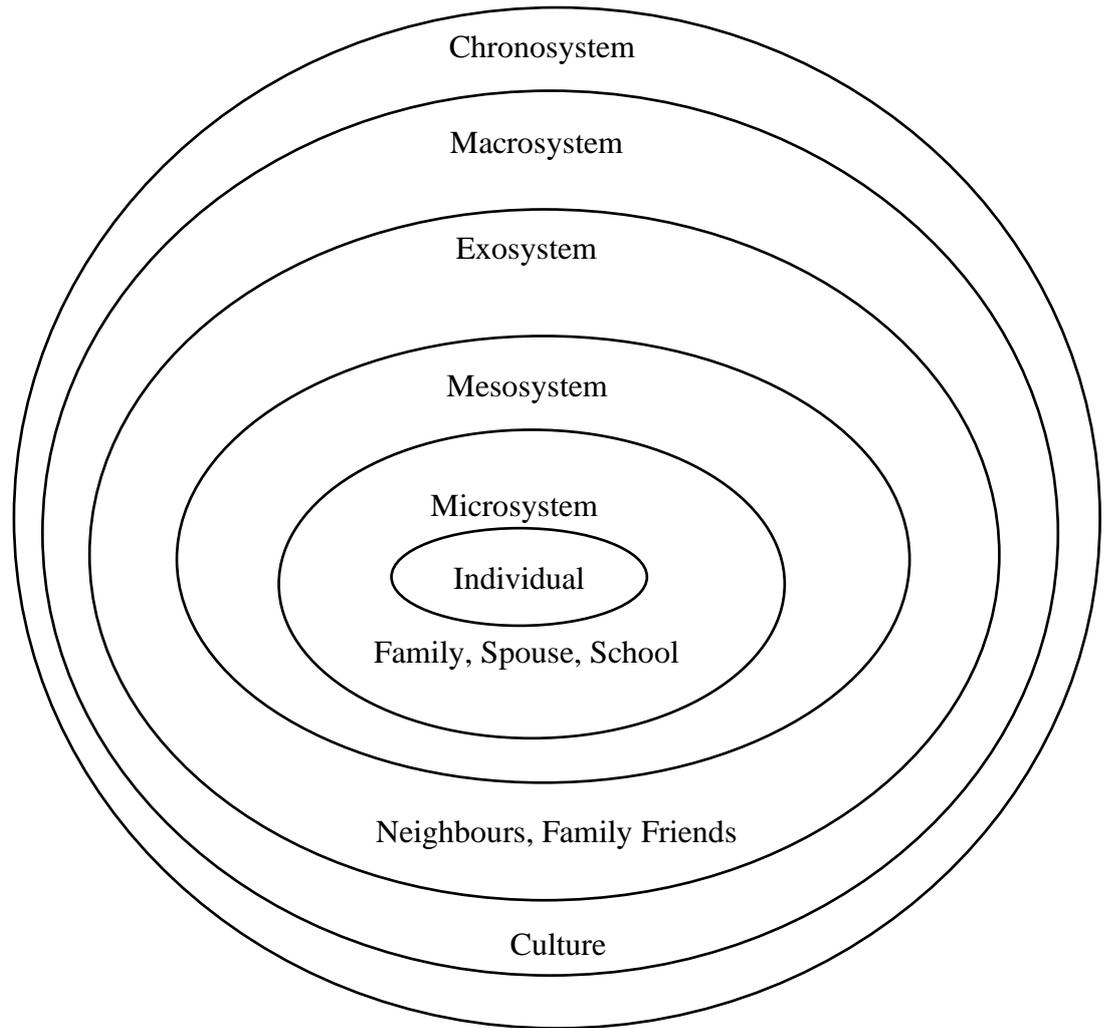
Figure 4

The Diagram of Ecosystem Theory

The source adapted from https://www.researchgate.net/publication/285232380_Moving_eco_back_into_socio-

ecological_models_A_proposal_to_reorient_ecological_literacy_into_human_developmental_models_and_school_systems/figures?lo

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Cross-Cutting themes in the thesis

The important themes that have been investigated by the papers in this thesis are maternal mental health, more specifically predictors of the internalizing problems of depression, stress and anxiety; mother-child relationship quality when mothers are expecting their second child, and finally children's early behaviours toward their newborn sibling.

Maternal Internalizing Problems

A growing body of research is devoted to understanding maternal well-being and how it is predictive of child developmental outcomes, the mother-child relationship, marital relationship, and parenting behaviours (Belsky & Jaffee, 2015; Feldman et al., 2009; Leerkes & Crockenberg, 2002; Mensah & Kiernan, 2011). The cost of perinatal mental health problems to society is about £8.1 billion per annual cohort of births in the UK, with 10-20% of women afflicted with mental health difficulties and 20% of experiencing perinatal depression in the UK (Bauer et al., 2014; A. Bowen & Muhajarine, 2006; Parfitt & Ayers, 2014). A meta-analysis indicated that perinatal mental issues are linked to a threefold increase in the likelihood of child maltreatment (Ayers, Bond, et al., 2019). Poorer mental health during pregnancy can also lead to serious outcomes like prematurity, low birth weight and even mortality (Grote et al., 2010).

In addition to the perinatal period, maternal mental health in specific contexts like having twin children also may be compromised. Mothers of twins require more effortful parenting, and organization around the house (Barker et al., 2011). Therefore, in Chapter 2, predictors of maternal depression, anxiety and stress among mothers of young twins were investigated. Similar to having twins, when mothers are pregnant with their second children, their mental health is also challenged. Not only are these

mothers coping with the demands of pregnancy, but they must also attend to the firstborn's needs. In the 'From 3 to 4 Arrival of Second Child' sample, the average age of first-born children was 32.26 months, which reflects the modal age gap in the UK (Golsteyn & Magnée, 2017). This age group is developing self-regulation abilities, and tend to show more behavioural problems than do younger or older children (Belsky et al., 1996; Thompson & Goodman, 2010). These problems in turn are associated with poorer maternal mental health, and mothers pregnant with second children report higher than average mental health difficulties (Barker et al., 2011; Kojima et al., 2005).

A great deal of research has been devoted to understanding post and antenatal depression in particular and has demonstrated links with subsequent child and family outcomes in later years. For example, depressed mothers' infants display low social engagement, negative emotionality and delayed language development, and their relationships with mothers are disrupted (Feldman et al., 2009; Lovejoy et al., 2000; Quevedo et al., 2012). Alternately, composite well-being or mental health indices have been used (Belsky & Jaffee, 2015). Internalizing problems are typically measured by the symptoms of depression, anxiety, and stress, especially in the perinatal period. The research highlighted that postpartum difficulties are related to perinatal stressors (Ayers, Crawley, et al., 2019). Therefore, investigating predictors of maternal mental health during perinatal periods is important, not only to prevent mental health problems but also in turn to foster family dynamics.

The Tripartite Anxiety and Depression Model (Clark & Watson, 1991) suggests that anxiety and depression can be studied separately, by dividing them into categories of positive affect, negative affect and physiological arousal. Research further highlights that different symptoms are more prevalent during different periods, for example,

anxiety is more common than depression during pregnancy (Lee et al., 2007). Thus, the

paper in Chapter 3 examined predictors of depression, anxiety and stress separately.

From 3 to 4: Arrival of the Second Child

The arrival of a second child can be challenging and stressful for families,

especially for mothers and first-born children (Kojima et al., 2005; Teti et al., 1996).

Two chapters of the thesis, Chapters 4-5, are devoted to understanding family

relationships during this transition. More specifically, we sought to understand mother

first-born child relationships and first-borns' behaviour towards their new siblings.

Mother-Child Relationship Quality. The mother-child relationship is the most

frequently studied family subsystem. The importance of warm and sensitive mothering,

driven from attachment theory, has been shown by many studies; it predicts child

developmental outcomes, as well as longer term adjustment in children' lives such as

emotion regulation and secure attachment in partner relationships (Simpson et al., 2007;

Zayas et al., 2011). The relationship between mother and child has been studied in

different developmental stages and contexts, like the transition to becoming a parent,

after having a second child, and critical times like family separation and divorce. In this

thesis, the focus is on the period of expecting a second child, and mother-child

interactions during the transition.

Findings suggest with the arrival of a second child the relationship between

mothers and first-born kids tend to get worse, such as less joint attention and playful

interactions, and more conflict (Kendrick & Dunn, 1980; Kojima et al., 2005; Teti et al.,

1996; Touris et al., 1995). What happens in the mother-child relationship during the

second pregnancy has received less attention. The aim was to understand the predictors

of mother-child relationship quality, considering the sensitive period of family

transition, compounded by pregnancy, including the increased risk of internalizing

problems. Therefore, how Belsky's Determinants of Parenting model applies to the predictors of mother-child relationship quality was tested, in the context of families expecting their second child in Chapter 4.

Early Sibling Relationship. Although sibling relationships have long term influences on individual's lives, sibling relationships have not been as widely investigated as other familial relationships such as parent-child or partner relationships (Mensah & Kiernan, 2011). The first stage of forming a sibling bond is when first-born children meet their newborn siblings. Many parents have concerns about the change in family dynamics during the transition to having a second child and especially how their firstborn will react to sharing parental resources (Kramer & Ramsburg, 2002; McDermott, 1980). The literature suggests that child characteristics like gender and temperament play a role in sibling interactions (Buist et al., 2013; Milevsky et al., 2007; Stoneman & Brody, 1993). Research also indicates that better marital equality predicts less jealousy of children toward their new sibling (Volling et al., 2002). Especially given that sibling arrival tends to coincide with first-born children having increased problematic behaviour (Volling, 2017), children are also prone to display antagonistic behaviours to their newborn siblings (Oh et al., 2015). In order to minimise such adverse outcomes, it is important to understand the very early reactions of first-born children towards their siblings. Thus, Chapter 5 is devoted to investigating protective and risk factors for positive and rivalrous behaviours toward newborn siblings.

Methodological approach for the empirical work

The data for the thesis come from two resources. The paper in Chapter 2 is a secondary data analysis using data from the 'Twins, Family and Behaviour Study' (TFaB) -- a longitudinal twin study in the UK. One hundred and fifty-eight mothers of twins ($M_{\text{child age}}$= 6.01 years, $SD_{age} = 0.50$) were participants. The cross-sectional data

used for the paper, consisted of 158 maternal (M_{age}= 38.14 years; $SD_{age} = 4.32$ years) self-reports.

The data for Chapter 2 was already collected by (TFaB) researchers. I chose only one time point from this longitudinal dataset. The reason I analysed cross-sectional data was because the study measured maternal well-being only once. Within that data set, considering the sample of the study – mothers in households that would require substantial organisation given the demands of parenting twins aged approximately 6 years on average – I hypothesized that household chaos and child behaviour problems would predict maternal well-being. Due to the availability of the measures, I used the Confusion, Hubbub, and Order Scale (CHAOS; (Radke-Yarrow et al., 1992) to assess household chaos, The Eyberg Child Behaviour Inventory (ECBI; (Eyberg & Pincus, 1999) to assess child behaviour problems and The Depression Anxiety Stress Scales (DASS-21; (Crawford & Henry, 2003) to measure maternal well-being.

All of the other papers in this thesis were based on data that Prof. Alison Pike and I collected together throughout my PhD. Families living in the south of England, Sussex, were invited to participate in a study examining the dynamics when families are expecting a second child. The study was advertised through Facebook and nurseries as well as University of Sussex Student Hubs news (for the advertised link: https://student.sussex.ac.uk/news/article/47390-best-friends-like-the-kardashians-or-rivals-like-the-milibands-how-sibling-relationships-form). We planned the original study to have two time points which consisted of home visits when mothers were pregnant with their second children and again four months after the due date. We managed to complete all of the data collection for Time 1 when mothers were expecting their second child and started to conduct Time 2 home visits. However, because of the COVID-19 pandemic, we had to stop home visits for Time 2 data collection. For the

majority of families, only online questionnaire data were collected at the second time point.

For Time 1 data, participants were 51 mothers (M_{age}= 34.78 years; SD_{age} = 3.86 years) and their firstborn children ($M_{child\ age}$=32.26 months; SD_{age} = 6.27 months), with 29 boys and 22 girls. Two of the mothers were living outside of Sussex, so home visits could not be done, however, they completed the online questionnaires. Prior to home visits, I contacted participants to explain the procedure of the visit via email, and if necessary, participants were telephoned when they required more information. The visits lasted approximately 1.5 – 2 hours. Materials for the visit included toys, a video camera with a tripod, a voice recorder, a laptop and an iPad. I prepared all of the questionnaires by using Qualtrics software.

After meeting with the family, we explained what to expect from the visit and the activities we had planned for them. Mothers were given the consent form and information forms and we left a copy of each for the family to keep. Firstly, mother and child were filmed while interacting in three play sessions that were appropriate for the given child's age group and that had been used successfully in previous research (Atzaba-Poria et al., 2014). The protocol for each play session was explained to the mother and the child. Each play session lasted five minutes, starting with *structured play*, in which the mother and child were asked to play with blocks to build a train, hide a duck with two cups, and read a story about Easter. Next was *free play*; the dyad was given several toys to play with however they chose. The toys were a doctor kit, cars, several animals, a wooden puzzle, toy cutlery of plates and spoons, and a wooden doll family set. We then introduced a *clean-up session* which lasted approximately two minutes, in which mother and child were asked to put the toys away together. Finally, we provided materials for *newborn play*, with toys such as a doll bath and feeding set.

After this interaction session, Prof. Pike and the mother went into one room and I stayed with the child in another room, if possible, if not we all stayed in the same room. We arranged the room settings for the mother and child's convenience. Prof. Pike gave several questionnaires to the mothers on an iPad and conducted an interview at the end about their expectations for the arrival of the second child. In the meantime, I conducted several child tasks to measure the temperament of the children and videotaped the entire session. When we completed the visit, Prof. Pike and I completed a post-visit survey, in which we also evaluated the temperament of the child. For any reason, if a mother could not complete the questionnaires during the visit, I sent that questionnaire online via email and reminded them to complete it if they did not. All of the mothers were living with the father of their children, and we asked fathers to complete an online questionnaire, in which we asked about first-born temperament and the marital relationship. We asked fathers for their email address if they were present during the visit, otherwise we asked the mothers if they would provide it. After the visit, I sent emails to the fathers explaining the questionnaire with a consent form at the beginning of the questionnaire. Even with the reminders, the participation rate for fathers was only 50%. For the papers included in this thesis, we only used mother-child interactions, our ratings of child temperament, and maternal questionnaires.

Measures and Rationale for From 3 to 4: Arrival of the Second Born

Time 1 Measures

Observer Ratings.

I used observational methods to assess mother-child relationship quality and child temperament to have objective assessment. These observational measures were used to avoid rater bias for those constructs where it was possible to observe the behaviours of interest.

Relationship Quality. Relationship Quality of Dyadic Relationship Scales from the fifth edition of The IOWA Family Interaction Rating Scales (Melby et al., 1995) was used to measure relationship quality (RQ). This scale was chosen because it does not require formal training and it is widely used in the field (Simons et al., 1993; Williamson et al., 2011). I trained a research assistant who evaluated the quality of the relationship between the mother and child from low (0) to high (9). The research assistant and I coded nine videos separately and our inter-rater reliability was $r = .65$. After discussing the different scores and reaching and agreement the research assistant completed the remaining video coding. A lower score indicates an unsatisfying, uninvolved or a conflicted relationship while a higher score indicates a satisfying, warm, happy relationship. Since we had four play sessions, I created four sections which were coded and scored separately. The average of the scores from the four sections constituted the overall RQ of the mother-child dyads. The reliability of the four sections was excellent (Cronbach $\alpha = .97$).

Child Temperament. Prof. Alison Pike and I completed The Early Childhood Behaviour Questionnaire (ECBQ) very short form (Putnam et al., 2006) to assess the temperament of the first-born child. After each home visit, we completed the questionnaire in which we altered the word of 'your child' to 'the child'. The ECBQ was chosen because of its excellent psychometric properties and wide usage (Putnam et al., 2006). We used three subscales: negative affect, surgency and effortful control. The internal reliability for surgency was poor, however, the correlation between negative affect and effortful control was high -.74, therefore we combined them by reverse coding negative affect and created an easy temperament score, with excellent internal consistency (Cronbach $\alpha = .90$). A sample item is "When engaged in play with his/her favourite toy, plays for more than 10 minutes".

Maternal Self-Reports.

Mothers were given the questionnaires either before the home visit a Qualtrics link or during the visit using an iPad.

Child Behaviour Problems. Child behaviour problems were measured using The Eyberg Child Behaviour Inventory (ECBI; (Burns & Patterson, 2000). This 36-item scale measures conduct problems, inattentive behaviour and oppositional defiant behaviour and we used this scale because it includes low-level problems, good for a non-clinical community sample. In this study we used 34 items, and we did not use the items related to siblings. Mothers rated each item on a 7-point Liker-type scale (1 = *never* to 7 = *always*), e.g., "Gets angry when does not get own way'' and ''Destroys toys and other objects''. The scores were summed to identify the intensity of the problems. Cronbach α was .89.

Child-care Support. The Family Support Scale (FSS: (Dunst et al., 1988) was used to assess sources of support and how helpful the support was perceived to be. I chose this scale because it specifically measured the practical support rather than social support more broadly. Considering the situations that these mothers were in, being pregnant with a second child and taking care of the first-born, the amount of child-care support that they perceived was hypothesized to be a key factor in relation to their parenting. Mothers indicated how helpful each source was in raising their child on a 5-point scale (1 = *not at all helpful*, 5 = *extremely helpful*). The eight sources (my parents, my relatives, my friends, my partner's friends, my partner's relatives, my partner's parents, spouse or partner, other parents) as in the original scale were given, and "babysitter" was also added to the scale. Mothers were provided with a 'not applicable' option if the given support source was not available for them and if so it was coded as a missing variable. The Cronbach α was .75.

Co-parenting. Co-parenting was assessed via the Brief Co-parenting Relationship Scale (CRS; Feinberg et al., 2012). We used the brief version of this measure to minimise the burden for the participants. This version has also been to shown to be both valid and reliable in previous research (Feinberg et al., 2012). This measure includes seven domains; co-parenting support, agreement, undermining (reversed), closeness, endorsement, division of labour and exposure to conflict (reversed). Sample items are 'My partner and I have the same goals for our child', 'I feel close to my partner when I see him or her play with our child' and 'My partner is sensitive to our child's feelings and needs.'. The response format is a 7 point scale (0 = *not true of us/never*, 6 = *very true of us/very often (several times a day)*. The scale has good reliability Cronbach's α =.76.

Household Chaos. Mothers completed the short version of the Confusion, Hubbub, and Order Scale (CHAOS (Matheny et al., 1995). The 6-item scale measures household chaos on a 5-point scale (1 = *definitely untrue*, 5 = *definitely true*). The measure has been widely used in the U.K. (Coldwell et al., 2006; Pike et al., 2016). An example item was "You cannot hear yourself think in our home." Initially, the Cronbach α was low .55, therefore we deleted one suggested item ("The children have a regular bedtime routine (same bed each night, a bath before bed, reading a story") (reverse-scored)), new α was .59.

Maternal Effortful Control. Effortful control was measured using a 19- item subscale of the Adult Temperament Questionnaire short form (ATQ, (D. E. Evans & Rothbart, 2007). I wanted to measure maternal effortful control to see whether it contributes to maternal personal resources considering the mothers in the sample would require good effortful skills to manage a first-born child and being pregnant. Since the scale has a specific subscale for effortful control and a good psychometric properties (D.

E. Evans & Rothbart, 2007), we used ATQ. Mothers responded to each statement on a 7-point Likert-type scale (1 = *extremely untrue*, 7 = *extremely true*). A sample item is "I can make myself work on a difficult task even when I do not feel like trying." Cronbach α was .63.

  Maternal Internalizing Problems. The Depression Anxiety Stress Scales (DASS-21; (Crawford & Henry, 2003) were used to measure maternal internalizing problems. The 21-item questionnaire has 3 sub-scales, each of seven items. After discussing with an expert in perinatal mental (Susan Ayers), we decided that the DASS-21 was the best measure to capture differentiated internalizing symptoms with a concise questionnaire. Previous research also indicates very good internal consistency and construct and convergent validity (Coker et al., 2018). Mothers were asked to rate how much each statement was true for them over the past week on a 4-point scale (0 = *did not apply to me at all*, 3= *applied to me very much or most of the time*). Scores for each subscale were summed and multiplied by 2. Sample items and reliabilities for depression were 'I felt down-hearted and blue' (Cronbach's α = .80), for anxiety 'I was worried about situations in which I might panic and make a fool of myself' (Cronbach's α =.77) and for stress 'I tended to overreact to situations' (Cronbach's α = .79).

  Marital Satisfaction. The Kansas Marital Satisfaction Scale (Grover et al., 1984) was used to measure general marital satisfaction. We chose the scale because of its reliability and validity (Sabatelli, 1988) and because it was short; having three items. Mothers were asked how true each statement was for their feelings over the past month on a 5-point Likert scale (1 = *not at all*, 5 = *extremely*). A sample item is 'How satisfied are you with your partner as a partner/spouse?'.

Time 2 Measures

Time 2 home visits were arranged four months after the due date. The entire procedure was the same as for Time 1, with additional questionnaires about child behaviour towards the newborn sibling, and the mother-child play sessions included the newborn sibling. We also changed the last play session and provided additional newborn toys such as a rattle and activity mirror toy. However, we completed only 10 visits before we stopped due to the COVID-19 pandemic. It became obvious that we could no longer conduct home visits, therefore I decreased the number of questionnaires and sent a single questionnaire to the remaining mothers. I did the necessary follow-ups and sent mothers reminder e-mails throughout the data collection period. In total 45 mothers contributed to the questionnaires (M_{age}= 34.78 years; $SD_{age} = 3.86$ years), and all of the data were maternal self-reports. Given the fathers' low contribution rate at Time 1, and with the ongoing COVID-19 pandemic, we decided not to send questionnaires to the fathers. The online questionnaire contained one new measure, concerning the new sibling relationship.

Sibling Relationship. In order to measure the children's behaviour toward their new-born siblings, the Sibling Relationship in Early Childhood (SREC; Volling et al., 2002) scale was used. We consulted Prof. Brenda Volling who is an expert in the field and was the Principal Investigator for large-scale study of the arrival of the second-born in the USA. Volling provided us with her scale. The scale has 18 items, and mothers indicate how much the statements describe the feelings and behaviours of their first-born child toward his/her sibling on a 5-point response format (1 = *never,* 5 = *always*). The scale had three sub-scales: positive involvement, conflict and rivalry, and avoidance. Sample items (respectively) included "Accepts sibling as a playmate", "Feels jealous of brother/sister" and "Is happy when brother/sister goes away". The

internal reliability of sibling positivity was .90, sibling rivalry was .65 (after removing the item 'Bosses or tells sibling what to do') and avoidance was very low .48, therefore we did not use it in the main analysis.

Ethical Issues

The ethical approval for the first study I presented in Chapter 2, came from the TFaB study. They followed British Psychological Society (BPS) guidelines. The necessary ethical approval was gained from the University of Sussex Sciences and Technology C-REC (ER/BO42/3) and the procedure was in accordance with the 1964 Helsinki declaration.

I applied for all the necessary ethical approvals for the 'From 3 to 4, Arrival of the Second Born' study and approval was obtained from the University of Sussex Sciences and Technology C-Rec (ER/SY269/1) before data collection. All researchers who contributed to the research followed British Psychological Society (BPS) guidelines. We also have had our DBS (Disclosure and Barring Service) checks to show we can work with families and their children. After ethical approval was gained, families who agreed to participate were sent one online questionnaire that began with their consent to participate. After this stage, when we visited families at their homes, we gave them the consent form and information sheet as paper copies and retained signed consent forms.

I assigned families a number at the beginning of the study to increase confidentiality/anonymity. After every visit, I transferred all of the data including video and audio records, to the secure University of Sussex One drive, which only I and Ali can access. We also sent mother-child interaction videos to mothers when requested. In order to do this confidentiality, I linked using Sussex box for that family only, to which they and I had access. The data was stored by ID numbers, and all data were kept on secure University-maintained servers.

Summary of Chapters

In this Chapter, I provided the background theories that the thesis is situated within, as well as general cross-cutting themes and general procedure and ethics of the thesis. The thesis consists of six chapters, a general introduction and four journal formatted papers (one per chapter), and a general discussion. The thesis includes important family relationships and mental health, in critical periods like the transition to having a second child and four months after the birth. Chapter 2 presents a brief report of secondary data analysis to examine determinants of maternal internalizing problems in mothers of twins. The study hypothesised that household chaos and child behaviour problems would predict maternal internalizing problems. Importantly, in this paper differentiation of well-being was examined, specifically how maternal depression, anxiety and stress are associated with different variables.

All of the data for the papers in Chapters 3, 4 and 5 come from the study 'From 3 to 4, Arrival of the Second Child'. In Chapter 3, similarly to Chapter 2, I investigated predictors of maternal internalizing problems, but this time in the sample of pregnant mothers. The hypothesis was that co-parenting and marital satisfaction would be associated with maternal internalizing problems. Once again, in this study depression, anxiety and stress were investigated separately in support of the hypothesis of differentiation of maternal internalizing problems.

In Chapter 4, stemming from Belsky's (1984) determinants of parenting model, the aim was to understand the predictors of mother-child relationship quality when mothers were expecting their second child. Based on mother-child dyadic observations, child observations and maternal reports, it was expected that maternal mental health and effortful control, child temperament and behaviour problems, as well as household

chaos, child-care support, and marital satisfaction, would predict mother-child relationship quality.

Chapter 5 used the longitudinal part of the data, by including both time points. First-born children behaviours toward the four-month-old sibling were investigated. It was expected that first-born gender, temperament, mother-child relationship and marital quality would predict sibling behaviour four months after the baby's arrival.

Finally, Chapter 6 presents the general discussion of the thesis in which I provided a summary of the findings along with themes that are highlighted by the thesis such as differentiation of maternal internalizing symptoms, and family transition to having a second child. The discussion then states the theoretical and practical implications of the thesis, followed by a conclusion.

CHAPTER 2: Household Chaos and Child Behaviour Problems Predict Maternal Well-being

Abstract

The aim of the study was to investigate predictors of maternal well-being in mothers of twins. As well as being important in its own right, maternal well-being is a crucial predictor of parenting (Belsky, 1984). Based on previous research (Pike et al., 2006) we expected that household chaos (Confusion, Hubbub, and Order) and child behaviour problems would predict maternal depression, stress and anxiety. The data for the study was taken from the Twins, Family and Behaviour Study (TFaB) -- a longitudinal UK study of twins born in 2009 and 2010. One hundred and fifty-eight mothers of twins ($M_{\text{child age}}$= 6.01 years, $SD_{age} = 0.50$) reported on household chaos, child disruptive behaviours and their own well-being. Higher levels of household chaos were linked to maternal depression, anxiety and stress-related symptoms. More child behaviour problems were related to more depressive and stress symptoms but not anxiety. The findings show promise for future research investigating different types of maternal well-being and suggested practical implications, such as intervening on concrete aspects of household chaos to improve maternal well-being.

Keywords: maternal well-being, household organization, household chaos, child behaviour problems

Introduction

Maternal well-being (e.g., depression, stress and anxiety) is critical both for mother and child. The present study hypothesized that household disorganization would predict maternal well-being based on previous research (Pike et al., 2006) and further tested child behaviour problems as another predictor. The aim of the study was to examine relationships between household chaos, child behaviour problems and maternal well-being, and to uncover patterns of differentiation for well-being. The sample consisted of families with twins; such families require more organization and effort in parenting. Specifically, we investigated whether household chaos and child behaviour problems predicted maternal depression, stress and anxiety in similar or distinctive ways.

Maternal Well-being

Studying maternal well-being is important, not only for the mothers but also because it is predictive of better parenting. For example, better maternal mental health predicts better quality parenting (Belsky, 1984) and secure child attachments (Leerkes & Crockenberg, 2002). Conversely, depressed mothers are more hostile (Lovejoy et al., 2000), demonstrate fewer sensitive behaviours (Feldman et al., 2009) toward their children, and have more negative interactions with their infants (S. B. Campbell et al., 1991). Therefore, studying predictors of maternal well-being is important for understanding the mother-child relationship. Importantly, existing studies largely investigate one aspect of maternal well-being (e.g., depression) or several aspects as a composite (e.g., depression, stress and anxiety in combination). However, there are theoretical reasons to consider differentiating well-being (studying depression, anxiety and stress individually). The Tripartite Model of Anxiety and Depression (Clark & Watson, 1991) has been used to explain the comorbidity of depression and anxiety, dividing them into physiological arousal and positive and negative affect. Studies

investigating mothers during the prenatal and postnatal periods have demonstrated distinct findings for maternal anxiety and depression. For example, children's internalizing problems are influenced by maternal depression but not by anxiety (Clark & Watson, 1991). Yet the research on differentiation of maternal well-being is limited. To address this gap, we defined maternal internalizing problems as the level of depression, stress and anxiety symptoms reported by mothers, aiming to uncover patterns of differentiation for well-being.

Chaos, Child Behaviour Problems, and Maternal Well-being

Homes low in regularity, and high in noise and crowding, have been defined as high in household chaos (Wachs, 2005). Higher levels of household chaos have been related to maternal depression and stress (Pike et al., 2006), as well as with unsupportive behaviours of mothers toward their children (Nelson et al., 2009). The role of child behaviour problems has also been studied in relation to maternal well-being. For example, children of depressed mothers have more behaviour problems than children with non-depressed mothers (Radke-Yarrow et al., 1992). Although such associations are commonly conceptualized as a parent to child effects, there is also evidence of bidirectional effects; child characteristics can also influence parents. Research on children's temperament, for example, demonstrates that mothers of children with difficult temperaments are at risk of depression and stress (Goodlin-Jones et al., 1998; Oddi et al., 2013; Pike et al., 2016).

The Present Study

The sample for the current study was families with twins, families that typically experience additional stress. Given the links between household chaos, maternal well-being, parenting and child behaviour problems, we hypothesized a model whereby

household chaos and child behaviour problems predict maternal well-being. Previous research indicates that household chaos is associated with conduct problems, impulsivity and delinquency (G. W. Evans et al., 1998; Smith et al., 2001), externalizing behaviours and aggression, (Dumas et al., 2005) and diverse child adjustment problems (Coldwell et al., 2006; Dumas & Serketich, 1994). Due to the probable correlation among our predictors, we investigated independent predictions from household chaos and child behaviour problems to maternal well-being, as well as examining their prediction as a whole. Specifically, higher levels of household chaos and child behaviour problems were hypothesized to predict higher levels of depression, anxiety and stress. Additionally, we aimed to uncover possible differentiation of these aspects of maternal well-being.

Method

Participants and Procedure

Data were drawn from the Twins, Family and Behaviour Study (TFaB) -- a longitudinal UK study of twins born in 2009 and 2010, that investigates family relationships and children's behaviours. The data for this study was cross-sectional. In total, 158 mothers (M_{age}= 38.14 years; $SD_{age} = 4.32$ years) of twins reported on levels of household chaos, child behaviour problems and their own symptoms of depression, anxiety and stress, ($M_{child\ age}$= 6.01 years; $SD_{age} = 0.50$ years). Fifty-four of the twins were monozygotic and 101 were dizygotic, with 3 pairs of unclassified zygosity. One-hundred-and-forty-three (91%) mothers were married or cohabiting with a partner. Mothers were highly educated, 71.3% of the sample reported having an undergraduate or higher degree, and only 0.6% of mothers reported having no qualifications. Ethnicity information was not collected in this sample. Household income ranged between less

than £5,000 and more than £100,000, with a median response of £40,000- £49,000.

Mothers completed postal questionnaires for all study variables.

Measures

Household Chaos

The short version of the Confusion, Hubbub, and Order Scale (CHAOS; (Radke-Yarrow et al., 1992) was used to assess household chaos and consisted of 6 items. Mothers rated the items on a 5-point scale (1 = *definitely untrue*, 5 = *definitely true*). Example items are "The children have a regular bedtime routine (e.g., same bedtime each night, a bath before bed, reading a story)" (reverse-scored) and "It is a real zoo in our home". The Cronbach's α was .67.

Child Behaviour Problems

The Eyberg Child Behaviour Inventory (ECBI; (Eyberg & Pincus, 1999) was given to mothers to assess child behaviour problems. The response format was a 7-point Likert type scale (1= *never*, 7= *always*) and the questionnaire has 36 items. Example items are "Destroys toys and other objects" and "Acts defiant when told to do something". Items were summed, with higher scores indicating more disruptive behaviours. The correlation between maternal reports of their twins' behaviour problems was $r = .81$. Due to this substantial twin similarity, we created a single variable for each family. The Cronbach α for this measure was .93.

Maternal Well-being

The Depression Anxiety Stress Scales (DASS-21; (Crawford & Henry, 2003) was used to measure maternal well-being. The questionnaire has 3 sub-scales, each of seven items (note that in the current study one item measuring depression was inadvertently missing). Mothers were asked to rate how much each statement applied to them over the past week on a 4-point scale (0 = *did not apply to me at all*, 3= *applied to me very much*

or most of the time). A sample item for depression is "I felt that I had nothing to look forward to," for anxiety "I felt I was close to panic," and for stress "I found it difficult to relax." Scores for each subscale were summed and multiplied by 2. Cronbach's α values were good for depression ($\alpha = .82$) and stress ($\alpha = .77$) subscales, and reasonable for anxiety ($\alpha = .62$).

Results

Preliminary Analysis

Table 1 contains correlations and descriptive statistics among all study variables. As expected, higher levels of chaos were related to more depression, stress and anxiety symptoms, and also to more child behaviour problems ($r = .39$, $p < .001$). More child behaviour problems were related to more maternal depression ($r = .31$, $p < .001$), and stress ($r = .31$, $p < .001$) but not more anxiety. Socioeconomic status, maternal age, educational level and zygosity of twins were not related to maternal well-being, so we did not control for these variables in the main analysis.

Table 1

Descriptive Statistics & Bivariate Relations

Variable	*1*	*2*	*3*	*4*	*5*
1. CHAOS		.32**	.23*	.29**	.39**
2. Depression			.61**	.54**	.31**
3. Anxiety				.44**	.15
4. Stress					.31**
5.Child Behaviour Problems					
Mean (SD)	2.39 (.63)	3.52 (4.39)	2.82 (3.61)	9.92 (5.63)	3.10 (.62)
Range	1.17-4.00	0-30	0-20	0-32	1.66-5.14

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

Multiple Regression Analysis

To understand independent contributions of household chaos and child behaviour problems to maternal well-being, three multiple regression analyses were conducted (see Table 2). For depression, the entire model was significant $F (2, 154) = 12.41$, $p < .001$, explaining 13% of the variation. Both chaos ($B = .23$, $t = 2.86$, $p < .05$) and child behaviour problems ($B = .21$, $t = 2.62$, $p < .05$) significantly predicted depression. However, for anxiety, the results were slightly different. The overall model was significant $F (2, 154) = 4.49$, $p < .05$, explaining 5% of the variation. The only significant predictor was chaos ($B = 19$, $t = 2.32$, $p < .05$). Finally, for stress the model was very similar to depression, $F (2, 154) = 11.33$, $p < .001$, explaining 12% of the variation, with both the predictors chaos ($B = .19$, $t = 2.35$, $p < .05$) and child behaviour problems ($B = .23$, $t = 2.88$, $p < .05$) providing significant prediction.

Table 2

Multiple Regression Models for 3 Internalizing Problems

	t	*p*	*B*	*F*	*df*	*p*	*Adj R²*
Depression							
Overall Model				12.41	154	.000	.13
Chaos	2.86	.005	.23				
CBP	2.62	.010	.21				
Anxiety							
Overall Model				4.49	154	.013	.04
Chaos	2.32	.021	.20				
CBP	.84	.405	.07				
Stress							
Overall Model				11.33	154	.000	.12
Chaos	2.35	.020	.19				
CBP	2.88	.004	.24				

Note. CBP is Child Behaviour Problem. Standardized B values are reported. $N = 156$

Discussion

We used a UK- based sample of families with young twins, to test household chaos and child behaviour problems as predictors of maternal well-being. There was an advantage of using a twin sample in that families with twins require more organization and effort in parenting, and previous studies have used twin samples to understand household chaos and child behaviour problems (Deater-Deckard et al., 2009; Hanscombe et al., 2011; Oliver et al., 2008; Wang et al., 2012). Mothers perceiving more household chaos tended to report more depressive, stress and anxiety-related symptoms. More child behaviour problems also predicted more depressive and stress-related symptoms, but it was not predictive of maternal anxiety. The results supported previous research indicating household chaos correlates with maternal well-being (Pike et al., 2006). Notably, the results showed differentiation of maternal well-being in relation to child behaviour problems. This highlights the importance of studying these aspects of maternal well-being separately.

We also demonstrated the independent prediction of chaos and child behaviour problems with maternal well-being, in the context of existing literature that shows a link between child behaviour problems and chaos (Coldwell et al., 2006; Dumas et al., 2005; Dumas & Serketich, 1994). The results indicate when chaos and child behaviour problems are put in the model together more chaos was a significant predictor of all well-being variables but for child behaviour problems it was depression and stress. Results demonstrated that if mothers perceive more chaos and disorganization in the home, they may be at risk of having more depression, stress symptoms and anxiety. If they report more child behaviour problems, they may also be at risk of having more depression and stress but not anxiety. These findings suggest that interventions focused on reducing the levels of chaos in the home, (e.g. implementing a regular bedtime

routine, inducing calm and having an organized schedule) and/or reducing child behaviour problems may also result in improved maternal well-being. The results can also imply that child behaviour problems are risk factors for poor maternal well-being, highlighting the bi-directional influence mothers and children have on one another.

Limitations

Despite the strengths of our novel study, we acknowledge some limitations. The current sample was mothers of twins and requires replication across different family types. Additionally, the sample was highly educated, 71.3% of the mothers reported having an undergraduate or higher degree, so the results cannot be generalized to all populations. Future studies should investigate whether the same pattern of results is apparent not only for parents of non-twin children but also for more representative samples in terms of education levels. Another point that is worth mentioning is that the anxiety subscale showed poor internal reliability, which may have attenuated associations. Most important, a longitudinal design with all measures repeated over time would enable cross-lagged models to identify the temporal ordering of influence.

Conclusion

The current study showed that chaos predicted maternal depression, anxiety and stress, whereas child behaviour problems were predictive of maternal depression and stress – but not anxiety. In order to have better outcomes for maternal well-being as well as for parenting, household chaos and child behaviour problems should be targeted in interventions. The results suggest that child behaviour problems and chaos are risk factors for impaired parental functioning.

CHAPTER 3: Co-parenting and Marital Satisfaction Predict Maternal Internalizing Problems When Expecting a Second Child

Abstract

Purpose Internalizing problems during and after pregnancy is important for parenting and child outcomes (Belsky, 1984; Staneva et al., 2015). The study aimed to understand correlates (i.e., marital satisfaction, co-parenting) of maternal internalizing problems during pregnancy with a second child.

Method We investigated levels of depression, anxiety and stress symptoms of mothers in the third trimester of pregnancy with their second children. Fifty-one mothers and their firstborn children were visited in their homes and mothers completed questionnaires.

Results Results showed that co-parenting and marital satisfaction were related to internalizing outcomes. More specifically, co-parenting predicted depression and stress when controlling for marital satisfaction whereas marital satisfaction predicted anxiety over co-parenting.

Conclusion The findings highlight the importance of studying prenatal internalizing problems differentially and can inform future intervention studies to prevent poor psychological outcomes.

Keywords: Perinatal mental health, Internalizing problems, Co-parenting, Marital Satisfaction

Introduction

The cost of perinatal mental health problems including depression and anxiety is around

£8.1 billion per annual cohort of births to society in the UK (Bauer et al., 2014).

Pregnant mothers are monitored by general practitioners (GP) and/or midwives, there

are also some practices within mental health services specializing in mothers suffering

from mental health issues. Pregnant women in UK who are suffering from depression

exhibit emotional isolation, which highlights the importance of increased midwifery

support (Raymond, 2009). The purpose of the current study was to investigate the

correlates of maternal internalizing problems in pregnancy with a second child. Based

on family dynamics theory (M. Bowen, 1978) and current literature, we proposed two

main predictors -- co-parenting and marital satisfaction.

Maternal Internalizing Problems

Overall, good maternal mental health is linked with good quality in parenting

(Belsky, 1984; Belsky & Jaffee, 2015) and secure child attachments (Leerkes &

Crockenberg, 2002) which are crucial for child development. Conversely, depressed

mothers are more hostile (Lovejoy et al., 2000), demonstrate fewer sensitive behaviours

(Feldman et al., 2009) towards their children, and have more negative interactions with

their infants (S. B. Campbell et al., 1991). A large amount of research has been

conducted on post-partum depression and its effects on infant development. For

example, infants of depressed and anxious mothers demonstrated poor self-regulation

(Feldman et al., 2009), and post-partum depression was related with infants' language

development at 12 months of age (Quevedo et al., 2012).

Pregnancy is also a critical stage for maternal well-being, which has received far

less research attention. A systematic review suggested that mothers tend to report more

depressive and anxiety-related symptoms (Bennett et al., 2004) and antenatal depression is highlighted especially in third trimester (J. Evans et al., 2001). In turn, maternal internalizing problems in pregnancy can lead to serious outcomes like low birth weight, mortality, and prematurity (Grote et al., 2010; Staneva et al., 2015). In addition, both depression and anxiety during pregnancy increase the risk of post-natal depression (Lee et al., 2007). Prenatal depression not only increased the risk for later depression but also increased the chances of post-delivery the fear of child-birth (Bangma et al., 2020). Thus, considering the fact that about 20% of women suffer from prenatal depression (A. Bowen & Muhajarine, 2006), it is important to study the determinants of internalizing problems during pregnancy.

There is a good amount of literature devoted to understanding well-being during the transition to parenthood (S. B. Campbell et al., 1992; Hock et al., 1995; McDaniel et al., 2012). However, pregnancy with a second child can be more stressful for mothers, due to the needs of the first-born. Research shows that second-time mothers have worse psychological adjustment compared to first-time mothers (Kojima et al., 2005). Mothers when they are pregnant with their second child, suffering from sleep deprivation, may struggle to regulate their executive functioning. Furthermore, having a first-born aged 2-3 years old, in which most children develop self-regulation abilities (Thompson & Goodman, 2010) but also tend to show some problematic behaviours (Belsky et al., 1996) which is in turn linked with maternal depression and stress (Barker et al., 2011; Beck et al., 2004). Therefore, studying predictors of maternal depression, anxiety and stress during this transition may be particularly informative.

Previous research has largely investigated single aspects of maternal internalizing problems (e.g., depression) or several aspects as a composite (e.g., depression, stress

and anxiety in combination). However, there are theoretical reasons to consider them differentially. For example, the Tripartite Model of Anxiety and Depression (Clark & Watson, 1991) explains the comorbidity of depression and anxiety dividing them into physiological arousal, positive and negative affect. In addition, studies investigating mothers during the prenatal and postnatal periods have demonstrated different findings for maternal anxiety and depression. For example, internalizing difficulties of children have been shown to be influenced by maternal depression but not by anxiety (Barker et al., 2011). Additionally, Lee and colleagues (2007) found that anxiety symptoms were more common than depressive symptoms in all stages of pregnancy. Yet the research on differentiation of these problems is limited. In the current study we examined three different types of maternal internalizing problems, depression, anxiety and stress.

Co-parenting and Marital Satisfaction

The current study investigated co-parenting and marital satisfaction as predictors of maternal internalizing problems. Co-parenting can be defined as parents supporting each other in child-care, making decisions about the child together, as well as appraising each others' parenting practices not undermining each others' parenting, and it includes aspects such as co-parenting support, agreement about child-care, child-care division, endorsement, as well as conflict and undermining (Feinberg, 2003). Co-parenting plays an important role in the family system. Based on family dynamics theory, which emphasises that members of a family are interdependent (M. Bowen, 1978), we suggested co-parenting as a predictor of maternal internalizing problems and is an important predictor of parenting, parental adjustment and child development (Feinberg et al., 2007). Furthermore, several studies suggest that co-parenting support is related to lower levels of depression (O'hara & Swain, 1996), while co-parenting conflict and undermining are related to higher levels of depression (Solmeyer & Feinberg, 2011).

Another study showed that low levels of co-parenting alliance increases parenting stress (Morrill et al., 2010). We know less about anxiety and specifically stress, as most studies focused on parenting stress rather than general stress. Therefore, studying distinctive of these symptoms of depression, anxiety and stress in relation to co-parenting will contribute to the literature, especially in the stressful perinatal period.

Research on social support and family systems shows that low satisfaction with support is related with depressive and anxiety symptoms (Paarlberg et al., 1996). Importantly, the marital relationship is related with maternal mental health more so than other social relationships, including friends and family (Antonucci et al., 2001; Whisman et al., 2000). Marital satisfaction can be defined as how much a person is satisfied with their spouse/partner, and whether they are satisfied with their relationship and marriage as a whole domain. Not only does marital satisfaction show a gradual decrease in the transition to parenthood (Doss et al., 2009; Gottman & Notarius, 2000), it is also an important predictor of maternal internalizing problems (Kamp Dush et al., 2008; Whisman, 2001). Marital problems were related with more depression concurrently (Davila et al., 2003; Walker et al., 2013), as well as predicted depression one year later (Beach et al., 2003). Conversely, whereas higher marital quality has been shown to be associated with better well-being over time (Proulx et al., 2007). Therefore, we also included marital satisfaction as a predictor of maternal internalizing problems.

The Present Study

The study aims to understand maternal internalizing problems in pregnancy with a second child. Importantly in this study, we examined three aspects of internalizing symptoms; depression, anxiety and stress. Considering the likely correlation between co-parenting and marital satisfaction (Baril et al., 2007) we tested weighted

contributions of marital satisfaction and co-parenting to each aspect of maternal internalizing problems.

Method

Participants and Recruitment

Participants comprised 51 mothers (M_{age}= 34.78 years; SD_{age} = 3.86 years) and their firstborn children ($M_{\text{child age}}$=32.26 months; SD_{age} = 6.27 months) from the UK. Twenty-nine of the children were boys and 22 were girls. Participants were recruited by emailing nurseries and via social media (Facebook groups) in the south of England, Sussex. Mothers were invited to participate in the third trimester of pregnancy (M= 33.43 weeks; SD = 4.45 weeks). All of the mothers were cohabitating with the father of the first-born child; children were typically developing. 93.7% of the mothers reported having an undergraduate degree or higher. Forty-seven of the mothers reported their ethnicity as white. 86% reported having a job but only 6% had a full-time job.

Procedure

Prior to the home visit, mothers were asked to complete an online questionnaire. The visits were conducted by two researchers and lasted 90-120 minutes. The researchers were trained extensively, had DBS checks and experience in the field. Then, one researcher interviewed the mothers and asked them to complete questionnaires whereas the other researcher completed child tasks. Only mother-report questionnaires are used in the current study. Two of the mothers were living outside of the Sussex area. We could not conduct the home visits; however they completed all of the questionnaires online.

Ethical issues

Ethical approval was gained from University of Sussex Sciences & Technology C-REC (ER/SY269/1) before recruitment commenced. British Psychological Society (BPS) ethical guideless were followed throughout the study and mothers provided informed consent.

Measures

Maternal Internalizing Problems

The Depression Anxiety Stress Scales (DASS-21; (Crawford & Henry, 2003) were used to measure maternal internalizing problems. The 21-item questionnaire has 3 sub-scales, each of seven items. Mothers were asked to rate how much each statement was true for them over the past week on a 4-point scale (0 = *did not apply to me at all*, 3= *applied to me very much or most of the time*). Scores were for each subscale were summed and multiplied by 2. Sample items and reliabilities for depression were 'I felt down-hearted and blue' (Cronbach's α = .80), for anxiety 'I was worried about situations in which I might panic and make a fool of myself' (Cronbach's α =.77) and for stress 'I tended to overreact to situations' (Cronbach's α = .79). The scale has great internal consistency and construct and convergent validity (Coker et al., 2018).

Co-parenting Behaviour

Co-parenting behaviour was assessed via the Brief Co-parenting Relationship Scale (CRS; Feinberg et al., 2012). This measure includes seven items; co-parenting support, agreement, undermining (reversed), closeness, endorsement, division of labour and exposure to conflict (reversed). Sample items are 'My partner and I have the same goals for our child', 'I feel close to my partner when I see him or her play with our child' and 'My partner is sensitive to our child's feelings and needs.'. The response format is a 7 point scale (0 = *not true of us/never*, 6 = *very true of us/very often (several*

times a day). The scale has good reliability Cronbach's α =.76, stability and construct validity.

Marital Satisfaction

The Kansas Marital Satisfaction Scale (Grover et al., 1984) was used to measure general marital satisfaction. The scale has three items. Mothers were asked how true each statement was for their feelings over the past month on a 5-point Likert scale (1 = *not at all*, 5 = *extremely*). A sample item is 'How satisfied are you with your partner as a partner/spouse?'. The scale had a high reliability (Cronbach α =94). The scale reported as having good internal consistency with having support for its validity (Sabatelli, 1988).

Results

Preliminary Results

Table 1 depicts the descriptive statistics and correlations among all study variables. Child's gender and age were not related with maternal internalizing problems, so we did not control for these variables in the main analysis. Maternal age was correlated only with anxiety (r = -0.40, $p < .05$). Correlations among study variables were all in the expected direction and ranged in size from $r = 0.25$ to $r = 0.72$.

Maternal depression, anxiety and stress, were all inter-related, as expected. Similarly, marital satisfaction was related with co-parenting. Maternal depression was significantly correlated with co-parenting and marital satisfaction, more symptoms of depression was related with less co-parenting and marital satisfaction. For anxiety, mothers' age was significantly correlated with anxiety, (r = -0.40, $p < 0.05$) the younger the mothers, the more anxiety related symptoms they reported. Therefore, we conducted partial correlations to control maternal age. Results showed that the correlation between

maternal anxiety and marital satisfaction were still significant after controlling for

maternal age, more symptoms of anxiety was related with less marital satisfaction, and

less co-parenting ($r = -0.29$, $p = 0.049$). Less co-parenting was associated with more

stress related symptoms, whereas stress was not related with marital satisfaction.

Table 1

Descriptive and Correlations among Study Variables

Variable	*1*	*2*	*3*	*4*	*5*
1. Depression		.58**	.64*	-.45*	-.35*
2. Anxiety			.72**	-.29	-.42*
3.Stress				-.39*	-.25
4.Co-parenting					.65**
5.Marital Satisfaction					
Mean	4.47	4.71	11.53	6.24	4.32
(SD)	(4.50)	(5.78)	(6.13)	(.53)	(.62)
Range	0-16	0-24	0-28	4.64-7.0	3-5

Note. * $p < .05$, ** $p < .001$ $N = 51$

Multiple Regression Analysis

In order to test independent contributions of marital satisfaction and co-parenting to the maternal internalizing symptoms, three multiple regression analyses were conducted. (see Table 2).

Depression

The overall model was significant F (2, 48) = 6.41, $p < 0.05$, explaining 18% of the variation. Only, co-parenting significantly predicted depression (B = -0.39, t = -2.29, $p < 0.05$). Thus, with both marital satisfaction and co-parenting are in the model, co-parenting was the only significant predictor.

Anxiety

Maternal age was correlated with anxiety so we included maternal age, as well as marital satisfaction and co-parenting as a predictor. The overall model was significant F (3, 44) = 5.89, $p < 0.01$, explaining 24% of the variation. Marital satisfaction (B = -0.36, t = -2.20, $p < 0.05$) and maternal age (B = -0.32, t = -2.45, $p < 0.05$) were significant predictors. Thus, marital satisfaction was the strongest contributor to the model, followed by maternal age, whereas co-parenting was not a significant predictor.

Stress

The overall model was significant, F (2, 48) = 4.29, $p < 0.05$, explaining 12% of the variance. Co-parenting was the only significant predictor (B = -0.39, t = -2.25, $p < 0.05$).

Table 2

Multiple Regression Models for 3 Internalizing Problems

	t	*p*	*B*	*F*	*df*	*p*	*Adj R²*
Depression							
Overall Model				6.41	48	.003	.18
Co-Parenting	-2.29	.026	-.39				
Marital Satisfaction	-.62	.540	-.10				
Anxiety							
Overall Model				5.89	44	.002	.24
Co-parenting	-.31	.755	-.05				
Marital Satisfaction	-2.20	.033	-.36				
Maternal Age	-2.45	.018	-.32				
Stress							
Overall Model				4.29	48	.019	.12
Co-Parenting	-2.25	.029	-.39				
Marital Satisfaction	.02	.984	.003				

Note. Standardized B values are reported. $N = 51$

Discussion

The study focused on predictors of maternal internalizing problems when expecting a second child. We tested two predictors and found that marital satisfaction and co-parenting were related with maternal internalizing problems consistent with previous literature (Feinberg & Kan, 2008; Kamp Dush et al., 2008; Walker et al., 2013; Whisman, 2001). Finding that higher levels of marital satisfaction were related with less symptoms of depression and anxiety (Davila et al., 2003; Paarlberg et al., 1996; Walker et al., 2013), as well as co-parenting with depression and stress (Morrill et al., 2010; Solmeyer & Feinberg, 2011) replicated previous literature. However, we did not find any significant association between marital satisfaction and stress.

Considering the critical importance of maternal mental health during pregnancy (Bennett et al., 2004; Grote et al., 2010; Lee et al., 2007), we contributed to the literature by showing differentiated prediction of the three types of maternal internalizing problems. For depression, and stress, only co-parenting was the independent predictor. However, for anxiety, it was only marital satisfaction that provided independent prediction. Thus, maternal depression and stress showed similar patterns, and this was different for anxiety. Thus, these findings highlighted the importance of studying internalizing problems differentially. The current literature on maternal internalizing problems tends to study internalizing problems as monolithic construct rather than separating the symptoms of depression, anxiety and stress. Considering the different associations, these symptoms should be studied in detail. In addition to showing that maternal internalizing problems should be studied differentially, we also demonstrated that marital satisfaction and co-parenting are not the same thing. Indeed, they are distinct and predicted different outcomes. Although we replicated that two concepts are inter-correlated (Baril et al., 2007). We also showed

that co-parenting was a distinct predictor of depression and stress above and beyond marital satisfaction.

All in all, the findings can have implications for intervention studies and therapeutic settings. Previous intervention studies showed that it is possible enhance mother's and father's co-parenting skills, and in turn, decrease symptoms of depression and anxiety (Feinberg & Kan, 2008). In addition, these same families showed decreased levels of parenting stress 3.5 years after the intervention (Feinberg et al., 2010). The current study indicates that such an intervention study could prevent maternal depression, anxiety and stress, if conducted in the perinatal stages. Interventions can focus to increase marital satisfaction and especially co-parenting, leading to better well-being outcomes. Partners can be taught several co-parenting strategies, like 'discussing the best way to meet their child's needs' (Feinberg et al., 2012). The finding also can be useful when considering therapeutic settings. Especially, for the setting of couples therapy, partners can work on increasing satisfaction and co-parenting not only for maternal internalizing problems, but also to benefit child outcomes (S. B. Campbell et al., 1991; Feldman et al., 2009; Lovejoy et al., 2000). Crucially, co-parenting can be a more concrete and less vulnerable focus for intervention via a common focus, the child, partners can work to increase co-parenting.

Limitations and Future Directions

A limitation of the study was the exclusive focus was on mothers. Although fathers were asked to contribute, only 50% of the fathers completed the questionnaire. It would be ideal to make a composite score of co-parenting variable with higher contributions of fathers. However, we would argue that the outcome of interest was maternal internalizing problems, so mothers' perspectives were essential. Additionally, considering the evidence from literature suggesting that partner's own marital

satisfaction predicted depression of the spouse (Beach et al., 2003), paternal reports of marital satisfaction would also be vulnerable. To overcome this, future studies can encourage paternal contribution with preferably larger sample sizes. Another limitation is that our sample was largely white, and 93.7% of the sample had an undergraduate degree or higher, which might be an issue for generalizability of the findings. A majority of the mothers were also employed, which is associated with better well-being outcomes (Kleiverda et al., 1990). Therefore, future studies, with diverse educational and ethnical backgrounds, are needed.

Finally, the current study is coming from a longitudinal study's first time point. The second time point, which we were collecting 4 months after the birth of the second child, has been disrupted because of the COVID-19 pandemic. Of course, to be able to predict maternal internalizing problems over time would be better than concurrent. Child behaviour problems tend to increase with the arrival of second born (Dunn et al., 1981; Gottlieb & Mendelson, 1990), and also there is a link between child behaviour problems and maternal internalizing problems, depressed mothers tend to have children with more behaviour problems than non-depressed mothers (Radke-Yarrow et al., 1992). Another possible predictor variable in a longitudinal study would be child temperament, considering mothers of children with difficult temperaments are considered at risk of depression and stress (Oddi et al., 2013; Pike et al., 2016). Therefore, with a longitudinal study, it would be possible to test the temporal ordering of associations.

CHAPTER 4: Predictors of Mother-Child Relationship Quality When Expecting a Second Child

Abstract

The current study identifies predictors of mother-first-born-child relationship quality of an important period that is when expecting a second child. Based on Belsky's determinants of parenting model (Belsky, 1984), we suggested three domains to predict mother-child relationship quality, maternal personal resources (well-being, effortful control), child characteristics (temperament, behaviour problems) and contextual factors (household chaos, child-care support, marital satisfaction). Forty-five mothers ($M_{age}=$ 34.78 years; $SD_{age} = 3.86$ years) and their typically developing first-born children ($M_{child\ age}=32.26$ months; $SD_{age} = 6.27$ months) were visited at home in the south of England, Sussex, UK, where mothers completed questionnaires and mother-child interactions were videotaped. Results demonstrated that easier child temperament, better maternal well-being, less household chaos and more child-care support were related to more positive mother-child relationship quality. Together the predictors explained 23% of the variance in relationship quality. The child's easy temperament, chaos and child-care support provided unique variance in explaining the mother-child relationship. These results contribute to the literature on expecting a second child and yield several implications. The findings also provide guidance for future intervention programs. In order to improve the mother-child relationship quality, child temperament may be a fruitful target for intervention, as well as increased support for child-care and decreased household chaos.

Keywords: mother-child relationship, household chaos, child-care support, child temperament

Introduction

There are very few studies that have examined the mother-firstborn relationship when expecting a second born, considering the research showing that there are dramatic changes in mother-child relationships in this transition (Kojima et al., 2005; Teti et al., 1996), it is important to understand mother-firstborn relationships and the predictors of the quality of those relationships. Therefore, we investigated the predictors of observed mother-child relationship quality when expecting a second child. Based on Belsky's determinants of parenting model (Belsky, 1984) we suggested three domains, maternal personal resources (well-being and effortful control), contextual factors (chaos, support, and marital satisfaction) and child characteristics (child temperament and behaviour problems).

Mother-Child Relationship

Positive mother-child relationship quality can be defined as high on warmth, sensitivity, good communication and responsiveness. Mother-child relationship quality in the early years has long term influences on children's development, sensitive parenting during infancy predicts improved emotion regulation in adulthood (Simpson et al., 2007), and early maternal caregiving predicted partner and peer attachment 20 years later (Zayas et al., 2011). It is also salient to understand this relationship during the transition to having another child.

Several studies have shown that mother-first-born child relationships during the transition are often disrupted, in terms of instability in the attachment (Touris et al., 1995), decreased security in attachment (Teti et al., 1996), less playful interactions (Kojima et al., 2005) and less warmth in the relationship (Taylor & Kogan, 1973). Most studies have focused on mother-child relationship quality after the birth of a second child. However, pregnancy is a critical stage for maternal well-being; a systematic

review demonstrated that women report increased depressive and anxiety-related symptoms in the second and third trimesters of pregnancy (Bennett et al., 2004). To our knowledge, mother-child relationship quality when expecting a second child has not been widely investigated. The transition period to having a second child is a family transition that can be stressful for all family members. Research also suggested that a spike is seen in first-born children having problematic behaviours (Volling, 2017). On the other hand, a good quality mother-child relationship might prevent this spike in problematic behaviours. Therefore, we aimed to understand the predictors of mother-child relationship quality before the birth of a second child. Belsky's theory of determinants of parenting suggests that parenting quality is influenced by personal characteristics, child characteristics and contextual sources (Belsky, 1984). The theory suggests the following hierarchy between the determinants of parenting; individual well-being, contextual sources of stress and support and finally child characteristics (Belsky, 1984). He suggests that parental well-being buffers the parent-child relationship more effectively than support and support buffers the parent-child relationship better than child characteristics.

Maternal Personal Resources

We proposed maternal personal resources as one domain with two important variables, maternal well-being and effortful control as predictors of the mother-child relationship. Personal well-being is suggested to be the most effective buffer for the parent-child relationship by Belsky (1984). Better maternal mental health predicts higher parenting quality as reviewed by Belsky and Jaffee (2015). Previous research also demonstrates that mothers with depression tend to show less sensitive behaviours toward their children (Feldman et al., 2009) and more negative affect toward their infants (Campbell et al., 1992). Considering mothers expecting a second child, depleted

resources (including sleep deprivation) may hinder their ability to regulate effortful control skills. Evidence also shows that parental effortful control has been linked with more warmth and interactive time spent with children (Bridgett et al., 2011). Therefore, we hypothesized that maternal well-being and effortful control skills would predict mother-child relationship quality within our sample of pregnant mothers.

Child Characteristics

Child characteristics such as difficult temperament have been linked with poorer mother-child relationship quality. For example, mothers demonstrate more disapproval towards 2-year-olds with difficult temperament (Gauvain, 1995). The first-born children in the present study were aged 2-4, which is an important period for children to learn and acquire self-regulation abilities (Thompson & Goodman, 2010). We expect temperament including self-regulation to play a significant role in the mother-child relationship. The age group also demonstrates more problematic behaviours (Belsky et al., 1996). Withdrawal behaviour predicts mother-child conflict, aggression and delinquency predict conflict with both parents and closeness with mothers predicts less withdrawal (Zhang et al., 2008). These links are bidirectional in nature (Harnish et al., 1995; Moss et al., 2008; Zhang et al., 2008). Therefore, we expected child behaviour problems to also play a role when predicting mother-child relationship quality in the study.

Contextual Factors

Finally, we proposed that the contextual factors of marital satisfaction, household chaos and child-care support would also predict mother-child relationship quality. Applying the spillover hypothesis within families predicts that the quality of one relationship can reflect on another relationship within a family (Nelson et al., 2009). Marital dissatisfaction and conflict are linked with poorer quality parent-child

relationships (Krishnakumar & Buehler, 2000), whereas more positive marital behaviour predicted more supportive parent-child relationships 9 years later (Tanner Stapleton & Bradbury, 2012). Therefore, we expected marital satisfaction to be an important predictor in our contextual factor domain. Household chaos can be described as high noise, low regularity and crowding within the home environment (Wachs, 2005). Household chaos is not only linked with negative life outcomes but also is related to less parental emotional availability (Whitesell et al., 2015). A very recent review on household chaos and family outcomes suggested that household chaos is related to worse parent-child relationship outcomes, such as less closeness and supportiveness, and more conflict (Marsh et al., 2020). Thus, we expected household chaos to be a significant predictor in explaining mother-child relationship quality. Support is another important contextual factor and support sources were suggested to be effective to buffer the parent-child relationship (Belsky, 1984). Previous research has demonstrated that higher social support in pregnancy was related to more parental satisfaction and efficacy (Angley et al., 2015). Additionally, support quantity and high social support satisfaction were positively linked with maternal sensitivity (Goldstein et al., 1996). Taken together, we hypothesized that child-care support, household chaos and marital satisfaction would relate to mother-child relationship quality.

The Present Study

The study aimed to unveil the predictors of mother-child relationship quality when expecting a second child. Based on Belsky's determinants of parenting theory, we hypothesized that better maternal personal resources (well-being and effortful control), child characteristics (easier temperament and fewer behaviour problems) and beneficial contextual factors (less household chaos, child-care support, and marital satisfaction) would predict better mother-child relationship quality. In addition, we examined the

independent contributions of each predictor to mother-child relationship quality and further tested whether the hierarchy of determinants of parenting (Belsky, 1984) would be present in the sample.

Method

Participants and Recruitment

Forty-five mothers (M_{age}= 34.78 years; SD_{age} = 3.86 years) and their first-born children ($M_{child\ age}$=32.26 months; SD_{age} = 6.27 months) were the participants. Twenty-six of the children were boys and 19 were girls. Mothers and their typically developing children were recruited via nurseries and social media (Facebook groups) in the south of England and were invited to participate in the third trimester of pregnancy (M= 33.43 weeks; SD = 4.45 weeks). All of the mothers were cohabiting with the father of the first-born child. Mothers were highly educated; 93.7% reported having an undergraduate degree or higher. 44/45 participants indicated their ethnicity as White, which reflects the population from which the sample was drawn.

Procedure

Prior to the home visit, mothers were asked to complete an online questionnaire. The visits were conducted by two researchers and lasted 90-120 minutes. The researchers were trained extensively, had DBS (Disclosure and Barring Service) checks (right to work with children) and had experience in the field. The mother-child relationship was measured by observation. Mother and child were invited to complete three play interactions all of which were videotaped; the researchers left the room. The play sessions were designed according to what is acceptable for this age range (Atzaba-Poria et al., 2014). All materials were provided by the researchers; a) Structured play (five mins): Mothers were asked to play with blocks to make a train, and two cups with a duck, hiding the duck under the cups and read a story with their child. b) Free play

(five mins): Mother and child were provided with several toys (e.g., dolls, doctor set, cars, blocks, etc.) and were given no instructions. c) Clean-up session (two mins); Mothers and children were asked to put away the toys together. d) New-born play (five mins): Mother and child were given toys designed to elicit talk and play about the arrival of the newborn a doll, with a bathing and feeding set. Mothers were also asked to complete questionnaires. After the visit, the researchers rated child temperament based on their observations during the visit.

Ethical issues

Ethical approval was gained before recruitment commenced. British Psychological Society (BPS) ethical guidelines were followed throughout the study and mothers provided informed consent.

Measures

Observer Ratings.

Relationship Quality. The scale of Relationship Quality of Dyadic Relationship Scales from the fifth edition of The IOWA Family Interaction Rating Scales (Melby et al., 1995) was used to measure relationship quality (RQ). A trained coder evaluated the quality of the relationship between the mother and child from low (0) to high (9). A lower score indicates an unsatisfying, uninvolved or a conflicted relationship while a higher score indicates a satisfying, warm, happy relationship. All four of the videotaped sections were coded separately. The average of the scores from the four sections constituted the overall RQ of the mother-child dyads. The reliability of the four sections was excellent (Cronbach $\alpha = .97$). The inter-rater reliability, the intra-class correlation for nine randomly selected families was $r = .65$.

Child Temperament. The two researchers who conducted the home visits completed a subset of items from The Early Childhood Behaviour Questionnaire (ECBQ) very short form (Putnam et al., 2006) to assess the temperament of the first-born child on three subscales negative affect, surgency and effortful control. After each visit, the researchers indicated and agreed together how often the child showed each behaviour during the visit on a 7-point Likert scale (1 = *never*, 7 = *always*). The internal reliability for surgency was poor, however, the correlation between negative affect and effortful control was high -.74, therefore we combined them by reverse coding negative affect and created an easy temperament score, final reliability was excellent (Cronbach α = .90). A sample item is "When engaged in play with his/her favourite toy, plays for more than 10 minutes".

Maternal Self-Reports.

Child Behaviour Problems. Child behaviour problems were measured using The Eyberg Child Behaviour Inventory (ECBI; (Burns & Patterson, 2000). The scale has 36 items in total and measures conduct problems, inattentive behaviour and oppositional defiant behaviour. In this study we used 34 items, we did not use the items related to siblings. Mothers rated each item on a 7-point Liker-type scale (1 = *never* to 7 = *always*), e.g., "Gets angry when does not get own way'' and ''Destroys toys and other objects''. The scores were summed to identify the intensity of the problems. Cronbach α was .89.

Maternal Effortful Control. Effortful control was measured using a 19- item subscale of the Adult Temperament Questionnaire short form (ATQ, (D. E. Evans & Rothbart, 2007). Mothers responded to each statement on a 7-point Likert-type scale (1

= *extremely untrue*, 7 = *extremely true*). A sample item is "I can make myself work on a difficult task even when I do not feel like trying." Cronbach α was .63.

Maternal Well-Being. The 21-item Depression Anxiety Stress Scales (DASS-21; (Crawford & Henry, 2003) was used to measure maternal well-being. Mothers rated how much each statement was true for them over the past week on a 4-point scale (0 = *did not apply to me at all*, 3= *applied to me very much or most of the time*). Scores were summed and then multiplied by 2 as the measure suggested. Sample items were "I felt down-hearted and blue'', ''I tended to overreact to situations'' and ''I felt I was close to panic". The scale reliability was excellent (Cronbach α =.86). Higher scores indicated more symptoms related to depression, anxiety, and stress.

Household Chaos. Mothers completed the short version of the Confusion, Hubbub, and Order Scale (CHAOS (Matheny et al., 1995). The 6-item scale measures household chaos on a 5-point scale (1 = *definitely untrue*, 5 = *definitely true*). An example item was "You cannot hear yourself think in our home." Initially, the Cronbach α was low .55, therefore we deleted one suggested item ("The children have a regular bedtime routine (same bed each night, a bath before bed, reading a story") (reverse-scored)), new α was .59.

Child-care Support. The Family Support Scale (FSS: (Dunst et al., 1988) was used to assess sources of support and how helpful the support was perceived to be. Mothers indicated how helpful each source was in raising their child on a 5-point scale (1 = *not at all helpful*, 5 = *extremely helpful*). The eight sources (my parents, my relatives, my friends, my partner's friends, my partner's relatives, my partner's parents, spouse or partner, other parents) as in the original scale were given, and "babysitter" was also added to the scale. Mothers were provided with a nonapplicable option if the

given support source was not available for them and if so it was coded as a missing variable. The Cronbach α was .75.

Marital Satisfaction. The Kansas Marital Satisfaction Scale (Grover et al., 1984), was used to measure marital satisfaction. Mothers rated how true three statements were for their feelings over the past month on a 5-point Likert scale (1 = *not at all*, 5 = *extremely*), e.g., "How satisfied are you with your marriage/your partner as a spouse and your relationship with your partner/spouse?". The scale had high reliability (Cronbach α = 94).

Results

The correlation tests indicated that demographic variables, child age, gender and maternal age were not associated with mother-child relationship quality. In order to test the hypothesis that better maternal resources, better child characteristics and better contextual factors predict better mother-child relationship quality bivariate correlations were conducted (see Table 1). Three of the correlations among the predictors were significant. More behaviour problems were related to more household chaos, easier child temperament was related to better maternal effortful control and mothers reporting more marital satisfaction also reported better well-being. Easier child temperament, better maternal well-being (fewer symptoms of depression, anxiety and stress), less household chaos, and more child-care support were linked with better mother-child relationship quality. On the other hand, maternal effortful control, child behaviour problems, and marital satisfaction were not associated with mother-child relationship quality.

In order to understand each predictors' contribution, a multiple regression analysis was conducted with the child's easy temperament, maternal well-being, household chaos, and support (see Table 2). The overall model was significant $F_{(4, 40)} = 4.32$, $p <$

.01 and 23% of the variance was explained. When all variables were in the model, child easy temperament ($B = .28$, $p < .05$), child-care support ($B = .24$, $p < .05$) and household chaos ($B = -.23$, $p < .05$) were significant predictors. However, maternal well-being was not significant.

Table 1

Descriptive and Correlations Among Variables

Variable	1	2	3	4	5	6	7	8
1. Relationship Quality		.35**	-.05	.17	-.29*	-.34*	.32*	.11
2. Child Temperament Easy			-.07	.27*	-.06	-.13	.11	-.05
3. Child Behavior Problems				.05	.10	.40**	-.09	-.07
4. Maternal Effortful Control					-.22	-.15	.09	.18
5. Maternal Well-Being						.21	-.24	-.39**
6. Household Chaos							-.05	-.14
7. Child-care Support								.13
8. Marital Satisfaction								
MEAN (SD)	7.90	4.65	115.6	4.66	7	1.85	3.33	4.30
	(1.01)	(1.18)	(20.24)	(.51)	(4.96)	(.55)	(.70)	(.59)
Range	4.75-9	2.42-6.75	60-170	3.63-5.68	0-22	1-3.20	1.86-4.6	3-5

Note: One tailed test were performed throughout. * $p < .05$, ** $p < .01$. $N = 45$.

Table 2

Multiple Regression Model

	t	p	B	F	df	p	$Adj\ R^2$
Overall Model				4.32	40	.005	.23
DV: Mother-child							
Relationship Quality							
C-Temperament	2.11	.020	.28				
Maternal Well-being	-1.25	.109	-.17				
Household Chaos	-1.71	.047	-.23				
Child-care Support	1.79	.040	.24				

Note. One tail tests was performed and standardized B values are reported. $N = 45$

Discussion

The study aimed to understand the predictors of mother-child relationship quality when expecting a second child. We expected three domains, maternal personal resources (well-being and effortful control), child characteristics (temperament and behaviour problems) and contextual factors (chaos, child-care support and marital satisfaction) to predict mother-child relationship quality. Importantly, we used observational methods to measure mother-child relationship quality and child temperament which provides objectivity, by reducing bias in self-reports. The results showed that better maternal mental well-being, easier child temperament meaning that better effortful control skills and lower negative affect, less household chaos and more child-care support were associated with better mother-child relationship quality. Furthermore, all of the predictors together explained 23% of the variance, and we revealed that child temperament skills and child-care support and household chaos provided an independent prediction of mother-child relationship quality.

The study contributed to the literature on mother-child relationship quality when expecting a second child. Considering the disruption in the mother-first-born relationship (Kojima et al., 2005; Taylor & Kogan, 1973; Teti et al., 1996) and first-born children's adjustment problems (Volling, 2017), we investigated all possible domains based on Belsky's model (Belsky, 1984) that may contribute to mother-child relationship quality. Belsky predicts that maternal personal resources will be most important to predict mother-child relationship, however, we demonstrated that child easy temperament and child-care support were the strongest predictors. Thus, while finding partial support for Belsky's overall model, we did not confirm his hypothesized ordering of parental well-being> support > child characteristics. In fact, we showed that

parental well-being is no longer a determinant when support, chaos and child temperament were in the model.

The results were consistent with previous literature suggesting that child temperament is related to the mother-child relationship (Gauvain, 1995). Our findings support and extend this work to observed maternal behaviour. Child-care support was operationalized as the number of support mothers perceive and how helpful they found each resource is in terms of child-care. We demonstrated that child-care support predicts mother-child relationship quality even after controlling for chaos, child temperament and maternal well-being. Previous literature has examined social support in general (Angley et al., 2015), and demonstrated an association with parenting. The results of the study show us the importance of practical child-care support when predicting mother-child relationship quality. There is however some evidence from previous research to support our finding. Material support such as helping in child-care and household jobs was helpful in the transition to siblinghood for mothers coping with first-born needs (Jordan, 1989). The current research extends the literature to show that child-care support predicts mother-child relationship quality during pregnancy prior to sibling arrival.

Finally, household chaos was a significant predictor after controlling for child-care support, maternal well- being and child temperament skills consistent with previous research (Marsh et al., 2020). However, since the reliability of the scale was low, the results should be interpreted carefully, and future studies should use a higher reliability scale. On the other hand, maternal well-being was not a significant contributor. Post hoc power calculations by using G*Power 3.1 (Faul et al., 2009) demonstrated good power of .80 with a medium effect size of the study ($f = .30$, (Cohen, 1977). Another important point to consider is that the sample was well-adjusted. Future

studies should aim to include a more representative sample of mothers. A very recent study demonstrated that lower parental effortful control and executive functioning predicted more negative parenting in homes with a moderate level of household chaos (Geeraerts et al., 2020). The more positive mother-child relationship could also be linked with better effortful control skills as well as less chaos in the house. Future studies with a larger sample size would enable more complex analyses like moderation.

The study has some limitations that imply further improvement for research on this topic. First of all, the sample size was relatively small. The sample of the study was also socially advantaged considering the fact that 93.7% of the mothers were highly educated. Future studies should aim to include larger and more diverse samples. Another issue is that the study aimed to have two-time points originally, to include a second-time point 4 months after the second child's birth. However, because of the COVID-19 pandemic, we had to stop home visits. It would be illuminating to test change in mother-child relations and predictors across at least two-time points. It is worth mentioning that the current research aimed to have paternal data too, but the contribution rate was very small, it is important for future studies to target fathers to have a complete picture. However, the current study does highlight the period of a second pregnancy, a critical and stressful time period for understanding mother-child relationships. Moreover, understanding correlates may help to develop interventions to improve mother-first-born relationships which seem to be disrupted in this transition.

Some practical suggestions for intervention emerge from the current study. To improve children's temperament like effortful control skills, some behavioural intervention might be rewarding the child after waiting for a desirable item, playing games that require attention and praising children for persistence in play. Finally, providing resources for child-care support may also improve mother-first-born

interaction when they are together. Improving mother-child relationship quality may

also benefit child outcomes as well as fostering more harmonious family functioning.

CHAPTER 5: Early Predictors of First-born Behaviours towards Newborn Siblings

Abstract

We investigated predictors of first-born behaviour towards their 4-month-old sibling and hypothesized that first-born gender and temperament, as well as marital quality and mother-child relationship, would predict sibling rivalry and positivity. Forty-six mothers (M_{age}= 34.78 years; SD_{age} = 3.86 years) and their first-born children ($M_{child\ age}$=32.26 months; SD_{age} = 6.27 months) living in the south of England were the participants. Mothers reported on marital satisfaction, partner responsiveness and first-born children behaviour towards newborn siblings and researchers rated first-born child temperament and mother-child relationship quality. The results showed that girls and children with easier temperaments tended to be more positive towards their newborn siblings, whereas better marital quality was associated with less sibling rivalry. The study extends the literature on early predictors of first-born children's behaviours toward their newborn siblings and may inform future intervention programs such that targeting marital quality and child temperament may decrease sibling rivalry.

Keywords: Sibling behaviour, child gender, temperament, marital quality

Introduction

One of the most influential relationships one can experience is that with their sibling. Siblings influence each other's development by being role models, as well as frequent social partners who engage in emotionally uninhibited interactions. (McHale et al., 2006). However, most family research has focused on marital and/or parent-child relationships. There is a need for further research on sibling relationships (Whiteman et al., 2011) considering early sibling relationship quality predicts long-term outcomes (Brody, 2004; Buist et al., 2013; Dunn et al., 1994). Even before the relationship occurs, parents question how their first-born child will react to a sibling and how they can make this transition smoother. In order to better understand these factors, we investigated the early predictors of first-born behaviours towards newborn siblings.

The Sibling Relationship

Sibling relationships in the early years are essential for child adjustment (Dunn et al., 1994) and related to well-being across the life course (Brody, 2004). Interest and affection shown to an infant brother/sister predicted positive sibling interactions a year later (Dunn & Kendrick, 1982). A recent study also demonstrated that first-born children tend to show behaviour problems just after the sibling arrives (Volling, 2017). Furthermore, children demonstrated antagonistic behaviour toward 4 month-old siblings (Oh et al., 2015). In order to prevent first-born's possible negative behaviours and improve the sibling relationship, predictors should be investigated. Existing research has focused more on first-born's adjustments problems after sibling arrival rather than on behaviours toward newborn siblings specifically. The current study addresses these firstborns' very early behaviours toward their siblings just months after the birth.

Predictors of Sibling Behaviour

We suggested four domains as predictors, first-born gender, temperament, marital quality, mother-child relationship quality. Firstly, there is evidence to suggest girls show more empathy and nurturing behaviours towards siblings (Cicirelli, 1996) and more sibling support than boys (Milevsky et al., 2007). In addition, girl-girl siblings demonstrate the better quality of attachment compared to boy-boy and girl-boy sibling pairs (Buist et al., 2002). Most of the evidence is coming from school-aged children and adolescents, such as female adolescents indicated more warmth towards the siblings than males (Milevsky, 2005). Therefore, it is important to understand how gender could be related at the very beginning of the sibling relationship to fill the gap in the literature. Secondly, temperament of a first-born has been found to be linked with sibling relationship quality, older siblings with negative mood and non-distractibility were less likely to join pretend play with younger siblings (Munn & Dunn, 1989), difficult temperament was associated with difficulties in sibling relationship (Stoneman & Brody, 1993). More recent research supported that less difficult temperament is associated with positive sibling relationships (Volling, 2003). In addition, child effortful control was linked with more positive feelings towards siblings before the birth (Chen et al., 2018). Therefore, we expected that children with less difficult temperaments and girls would have more positivity and less sibling conflict.

Situated in family systems theory (M. Bowen, 1978), where relationships within a family are influenced by other family members, and social learning theory (Bandura, 1977), states that children take role models of their families' behaviours, we suggested that two types of relationship would predict first-born behaviour towards a newborn sibling, which are marital quality and mother-firstborn relationship. Firstly, mother-child relationship quality is linked with sibling relationships, as suggested by

researchers, children may model parental behaviours in their relationship with their siblings (Pike et al., 2005). Furthermore, researchers came up with a cross-system contagion model, which suggests that negativity in a relationship in the family, especially parent-child interaction, often reflects on sibling relationships (Bank et al., 2004; Patterson, 1984). Further studies supported the model such as negative mother-child relationship quality was associated with sibling conflict in 10-12 aged boys, which later predicted antisocial behaviour (Criss & Shaw, 2005) and parental and sibling negativity are highly related (Feinberg et al., 2005). On the other hand, with a positive functioning family, older siblings tend to have positive interactions with younger ones (Brody et al., 1992). We expected in our sample, more positive mother-child interactions to relate to more positive sibling behaviour and less rivalry.

Lastly, we proposed marital quality, to predict first-born child's behaviours toward newborn siblings. Based on social learning theory (Bandura, 1977), which states that families are models for social learning, and it is suggested that parents who are loving, affectionate and warm towards each other, could be taken as role models by children so that they would be warm and loving towards siblings (Whiteman et al., 2011). Therefore, we proposed that older siblings would reflect what they observe in their parents' relationship, with their siblings. For example, marital hostility was associated with an older sibling's negative attitude towards a younger one (Dunn et al., 1999) and marital satisfaction predicted sibling positivity and negativity a year later (Brody et al., 1994). Further studies have also confirmed a link between parental divorce and sibling relationships (Riggio, 2000, 2001). On the other hand, how children perceive their parents' marital satisfaction is related to positive sibling outcomes, such as closeness and support (Milevsky, 2004). Further research showed that good relationship quality between parents could be protective in sibling relationships such as

higher relationship quality predicted how well older siblings regulate their jealousy towards younger ones during mother interactions (Volling et al., 2002). In the current study, we expected better marital quality, to predict more positivity and less conflict in older siblings' behaviours towards younger ones.

The study

The purpose of the current research was to examine the early predictors of first-born child behaviour toward their siblings four months after birth. We hypothesized that girls as well as those with easier temperaments would display more positivity and less rivalry toward their newborn siblings. Based on social learning, family systems theory and previous literature, we further hypothesized that positive mother-first-born relationships and better marital quality would also predict more sibling positivity and less rivalry.

Method

Participants and Recruitment

The participants of the study were 45 mothers ($M_{\text{age}}= 34.78$ years; $SD_{age} = 3.86$ years) and their typically developing children ($M_{\text{child age}}=32.26$ months; $SD_{age} = 6.27$ months, 26 boys and 19 girls). Participants were contacted and recruited via Facebook groups and by emailing several nurseries in the south of England. Mothers were cohabitating with the father of the first-born child and were highly educated; 93.7% reported having an undergraduate degree or higher. Forty-four of the mothers indicated their ethnicity as white.

Procedure

The study had two-time points. At Time 1; mothers were in their third trimester of pregnancy ($M= 33.43$ weeks; $SD = 4.45$ weeks), and Time 2 was scheduled 4 months after the due date.

Time 1

The Time 1 data was composed of home visits. The visits were conducted by two extensively trained researchers and lasted 90-120 minutes. Mothers were asked to complete an online questionnaire prior to the home visit. During the home visit, mothers and their children were invited to complete play sessions, which were videotaped and coded after the visits. The play sessions consisted of three play interactions that were suitable for this particular age (Atzaba-Poria et al., 2014). Researchers provided all toys. Play sessions each lasted five minutes; 1) Structured play: Mothers and their children were invited to play in an ordered session demonstrated by the researcher; making a train with some blocks, hiding a duck under two cups and a small story to read 2) Free play: The session consisted of age-appropriate toys (e.g., cars, doctor set, dolls etc.) and mother and child were asked to play however they usually play 3) Clean-up session: This session lasted two minutes and mother-child dyads were asked to put the toys away together 4) Newborn play: In this session, they were provided with the newborn doll and feeding and bathing set, designed to elicit play about the arrival of the baby. Later on, mothers were interviewed and completed several questionnaires. When the visit was completed, the two researchers agreed on ratings of the child's temperament.

Time 2.

The procedure of the Time 2 data collection was similar to Time 1 with an additional questionnaire about the new sibling relationship. However, we had to stop home visits due to COVID-19. Therefore, we sent mothers the questionnaires online; all Time 2 data was maternal self-reports. The only Time 2 measure that was used in the analysis was sibling relationship quality.

Ethical issues

British Psychological Society (BPS) ethical guidelines were followed throughout

the study. The necessary ethical approval was gained from the University and mothers

gave informed consent. The researcher also had the right to work with children and

families checks (DBS; Disclosure and Barring Service).

Measures

Observer Ratings

Mother-child Relationship Quality. The fifth edition of The IOWA Family

Interaction Rating Scales (Melby et al., 1995) was used to measure mother-first-born

relationship quality. More specifically, the Relationship Quality of Dyadic Relationship

coding was used. Another researcher who did not conduct the visit was trained and the

inter-rater reliability between two researchers for nine families, who were selected

randomly, was $r = .65$. The trained unbiased researcher evaluated the interactions

between mother and first-born dyads, from 0-9 (low to high). Overall, higher scores

mean a positive, warm, satisfying and happy relationship whereas lower scores mean a

more negative, unsatisfying and conflicted relationship. All of the sections in mother-

child interaction sessions were coded separately and the mean scores represent M-C

relationship quality. The reliability of the scale across the four play sessions was

substantial (Cronbach $\alpha = .97$).

Child Temperament. The researchers completed a subset of items from The

Early Childhood Behaviour Questionnaire (ECBQ) very short form (Putnam et al.,

2006) that measures the temperament of the first-born child on three domains; effortful

control, surgency, and negative affect. The reliability of the surgency scale was very

low, therefore we ended up not using it in any of the analyses. The frequency of the

observed behaviour was rated on a 7-point Likert scale (1 = never, 7 = always). The correlation between effortful control and negative affect was -.74, *p* < .05. We combined effortful control and negative affect (reverse-scored) and created a temperament score with the final internal reliability of Cronbach α = .90. Sample items were "When engaged in play with his/her favourite toy, plays for more than 10 minutes; while having trouble completing a task (e.g., building, drawing, dressing), how often did the child get easily irritated?". Higher scores indicated easier temperament.

Questionnaires

Marital Quality. To have a picture of marital quality we used two questionnaires; The Perceived Partner Responsiveness Scale (Reis et al., 2017) and The Marital Satisfaction Scale (Grover et al., 1984). The correlation between the two was .72 and significant p < .05, due to this substantial correlation, the two scales were averaged to create a single marital quality scale. The Perceived Partner Responsiveness Scale had 18 items. Mothers indicated how much each statement reflects their partner on a 9-point scale (1= *not at all true*, 9= *completely true*). An example item from the scale is "My partner is responsive to my needs". The internal reliability of the scale was excellent Cronbach α = .96. For marital satisfaction mothers rated how true three statements were for their feelings over the past month on a 5-point Likert scale (1 = *not at all*, 5 = *extremely*), on Kansas Marital Satisfaction Scale. A sample item is "How satisfied are you with your relationship with your partner/spouse and your marriage/your partner as a spouse?". The scale had high reliability (Cronbach α = 94).

Sibling Relationship. In order to measure the relationship between siblings, the Sibling Relationship in Early Childhood (SREC; Volling et al., 2002) scale was used. The scale has 18 items, and mothers indicate how much the statements describe the feelings and behaviours of their first-born child toward his/her sibling on a 5-point

response format (1 = *never,* 5 = *always*). The scale had three sub-scales, positive involvement, conflict and rivalry, and avoidance. Sample items (respectively) included "Accepts sibling as a playmate", "Feels jealous of brother/sister" and "Is happy when brother/sister goes away". The internal reliability of sibling positivity was .90, sibling rivalry was .65 (after removing the item 'Bosses or tells sibling what to do') and avoidance was very low .48, therefore we did not use it in the main analysis.

Results

The demographic variables, such as children age and maternal age were not associated with sibling positivity or sibling rivalry except first-born's gender. First-born's gender was related to sibling positivity, girls tended to be more positive towards newborn siblings. Table 1 depicts descriptive statistics and correlations among study variables. Sibling rivalry was not related to sibling positivity. Child temperament was also linked with sibling positivity, first-born children with easier temperament were more positive towards their baby sibling. Finally, marital quality was correlated with sibling rivalry, better marital quality was linked with less sibling rivalry. Mother-first-born children relationship quality (m-c relationship quality) was related to child temperament. Easier temperament was linked with more positive mother-first-born relationship quality.

Table 1

Descriptive Statistics & Bivariate Relations

Variable	*1*	*2*	*3*	*4*	*5*	*6*
1. Sibling Positivity		-.02	.31*	-.07	.32*	.17
2. Sibling Rivalry			-.24	-.31*	-.15	.06
3. First-born Temperament				-.04	.22	.41**
4. Marital Quality					-.11	-.04
5. First-Born Gender						.22
6. M-C Relationship Quality						
Mean	29.4	7.67	4.75	5.81	.4	7.88
(SD)	(5.7)	(2.2)	(1.2)	(.3)	.9	(1.0)
Range	12-40	4-15	2.4-6.7	3.6-7.3	0-1	4.7-9

Note. One tailed tests were performed throughout * $p < .05$, ** $p < .01$, for gender 0 =boys 1 =girls, N = 41-46.

In order to understand each variable's unique contribution to siblings' behaviour, a series of multiple regression analyses were conducted (See Table 2). When marital quality, m-c relationship quality, first-born gender and temperament were in the model to predict sibling rivalry, the overall model was significant $F (4, 36) = 2.98$, $p < .05$ and 16% of the variance was explained. Only better marital quality was a significant predictor of less sibling rivalry ($B = -.44$, $p < .01$). Therefore, when controlled for m-c relationship quality, first-born gender and temperament, the marital quality provided an independent prediction of the first-born's rivalry/conflict behaviour towards a newborn sibling.

For sibling positivity, the entire model was also significant $F (4,36) = 2.90$, $p < .05$ and 16% of the variance explained by the variables. Amongst the variables of marital quality, first-born gender and temperament, and m-c relationship quality, only first-born gender provided an independent prediction of sibling positivity; girls showed more positive behaviours towards newborn siblings ($B = .36$, $p < .05$). Thus, it means that the first-born gender predicted positivity towards newborn siblings above and beyond marital quality and first-born temperament.

Table 2

Multiple Regression Models for Sibling Behaviour

	t	*p*	*B*	*F*	*df*	*p*	*Adj R²*
Sibling Rivalry							
Overall Model				2.98	36	.016	.16
Marital Quality	-3.03	.002	-.44*				
First-Born Temperament	-1.15	.178	-.18				
First-born Gender	-1.00	.166	-.15				
M-C Relationship Quality	.92	.186	.15				
	t	*p*	*B*	*F*	*df*	*p*	*Adj R²*
Sibling Positivity							
Overall Model				2.90	36	.017	.16
Marital Quality	-1.08	.142	-.16				
First-Born Temperament	1.52	.068	.24				
First-born Gender	2.39	.011	.36*				
M-C Relationship Quality	-.08	.468	-.01				

Note. Standardized B values are reported. One tailed test were performed throughout.

Discussion

Despite its long-lasting importance in many people's lives, sibling relationships have not been widely investigated (Whiteman et al., 2011). In the current study, we aimed to investigate very early determinants of first-born behaviour towards the siblings 4 months after the birth. We hypothesized that older siblings' temperament, gender, marital quality, and m-c relationship quality, would predict firstborn behaviours towards newborn siblings. Our hypothesis was partially supported; girls and children with easier temperaments tended to show more positivity towards the newborn siblings, as well as better marital quality, predicted less rivalry first-born behaviours toward siblings. There are some strengths of the study. Firstly, we used observational data to measure a child's temperament, to increase objectivity and reduce possible bias in maternal self-reports. Furthermore, the study was longitudinal, providing strong predictions.

Finding that girls tend to have more positivity toward the newborn siblings, is consistent with previous literature suggesting that girls have more nurturing and empathetic behaviour towards their siblings and are more bonded (Buist et al., 2002; Cicirelli, 1996). We further replicated the literature on temperament links with sibling relations (Munn & Dunn, 1989; Stoneman & Brody, 1993; Volling, 2003), showing that easier temperament predicted more positive sibling behaviour. When all variables were in the model though, only first-born gender was predictive of sibling positivity, which shows the first-born gender is important above and beyond temperament to predict first-born behaviour towards a newborn sibling. In terms of sibling rivalry though, there was not a significant difference between girls and boys or easy and difficult temperament children.

Finally, we also supported previous findings on relationship quality amongst parents reflected on sibling relationships (Volling, 2012). Mothers who reported their relationship satisfaction high and partner responsive also indicated that their first-born was less in conflict towards 4-month old siblings. However, we did not find any association between m-c relationship quality and first-born behaviour towards a newborn sibling. It is important to note here, paternal data would not only help us to have a complete family picture but also could have provided unique results, considering the finding from the literature that paternal relationship accounted for sibling relationship quality more often than mothers' behaviours (Brody et al., 1992). Moreover, studies based on a cross-system contagion model, tend to focus on negativity transfer (Bank et al., 2004; Criss & Shaw, 2005; Feinberg et al., 2005; Patterson, 1984). In contrast, our hypothesis however was for positivity transfer, meaning that higher quality in mother-child interaction to be transferred in sibling behaviour. Considering our sample was also socioeconomically advantaged, 93.7% of the mothers were highly educated, and most of the literature is coming from low socioeconomics background families, future studies looking at both positive and negative dimensions of the mother-child relationship in representative samples would be essential.

The study contributed to the literature on studying sibling relationships at very early stages. The findings highlighted the importance of studying early first-born behaviours toward siblings to understand the origins of sibling relationships and increasing family complexity. To our knowledge, there has not been any research suggesting perceived partner responsiveness as a predictive of sibling relationship quality, so based on social learning theory (Bandura, 1977), we proposed marital quality is an important predictor of the sibling relationship and showed that it predicts less sibling conflict longitudinally.

We acknowledge some limitations of the study, such as the sample size was low so results should be interpreted carefully. Additionally, the sample was not very representative, so the results are not generalizable to the entire population. Although the study had two-time points, we could not conduct home visits at the Time 2 due to the COVID-19 pandemic. Ideally, having observational data at the second time point too would be better in terms of reducing the bias in maternal self-reports. Furthermore, in the study we only measured maternal reports about partners responsiveness and marital satisfaction, having fathers' perspective on their perception of how their partners treat them would be important and ideal. However, although we invited fathers to the study as well, 50% agreed to participate.

Importantly, the study shows the importance of child gender, temperament and marital quality to determine sibling relationship quality. The findings give promise for several intervention studies and future research on early sibling relationships. Considering the results of the study, one target intervention could be simply boosting marital quality, e.g., partner responsiveness, and child's temperament, such as effortful control skills, to improve first-born behaviours toward sibling so therefore future sibling relationship. In conclusion, parents' relationship with each other as role models predicts how their first-born child react to newborn siblings along with child temperament and gender. Therefore, when wondering how family dynamics will change in response to having a second child, in other terms how siblings get along, parents can work on their relationship.

CHAPTER 6: General Discussion

This thesis contributes to the literature on the arrival of the second child to the family, focussing on the perinatal period. Welcoming another child to the existing family structure can be stressful, especially for mothers who shoulder much of the child-care and might be suffering from prenatal mental health difficulties. Focusing specifically on maternal mental health was a novelty of the study and contributes to health psychology as well as family psychology.

Understanding mental health is the main focus of psychology. By investigating maternal internalizing problems when mothers were pregnant (Chapter 3), and mothers of twins (Chapter 2), I found that depression, anxiety, and stress are differentially linked to different variables, confirming the need to focus on each dimension separately. In addition, the relationship between mothers and first-born children is often disrupted in this transition (Kojima et al., 2005; Teti et al., 1996). Therefore, investigating the predictors of relationship quality between mothers and their first-born children, even before the newborn baby sibling arrives, is important. We suggested several predictors that we believe can contribute to the literature on mother-child relationship quality during this transition (Chapter 4). Finally, understanding first-born children's behaviours toward their newborn sibling is important for a smooth transition and to set the stage for a positive sibling relationship; in Chapter 5 we examined predictors of first-born children's positive and rivalrous behaviours toward their newborn siblings.

This chapter includes a brief summary of the results, followed by the cross-cutting themes of differentiation of maternal internalizing symptoms and family transition from 3 to 4. Next, I outline the theoretical and practical implications of the findings, followed by limitations and future directions, and finally a conclusion.

Summary of the Results

I have examined correlates of maternal mental health and family relationships in the context of families with twin children and families expecting their second child. The thesis consisted of four empirical papers, stemming from two studies. Chapter 2 used data from the 'Twins, Family and Behaviour Study' (TFaB), Chapters 3-5 used the data collected throughout my PhD for the study 'From 3 to 4; Arrival of the Second-Born'. In Chapter 2, the results showed that for mothers of twins, depression, anxiety, and stress were associated with household chaos, and child behaviour problems were related to depression and stress but not anxiety. I further investigated the internalizing symptoms of depression, anxiety, and stress in Chapter 3 with mothers pregnant with their second child. The multiple regression analysis demonstrated that marital satisfaction was associated with less anxiety, and co-parenting was associated with less depression and stress. Belsky's Determinants of Parenting theory was tested to understand the predictors of mother-child relationship quality in Chapter 4. Results demonstrated that better maternal mental health, more child-care support, easier child temperament and less household chaos were all correlated with more positive mother-child relationship quality. Further analysis showed that easy temperament of children, more child-care support and less household chaos provided an independent prediction of mother-child relationship quality. Finally, in Chapter 5, the predictors of first-born behaviours toward newborn siblings were explored. The results showed that children with easier temperament, and girls, demonstrated more positive behaviour toward newborn siblings. In addition, marital quality predicted first-born rivalrous behaviour toward the newborn sibling.

Cross-Cutting Themes

Maternal Mental Health: Differentiation of Internalizing Problems

Research on maternal mental health has largely focused on single aspects, most often depression, because of its association with children's development and the mother child-relationship (Lovejoy et al., 2000; Quevedo et al., 2012). Other studies have examined depression, anxiety and stress as a composite score (Belsky & Jaffee, 2015). When considering maternal internalizing problems in this thesis, (Chapter 2 and 3), I investigated depression, anxiety and stress separately and showed that maternal depression and stress were predicted by household chaos and child behaviour problems (Chapter 2), and perinatal depression and stress were predicted by co-parenting whereas perinatal anxiety was predicted by marital satisfaction (Chapter 3).

Therefore, I have supported theories such as the Tripartite Model of Anxiety and Depression (Clark & Watson, 1991), separating depression and anxiety as levels of negative and positive affect, also supporting proposals that internalizing problems are not monolithic. More importantly in Chapter 3, the critical stage of a second pregnancy was tested, when mothers also have another child to take care of. Considering the huge cost of perinatal mental health to the society, around £8.1 billion per annual cohort of births in the UK (Bauer et al., 2014), and its serious detrimental outcomes like child maltreatment, prematurity and mortality (Ayers, Bond, et al., 2019; Grote et al., 2010; Staneva et al., 2015), understanding the predictors of separate dimensions of internalizing problems is important for treatment as well as prevention.

Chapters 2 and 3 investigated predictors of maternal depression, anxiety, and stress with somewhat overlapping constructs. For example, household chaos was linked to depression, anxiety, and stress of twin mothers (Chapter 2) whereas it was not related to any internalizing symptoms of pregnant mothers expecting their second children

(Chapter 3). Similarly, child behaviour problems were associated with depression and stress (Chapter 2) for mothers of twins, but the same link was not found for the 'From 3 to 4; Arrival of the Second Child' study in Chapter 3. However, when we look at the findings of Chapter 3, marital satisfaction and co-parenting (not included in Chapter 2) were found to be significant predictors. These findings suggest that different family structures can moderate links with internalizing problems. For example, the organization in the home when parenting twins may be more important than when parenting only one child. Also, sample characteristics are different, including the age group of children in the two samples, the age of twin children were ($M_{\text{child age}}= 6.01$ years; $SD_{age} = 0.50$) and children in Chapter 4 were aged ($M_{\text{child age}}=2.68$ years; $SD_{age} =0.52$). It may be that the same variables can still relate to the same outcome in different contexts such that, if we can do a follow-up study with the arrival of the second-born sample, we may see household chaos predicting maternal mental health when both children are older and more physically active.

Family Transition: 3 to 4 Arrival of the Second Child

Another main purpose of this thesis was to understand the family dynamics during the transition to having a second child, and how those dynamics change and shape just after the birth of a baby. Specifically, I sought to understand the protective and risk factors for better family relationships and individual well-being. Often parents focus on how to prepare the firstborn for the arrival of the baby. There are lots of children's books devoted to the topic and research has focussed on what happens after the baby arrives (Oh et al., 2015; Volling, 2012). We studied before the birth of the baby as well as soon after the arrival. The findings from Chapter 3 suggested that marital satisfaction and co-parenting may be considered protective factors for maternal mental health by possibly reducing internalizing symptoms of depression, anxiety, and stress during a

second pregnancy. Furthermore, several factors were proposed that may foster positive

mother-child relationships that are at risk of disruption during the transition to having

another child (Kojima et al., 2005). Children's easy temperament was identified as the

most important protective factor. First-born children's temperament was also important

for relationship building, as it was predictive of first-born children's positive behaviours

toward their new siblings (Chapter 5). In the same study, low marital quality was

suggested as a risk factor for first-born rivalrous behaviour toward the newborn sibling.

The findings have contributed to the literature and research on family dynamics

during this normative stressful family transition. These findings are promising for

intervention studies to prevent and treat maternal internalizing problems as well to

improve mother-child relationships and to have a smoother transition when expecting a

second child.

Implications of the Thesis

Theoretical Implications

This section will address how the findings of the papers align with Bowen's

Family Systems Theory and the Spillover Hypothesis, Bronfenbrenner's Ecological

Model, and Belsky's Determinants of Parenting Model and as well as providing specific

implications of the results for theory development.

The Family Systems Theory and the Spillover Hypothesis. Situated within

Family Systems (M. Bowen, 1978) and the Spillover Hypothesis (Engfer, 1988), the

thesis supports and highlights the interdependence of family relationships and emotional

transference, that members within a family are interdependent and the emotional quality

of one familial relationship transfers to other familial relationships. For example, in

Chapter 5, we showed that marital quality predicted child behaviour towards newborn

siblings. Children may have learned behaviours from parents toward each other, through

observation and imitation, influencing their behaviours toward the newborn sibling. Spillover of emotions can be seen in Chapter 3, in which we demonstrated that the quality of the marital relationship was associated with maternal internalizing symptoms. This finding aligns with the family systems proposal that the psychopathology of a family member can be a result of disturbed family relations (Kerig, 2011).

The interesting interdependence that we expected but did not find was marital satisfaction to the mother-child relationship in Chapter 4. We expected maternal emotions about their relationship with their partners to "spillover" to their relationship with their child, as has been reported in previous research (Krishnakumar & Buehler, 2000; Tanner Stapleton & Bradbury, 2012). Another interdependence that we did not replicate was from the mother-child relationship to sibling behaviour in Chapter 5. Based on the Spillover hypothesis and previous literature, we expected mother-child relationship quality to be reflected in sibling behaviour (Bank et al., 2004; Patterson, 1984, Pike et al., 2005). The lack of significant associations in our sample might be due to the previous studies having focussed on middle childhood (Criss & Shaw, 2005) and also sibling relationship quality rather than first-born's behaviours towards a newborn.

In Chapter 5, a spillover from the marital relationship to sibling behaviour was supported; higher marital quality predicted less sibling rivalry. The results are particularly important because the transition to having another child can be very stressful for some families, often because of the first-born children's reaction and behaviour toward the newborn, like jealousy and hostility (Volling, 2012). One aspect that has been understudied is parents' partner/spouse relationship quality. Therefore, finding the emotional transference from the marital relationship to first-born children's behaviours toward siblings gives promise for future research and implications to eliminate and prevent adjustment problems that first-born children can face and foster a

smoother transition for families. Furthermore, the finding also adds to the current theory development in terms of putting emphasis on spillover from the marital relationship to the sibling relationship, whereas the focus in previous literature has largely concerned spillover from the marital to parent-child relationships, or from parent-child to sibling relationships.

Ecological Model. The thesis also provided further support for Bronfenbrenner's ecological model (Bronfenbrenner, 1996). As outlined in the introduction, the model proposes that individuals and family relationships should be understood within the larger environmental context. The microsystem relationships investigated were the marital relationship and mother-child relationship. In this thesis, household chaos and child-care support were highlighted environmental factors also in the microsystem that related to the quality of the mother-child relationship. Although many recent studies have included household chaos, studying it in the context of expecting a second child is a novelty of the thesis. Another novelty was examining mothers' perceptions of child-care support specifically, which might have been underestimated in the literature which has focussed on social support more generally (Angley et al., 2015). As Bronfenbrenner suggests, the results also support that the environmental context is important and those specific aspects may be more or less important at different stages in the family life cycle. The mesosystem, exosystem and macrosystem were not investigated in this thesis, because we considered that the most important factors were the immediate environment, and the study focused on a single culture: British-English. Considering that cultural norms moderate parenting (Bornstein, 2012), the results, therefore, are culturally specific and may not generalize to different cultures. The systems that were tested in the thesis provides a novel approach to studying family systems within the ecological model when transitioning to stressful periods by studying only the closest

environment, the microsystem. The focus on a stressful transition highlights that Bronfenbrenner's Ecological framework could be extended to include the dimension of time.

The theory emphasises the importance of one's surroundings, such as home environment, support, and child behaviour problems to maternal mental health. However, it is also probable that maternal internalizing symptoms also contribute to the home environment, support, and child behaviour, therefore suggesting interdependence. I will discuss the bidirectionality of outcomes later in the limitations section.

Determinants of Parenting. In Chapter 4, Belsky's determinants of parenting theory was applied to the sample of mothers pregnant with their second child and their first-born children. Partial support for Belsky's determinants of parenting was found, such that all three domains (maternal mental health, childcare support and child temperament) were correlated with mother-child relationship quality. However, the hierarchy that Belsky proposed, parental well-being (psychological resources)> contextual resources of support > child characteristics (mainly temperament) was different in this study. In fact, maternal internalizing problems (a total score of depression, anxiety and stress), which Belsky proposed as the most important variable, was not a predictor when household chaos, childcare support, and child temperament were introduced to the model. In addition, child temperament provided the strongest prediction followed by childcare support. On the other hand, marital satisfaction was associated with maternal well-being in the same study ($r = -.39$, $p < .05$), aligning with Belsky's suggestion that marital relationships influence maternal well-being (Belsky, 1984). Therefore, the results might be due to some mediating variables in between such as maternal internalizing problems, as Belsky suggests, from maternal satisfaction to maternal well-being to mother-child relationship quality. However, we did not formally

test mediation because of the small sample size of the study. It is also important to note that our sample characteristics, mothers pregnant with their second child and having 2-3 year old first-borns, were different to most previous studies. In terms of theory development, the results may imply that during stressful periods such as the transition to having another child, mother-child relationship quality may be predicted more so by child temperament and child-care support, than is the case during less stressful periods. The findings require further replication with larger and more generalizable samples.

Practical Implications

The papers in the thesis lead to several practical implications. Chapters 2 and 3 suggest several implications for interventions to improve maternal mental health. The target variables, by looking at the results of both papers, were household chaos, child behaviour problems, co-parenting and marital satisfaction. By examining individual items, household chaos could be targeted; for example, by reducing screen time at home, having a regular bedtime for children, and more organized daily routines such as regular mealtimes. Intervention studies supported our finding of co-parenting predicting depression and stress and showed that symptoms of parental depression and stress decrease when co-parenting skills are improved (Feinberg et al., 2010; Feinberg & Kan, 2008). Furthermore, this research showed that these interventions may be useful for prenatal stages, in which mothers tend to develop more mental health problems (Lee et al., 2007). Thus, skills and techniques of co-parenting may be improved through intervention to achieve better mental health outcomes as well as improved parenting and child outcomes. Finally, the results also suggest that couple therapies designed to improve marital satisfaction may also lead to improved parental well-being.

The findings reported in Chapter 4 suggest targets to improve mother-child relationship quality. Improving child temperament such as boosting effortful control

skills, providing more child-care support for families, and reducing household chaos may improve mother-child relationship quality. Temperament is conceptualized as stable across time and situation, but in fact, studies show that children's effortful control skills can be fostered (Chang et al., 2015; Gauvain, 1995). Child temperament was also a predictor variable in Chapter 5, such that easier child temperament was related with more positive first-born's behaviour toward a newborn sibling. Easier temperament in this work is operationalized as better effortful control and less negative affect. Effortful control can be a fruitful target to intervene. Playing games to improve executive functioning and attention or, when waiting for a desirable item, praising for waiting and controlled behaviour, are all concrete ways to foster effortful control. For example, children's effortful control skills were improved by interventions designed to improve proactive parenting and mothers' verbal scaffolding. These interventions, carried out at age 3, promoted children's executive processing and problem solving skills in later years (Chang et al., 2015; Landry et al., 2002).

Chapter 5 contributes to the sibling relationship literature by investigating very early determinants of first-born behaviour toward a new sibling; and again suggested several implications, concerning the significant predictors of child temperament and marital quality. Previous research suggests that many first-born children show problematic behaviours and unfriendly attitudes towards siblings during the transition to siblinghood (Oh et al., 2015; Volling, 2017). These first sibling behaviours could be targeted in interventions designed to improve 2-3 year old's behaviour. Traditional parenting interventions may be particularly beneficial before the arrival of the second-born. In addition, the results demonstrated that another aspect that could be targeted is marital quality. Parents often ask how to prepare their firstborn for the arrival of the baby. Parents can be encouraged by knowing that focussing on strengthening their

marital relationship is key to this preparation. Therapeutic settings can focus on couple therapies in which boosting the satisfaction and responsiveness between partners is the main goal, and these benefits may spillover to the entire family system.

Limitations and Future Directions

The first study that was included in the thesis used a twin sample; these same study questions should be replicated with non-twin samples to ensure generalizability. The sample also lacked diversity, with 71.3% of mothers having higher education and almost all of which were white - British. 'From 3 to 4; the arrival of the second-born' study had similar limitations, with 93.7% of the mothers being educated at university level and almost all of the sample being white - British. This might have also reflected in the results such that for internalizing problems, few mothers reported clinically relevant levels, as well as for mother-child relationship quality the mean indicated very good relationship quality. Future studies should include more diverse population-based samples, and with larger sample sizes. The sample sizes for Chapters 3-5 ($N = 45$-51) were low, however, the power of the study was sufficient: 80% power to detect medium effect sizes $f = .30$, (Cohen, 1977).

Another limitation was that questionnaire data was from a single source which might bias the findings. For this age group, the next best source of information would be fathers, especially as many of the constructs were related to fathers too, such as marital satisfaction. Having paternal data and multi-informant scores on variables like co-parenting, marital satisfaction, household chaos and child behaviour problems, would provide a more robust measurement. In addition, paternal well-being and the father-child relationship are important aspects of family dynamics, considering the recent literature concerning father-child relationships and how paternal involvement is related to positive outcomes for children and promotes development (Adamsons, 2013;

Jethwani et al., 2014). Thus, it is acknowledged that the lack of paternal data is a disadvantage of the thesis. Initially, we planned to invite fathers to our study as well, but considering the logistics, and already lengthy home visits, we decided to ask fathers to complete only one online questionnaire. However, even with reminders, only 50% of the fathers completed the study questionnaires. Future research can and should overcome this limitation of the study by recruiting more fathers. One way to encourage fathers to contribute to research could be by focusing on the importance of fathers specifically, instead of the main focus being on mothers and children only. Additionally, we asked fathers to complete the questionnaire in their own time, rather than booking a home visit with fathers. However, trying to arrange all those logistics would have required substantially more resources than what was available. On the other hand, we have used researcher assessed observational data for mother-child relationship quality and child temperament to eliminate bias in self-reports and to provide more objective measures. In order to measure mother-child relationship quality, I trained a research assistant, who was blind to home visits, thus reducing bias, and she coded recorded mother-child interactions. We also evaluated child temperament based on our observations during the home visit. Therefore, these two constructs were measured with minimal bias, with families in their natural home environment.

Originally, we planned to conduct home visits at the second time point, but due to the COVID-19 outbreak, this was not possible. Instead, parents were sent online questionnaires, providing a longitudinal element.

It would be ideal to include multiple home visits including several time points across the transition period. Still, an important contribution of the study was having both time points and examining what predicts first-born behaviour toward their newborn sibling, therefore providing prediction across time rather than cross-sectional

associations. Furthermore, although there is research that links the sibling relationship, with long-term outcomes (Brody, 2004; Buist et al., 2013), there is still a need for more research on siblings relationships because the vast majority of family studies focus on the parent-child relationship (Whiteman et al., 2011). Thus, we have contributed to the sibling relationship literature by investigating very early precursors of the relationship. A possible follow-up study to observe how the families are settling in and to observe sibling interactions beyond infancy would be a valuable future direction.

The possible bidirectionality of several measures can also be investigated in future longitudinal research. To begin with, child behaviour problems were related to maternal mental health (Chapter 2), but there are also findings in the literature suggesting mothers with mental health problems put children at risk of developing problematic behaviours more than mothers without mental health problems (Radke-Yarrow et al., 1992). Furthermore, mother-child relationship quality (Chapter 4) may also predict mother-father relationship quality, child temperament and maternal well-being. It would be interesting to be able to test for bi-directionality at multiple time points using cross-lagged analysis. There may also be mediating mechanisms such as maternal well-being as a mediator of the link between marital satisfaction and the mother-child relationship, as suggested in Belsky's model of determinants of parenting (Belsky, 1984). However, for such an analysis large sample sizes and longitudinal data will be required.

When studying family relationships and well-being, countless other factors might have been involved but were not tested, including the fathers' characteristics and the father-child relationship, as outlined above. Environmental factors such as work status are also likely to be important. A review on maternal employment status suggested that employed mothers are more satisfied with their lives and report better well-being (Hoffman & Youngblade, 1999). However, in our sample, most mothers had a job

previously, but at the time of data collection, they were not working due to maternity leave. Future studies with follow-up beyond the traditional maternity leave period and diverse employment backgrounds of mothers can investigate this issue further. When investigating mother-child relationship quality, we based our predictors on Belsky's theory of the determinants of parenting. Attachment theory, which states that relational schemata predict parenting behaviour suggests that parents' own attachment experiences influence parenting (Bowlby, 1969, 1988). These are just a few examples of avenues for future research.

The sample of the 'From 3 to 4 the arrival of the second child' study consisted of mothers in perinatal periods, that is prone to having mental health difficulties, so we examined internalizing problems, depression, anxiety and stress throughout the thesis. However, there are other important aspects to parental well-being such as hedonic well-being (avoidance of pain and achieving pleasure), eudemonic well-being (meaning in life, positive relationships, self-acceptance, purpose in life, personal growth, environmental mastery and autonomy) (Ryff & Singer, 1998), life satisfaction, and positive affect. In recent decades, studies have begun to focus on positive well-being, and the association between eudemonic well-being and parenting has been indicated whereas there was no association between hedonic well-being and parenting outcomes (Huta, 2012). There is still a lot to discover in well-being, as well as many inconsistencies in research findings. For example, recent research found that being parents improved adults' well-being (Brandel et al., 2018) whereas research has also suggested that internalizing symptoms tend to increase in pregnancy (Bennett et al., 2004; J. Evans et al., 2001). Therefore, future studies can also investigate these well-being dimensions along with internalizing problems to clarify inconsistencies, as well as to differentiate well-being constructs such internalizing problems.

Conclusion

Understanding family dynamics in certain contexts such as having twin children and adding another child to the mother-father-child triangle has attracted many researchers over the last decades. Driven by family systems theory (M. Bowen, 1978), this thesis has investigated maternal mental health and family relationships in these specific contexts. The common feature of both contexts is that they are both mentally and physically challenging. In line with this, the ultimate purpose of the thesis was to identify several risks and protective factors for better family functioning, especially at times of stress. The overarching implication and message of the study is that research should consider different family contexts and family life cycle stages.

The findings have contributed to the literature and research on family dynamics during the arrival of the second-born, as well as to research concerning maternal internalizing symptoms. The findings of the papers give promise for several intervention studies to prevent and treat internalizing problems, as well as to improve mother-child and early sibling relationships. Overall, the thesis suggests important protective and risk factors in the context of the arrival of a second child, by suggesting that easier child temperament and good marital quality are protective factors for first-born behaviours toward their newborn sibling. Traditionally family research highlights the need for marital and parenting interventions. The present research further highlights household chaos, child temperament, co-parenting, and child-care support. All of these concrete aspects may be fruitful avenues for intervention because they are potentially less personally challenging than parenting itself, producing less shame and defensiveness among parents. The ultimate conclusion of the thesis is that family members' mental health is a key component of relationship dynamics, and concrete

aspects such as effortful control skills of children, child-care support, and organization

in the home environment can foster improved family functioning.

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Appendices

Appendix 1. Consent Form For Project Participants for "From 3 to 4; The Arrival

of the Second Child"

Title of Project: From 3 to 4: Arrival of the Second-Born

Name of Researcher and School: Sumeyra Yalcintas School of Psychology

C-REC Ref no: ER/SY269/1

By consenting to take part in this study, you consent to the following:	*Please tick box*	
	YES	*NO*
• *I agree to take part in the above University of Sussex research project*	☐	☐
• *I agree to complete questionnaires*	☐	☐
• *I consent to being interviewed by the researcher*	☐	☐
• *I agree to the interview being audio-recorded*	☐	☐
• *I allow interactions between me and my child to be videotaped*	☐	☐
• *I understand that in exceptional circumstances , where the health, welfare and safety of myself or others is compromised by information I might disclose, the researcher will be legally required to pass this information onto an appropriate individual or agency.*	☐	☐
• *I allow my child to be videotaped when interacting with the researcher*	☐	☐
• *I understand that any information I provide is confidential, and that no information that I disclose will lead to the identification of any individual in the reports on the project, either by the researcher or by any other party*	☐	☐
• *I have read the information sheet, had the opportunity to ask questions and I understand the principles, procedures and possible risks involved.*	☐	☐

- *I consent to the processing of my personal information and data for the purposes of this research study. I understand that such information will be treated as strictly confidential and handled in accordance with the General Data Protection Regulation (GDPR) 2016.*　☐　☐

- *I agree to complete questionnaires*　☐　☐

- *I consent to the use of my data in future studies subject to further ethical approval.*　☐　☐

- *I confirm that my child does not have any known allergy to raisins and if no, I agree to provide an alternative snack.*　☐　☐

Name:

Signature

Date:

You may **volunteer** to allow us to:
use sections of videotaped interactions for conferences, teaching materials etc.　YES
NO
contact you for a follow-up study after the birth of your second child.
YES　NO
If you are willing to allow us to do this, please sign your name again. This does not affect your participation in any way.

Name:

Signature

Date:

Appendix 2. Information sheet for "From 3 to 4: The Arrival of the Second Child"

Time 1 Data

FROM 3 TO 4: ARRIVAL OF THE SECOND-BORN

You are invited to take part in a study investigating the arrival of the second-born into the family. Before you decide whether or not to take part, it is important for you to understand why the research is being done and what it will involve. Please take time to read the following information carefully.

WHAT IS THE PURPOSE OF THE STUDY?

The purpose of the study is to understand the changes that families experience when welcoming a second child. Specifically, we are interested in your first-born's reactions, as well as changes in family relationships and your own well-being.

DO I HAVE TO TAKE PART?

Taking part is entirely voluntary. If you do decide to take part, you will be asked to sign a consent form. If you decide to take part you are still free to withdraw at any time and without giving a reason. Just let us know that you would like to withdraw at any time during the home visit, and we will not ask why. In case you decide to withdraw your data after the home visit has finished, please let us know by phone or e-mail by Sept 2019 so that your data can be excluded from analysis and publication. After that date, the requests for withdrawal will not be possible.

WHY HAVE I BEEN INVITED TO PARTICIPATE?

You have been invited to participate because you are expecting a second child, and your first-born will be 24-42 months at the due date.

WHAT WILL HAPPEN IF I TAKE PART?

When you agree to participate, we will arrange a time to visit you and your child at home when you are approximately 28 weeks pregnant. The visit will be conducted by two researchers. The researchers will be trained extensively, have DBS checks and experience in the field. The visit will consist of videotaped play interactions between you and your child, completing questionnaires, a short interview and a computer task, and there will be tasks for your child to complete with a researcher. These types of games and interactions have been used previously, and families almost always enjoy our visits! The games that the researcher will play with your child are designed to measure your child's temperament and verbal ability. For example, we are interested in how well children are able to wait for a small snack (raisin), in how interested children are in playing with new toys (blocks and a drum set), and whether children are able to inhibit a dominant answer (by pointing to a small object embedded in a larger one). We will also discover words that your child knows. These tasks will be videotaped, and we will e-mail you a copy after the visit.

WHAT ARE THE POSSIBLE BENEFITS OF TAKING PART?

By taking part in this research you will contribute to our understanding of the transition that many families go through when welcoming a second child. Our intention is to produce findings that will be helpful to families in the future. In addition we will e-mail you the videos of you and your child.

WILL MY INFORMATION BE KEPT CONFIDENTIAL?

All the data that your family provides are strictly confidential; you and your child will be identified only by a number in the study datasets. Identifiable data (e.g., videotaped

interactions) will only be accessed by authorised persons in the research team and stored on encrypted, password-protected hard drives. The data your family provides will be kept for a minimum of 10 years after completion of the study, as recommended by the Medical Research Council (MRC). We will not pass your family's information on to any other organisations. The data may be retained for our use in future studies subject to further ethical approval.

WHO IS ORGANISING AND FUNDING THE RESEARCH?

This project is being conducted by researchers in the school of Psychology at the University of Sussex. The study team includes Sumeyra Yalcintas (PhD student), Prof Alison Pike (PhD supervisor) and project students undertaking BSc or MSc degrees.

WHO HAS APPROVED THIS STUDY?

This study has been approved by the Sciences & Technology Cross-Schools Research Ethics Committee by University of Sussex. The project reference number is ER/SY269/1. If you have any concerns about the way in which the study is conducted as it progresses, please contact the Chair of the Ethics Committee (crecscitec@sussex.ac.uk). The University of Sussex has insurance in place to cover its legal liabilities in respect of this study.

CONTACT FOR FURTHER INFORMATION

If you have any questions about the study at any time, please contact us (e-mail: 3to4study@sussex.ac.uk or Tel: 01273 877288)

Thank you SO MUCH FOR YOUR TIME!

Appendix 3. Protocol for "From 3 to 4: The Arrival of the Second Child" Time 1 Data

Pre-visit phone call:

Explain a bit about the protocol on the phone. Two of us will come to your home, and the visit will last about two hours. First, we will have sets of toys for you & your child to play with. This will be videotaped, and we will be able to send you this after the visit. Next, we will have some games to do with your child – hopefully somewhere quiet where they can concentrate. It's also easiest if there is a table, but it's not a requirement. While one of us is playing these games with your child, the other will have some questionnaires for you to complete, as well as a computer task and some interview questions. Just one more thing – a few of the child tasks involve a small snack. We will have cheerios and raisins with us – would one of those be ok for your child? (If not, ask the mum to provide something else small!)

All in all, the visit lasts 1.5 to 2 hours. What time of day is best for you – when your child is awake, not too hungry? Schedule accordingly.

Home visit

Introduction

Go through the stimuli booklet with mother and child & explain the protocol. Mention that you may want to put your phone on silent, or something like that so that it doesn't interrupt you during the tasks. Ask mother to sign the consent form.

M-C interactions

Camera arrangements: the camera needs to be able to see the mum, child, and toys on the floor. Minimise background noise.

Structured

book, 4 green blocks, duck, two cups. All together in a box.

"I have some things for you & your mummy to play with. First, here are some blocks. I want you (directed at mum) to build a train like this (put three blocks together length-wise with one more on top), -- a train that goes choo-choo-choo, and then give the blocks to **child's name** to help her build her own train.

(Move blocks out of the way.)

Next (looking at both), we have a little duck and two cups. What I want you to do is play hide and seek! You see, I hide the duck (put under the cup – move cups around), then ask child – where is it? Now we can hide it again. Where is it?

Finally, I have a book for you to read, if you have time.

I'm going to leave you to play now, and I will be back in about 5 minutes. If you can, just make sure that the child is not sitting with his/her back to the camera.

(Listen out for movement – check on camera position. Also, listen for Bayley items! Come back after 5 minutes of codable interaction.)

Free play

 animals, cars, puzzle (wooden one with handles), 2 cups, 2 plates, 2 spoons, doctor kit, Russian dolls

(Bring new box of toys – and take away old ones at the same time).

"Here is a box of toys for you to play with, as you usually would. (Take the lid off the box.) Again, I will leave you to play for about five minutes, and if you can make sure that the child is not sitting with his/her back to the camera, that would be great."

"I have one last box of toys for you to play with. Before I bring them, can you please clear up these toys? I'll be back when you're done." (Come back after a max of 2 minutes, or when they are done.)

New baby play

wooden family dolls – dad, mum, child, and baby. Also the newborn doll with bath etc kit.

Instructions same as for Free play.

Appendix 4. Mother interviews: demographic questionnaire

Date of Visit: _____   Family ID: _____

Mother

Date of birth: ☐☐ / ☐☐ / ☐☐☐☐ d/mm/yyyy)

Place of mother's Birth

☐ United Kingdom

☐ Other _____

If other, year of arrival to UK: _____

What is your ethnic origin?

☐ White

☐ Indian

☐ African Asian

☐ Black

☐ Bangladeshi

☐ Pakistani

☐ Mixed race *(please describe)* _____ _____

☐ Other *(please describe)*   _____

What is your marital status?

☐	Single unmarried	☐	Married to parent of child	☐	Married to other
☐	Single separated	☐	Cohabiting with parent of child	☐	Cohabiting with other
☐	Single divorced	☐	Single widowed	☐	Other

What is your relationship to the child?

☐	Birth mother	☐	Stepmother
☐	Other guardian (please describe)...		

What is your highest level of educational qualification?

No qualifications

CSE (Grade 2, 3, 4, 5) or GCSE (Grades D, E, F, G).

How many?_____

CSE (Grade 1) or 'O' Level (A, B, C) or GCSE (Grades A, B, C).

How many? _____

'A' Level, 'S' Level

How many? _____

Higher National Certificate (HNC)

Higher National Diploma (HND)

Undergraduate degree.

Please describe: _____

Postgraduate qualification (e.g., Masters, PhD).

Please describe: _____

Other. Please describe: _____

What was/is your most recent occupation? *(please state full job title)*

_____

Do you currently have a job? *(please tick one)*

☐☐☐☐☐ Yes   ☐ No   ☐ staying at home to look after the children

If yes, is this Full-time ☐ Part-time ☐ Number of hours a week: _____

Father

Date of birth:　□□ / □□ / □□□□ d/mm/yyyy)

Place of father's Birth

□ United Kingdom

□ Other _____

If other, year of arrival to UK: _____

What is your ethnic origin?

□ White

□ Indian

□ African Asian

□ Black

□ Bangladeshi

□ Pakistani

□ Mixed race *(please describe)* _____ _____

□ Other *(please describe)*　_____

What is your relationship to the child? NOT NEEDED

□	Natural father	□	Stepfather
□	Other guardian (please describe)...		

What is his highest level of educational qualification? (*please tick all that apply*)

No qualifications

CSE (Grade 2, 3, 4, 5) or GCSE (Grades D, E, F, G).

How many?_____

CSE (Grade 1) or 'O' Level (A, B, C) or GCSE (Grades A, B, C).

How many? _____

'A' Level, 'S' Level

How many? _____

Higher National Certificate (HNC)

Higher National Diploma (HND)

Undergraduate degree.

Please describe: _____

Postgraduate qualification (e.g., Masters, PhD).

Please describe: _____

Other. Please describe: _____

What was/is his most recent occupation? *(please state full job title)*

_____

Does he currently have a job? *(please tick one)*

□ Yes   □ No   □ staying at home to look after the children

If yes, is this Full-time □ Part-time □   Number of hours a week: _____

Household

Who are the people living in your household now? (including yourself)

_____ **Mum**   _____**Dad**   _____**Child**

_____ other adults (over 18 years)   _____ other children (less than 16 years)

_____ young adults (16-18 years)

2. How many rooms are in the house not including the kitchen and bathroom(s):

_____

Child

First name: …………………………………

Gender: □   Boy   □   Girl

Date of birth: ☐☐ / ☐☐ / ☐☐☐☐ d/mm/yyyy)

Place of child's Birth

□ United Kingdom

□ Other _____

If other, year of arrival to UK: _____

Childcare: Think about all of the time in a typical week that your child is not with you (the mother). During that time, who is looking after him/her?

Father (hours):

Relatives (grandparents, aunt etc) Hours:

Child-minder (hours):

Nursery (hours):

Babysitter (hours):

Nanny (hours):

Other _____

_____

About the Pregnancy & Birth of your first-born

Was your first pregnancy straightforward?

What about the labor (was it a caesarian)?

If no, describe.

Birthweight:

Gestational age in weeks:

Developmental milestones

Were there any delays in your child's development?

_____

Did\does your child have any medical problems? If yes, details:

_____

Has your child been hospitalized in the past, other than at the time of birth? What was the reason?

_____

For how long was s/he hospitalized? _____

About the Current Pregnancy

Has your current pregnancy been straightforward so far?

If no, describe:

And are you currently taking any medication?

If yes, describe:

Do you drink coffee? How many cups per day:

How about tea?

Any caffeinated soft drinks?

Any other sources of caffeine?

Do you smoke? How many per day?

And how about alcohol? How many units per week.

Mother interviews: expectations interview – end of visit

"This final interview lasts about 5 minutes. We are interested in hearing about your hopes and expectations for your family when your second child arrives. Is it alright if I record it – so that I don't have to try and write everything down now, and I can listen properly."

How do you think that your first-born child will react?

How do you think that having a second child will affect your relationship with your first-born name?

When you think about the arrival of the second-born, what feelings come up for you?

What are your hopes for this change in your family?

Do you have any fears or anxieties about the new baby joining the family?

Thank you so much! We are really looking forward to hearing about how everything goes over the new few months. Also, would you mind if we sent a short online questionnaire for your partner to complete? We want to give fathers an opportunity to share their views too. We look forward to seeing you in the future!

Partner e-mail:

Appendix 5. Maternal Internalizing Problems

DASS21 Name: Date:

Please read each statement and circle a number 0, 1, 2 or 3 which indicates how much

the statement applied to you over the past week. There are no right or wrong answers.

Do not spend too much time on any statement.

The rating scale is as follows:

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 time

3 Applied to me very much or most of the time

I found it hard to wind down

I was aware of dryness of my mouth

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

I experienced breathing difficulty (e.g. excessively rapid breathing, breathlessness in

the absence of physical exertion)

I found it difficult to work up the initiative to do things I tended to over-react to

situations

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

I felt that I was using a lot of nervous energy

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

I felt that I had nothing to look forward to I found myself getting agitated

I found it difficult to relax

I felt down-hearted and blue

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

I felt I was close to panic

I was unable to become enthusiastic about anything

I felt I wasn't worth much as a person

I felt that I was rather touchy

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)

I felt scared without any good reason

I felt that life was meaningless

Appendix 6. Brief Measure of Co-parenting

For each item, select the response that best describes the way you and your partner work together as parents:

0   1   2   3   4   5   6

Not true of us A little bit true of us Somewhat true of us Very true of us

I believe my partner is a good parent.

My relationship with my partner is stronger now than before we had a child.

My partner pays a great deal of attention to our child.

My partner likes to play with our child and then leave dirty work to me. (R)

My partner and I have the same goals for our child.

My partner and I have different ideas about how to raise our child. (R)

My partner tries to show that she or he is better than me at caring for our child.

My partner does not carry his or her fair share of the parenting work. (R)

My partner undermines my parenting.

We are growing and maturing together through experiences as parents.

My partner appreciates how hard I work at being a good parent.

My partner makes me feel like I'm best possible parent for our child.

Never Sometimes (once or twice a week) Often (once a day) Very Often (several times a day)

How often in a typical week, when all 3 of you are together, do you:

Argue about your relationship or marital issues unrelated to your child, in the child's presence?

One or both of you say cruel or hurtful things to each other in front of the child?

Appendix 7. Mother-child Relationship Quality

RELATIONSHIP QUALITY (RQ)** Rate: All (Dyadic Relationship)

This scale assesses the observer's evaluation of the quality of the dyad's relationship.

Code '5' if there is no evidence concerning the quality of the relationship or if evidence

is mixed. A low score indicates an unhappy, emotionally unsatisfying, or brittle

relationship. A high score indicates the observer's impression that the relationship is

warm, open, happy, and emotionally satisfying. *In activity-based tasks with young*

children, look at the ease of interaction, camaraderie, and comfortableness in being

together.

1= Negative:

The dyad's relationship is characterized as unhappy, conflicted, and brittle, OR the dyad

is uninvolved (emotionally divorced). In a sibling dyad, this type of relationship may be

characterized by high conflict, lack of interest in the other, or few indications of warmth

along with a high level of antisocial behaviour. *There is lack of synchrony in the*

interaction. Dyad members are unresponsive to the needs of each other.

2= 3= Somewhat negative:

The dyad's relationship is characterized as somewhat unhappy and conflicted. The

relationship is more negative than neutral or positive. *In activity-based tasks, there is*

some evidence for a lack of synchronicity between parent and child.

4= 5= Between the two extremes:

The dyad members are involved with each other, but the relationship is neither

excessively negative nor excessively positive. They may avoid some issues important to

the dyad/relationship. There also may be some areas in the relationship in which they

avoid unhappiness or conflict. This relationship would be described as an "okay"

relationship, but the relationship could use improvement in some areas to increase its

quality. Code as '5' if there is no evidence concerning the quality of the relationship or if the amounts of positive and negative evidence are fairly equal. Include here neutral parallel task involvement. *Additionally, the levels of synchronicity versus asynchronicity are fairly equal.*

6=

**Note: Exception to the general coding scheme described in section H on pages 7-8 because '5' is the neutral point, with '1' and '9' at the two extremes.

7 = 8= 9 =

Somewhat positive:

The dyad's relationship is characterized as generally positive and warm. The quality of the relationship is more positive than neutral or negative, although there may be some indications of low level negative behaviour. *In activity-based tasks, there is more evidence of synchronicity than asynchronicity between parent and child.*

Positive:

The dyad's relationship is characterized as open, satisfying, pleasing, communicative, and/or warm. The individuals have a positive outlook on their relationship. There are few, if any, incidents of negative behaviours. *Dyad members appear to be in sync with each other and respond appropriately to each other's needs.*

Clarifications: **Relationship Quality**

1. The following combinations of scales could indicate a high level of **Relationship**

Quality:
Warmth/Support
Communication
Positive Mood
Escalate Warmth/Support
Listener Responsiveness
Reciprocate Warmth/Support
Hostility
Angry Coercion
Contempt

Escalate Hostile
Reciprocate Hostile
Prosocial
Antisocial
Silence/Pause
Compliance
Defiance
Intrusive
Stimulates Cognitive Development
Sensitive/Child-Centered

Look for incidents in which good communication prevails and there is a willingness to discuss important issues. The dyad that appears to avoid talking about important issues would be rated lower on **Relationship Quality**. An unwillingness to discuss important issues could be indicated by changing the subject, going on to next card prematurely, denying the issue is important to the other interactor, or hostile behaviour exhibited by the focal when a subject is discussed.

Relationship Quality is an exception to the general coding scheme because the midpoint is a '5' rather than between a '5' and '6' and also because the levels range from negative to positive with the neutral point in the middle of the scale.

If evidence exists for both positive and negative behaviours, weigh the relative amounts of each. If the evidence is relatively equal, code a '5'; if more positive than negative, score a '6' or higher; if more negative than positive score a '4' or lower.

In judging **Relationship Quality** look at the ease with which interactors discuss situations, show supportiveness towards each other, and know about each other's lives. If in doubt for scores below '5', code down. If in doubt for scores above '5', code up

Appendix 8. Child Temperament (Observer Rated Version)

Please read carefully before starting. As you read each description of the child's behaviour below, please indicate how often the child did this **during visit.** If you did not see the child in the situation described during the visit just leave the statement blank. Leaving it blank is different from "NEVER" (1). "Never" is used when you saw the child in the situation but the child never engaged in the behaviour mentioned in the visit.

1 Never   2 Very Rarely   3 Less than half the Time   4 About half time

5 More than half the time   6 Almost always   7 Always

When approached by an unfamiliar person in a public place (for example, when food shopping), how often did the child cling to a parent?

While having trouble completing a task (e.g., building, drawing, dressing), how often did the child get easily irritated?

When offered a choice of activities, how often did the child decide what to do very quickly and go after it?

When engaged in play with his/her favorite toy, play for more than 10 minutes?

When engaged in play with his/her favourite toy, how often did the child continue to play while at the same time responding to your remarks or questions?

During quiet activities, such as reading a story, how often did the child fiddle with his/her hair, clothing, etc.?

While playing indoors, how often did the child like rough and rowdy games?

When encountering a new activity, how often did the child get involved immediately?

When engaged in an activity requiring attention, such as building with blocks, how often did the child tire of the activity relatively quickly?

During everyday activities, how often did the child pay attention to you right away when you called to him/her?

During everyday activities, how often did the child become bothered by sounds while in noisy environments?

During everyday activities, how often did the child seem full of energy, even in the evening?

When told "no", how often did the child stop the forbidden activity?

While playing indoors, how often did the child run through the house?

When asked to wait for a desirable item (such as ice cream), how often did the child wait patiently?

When you were busy, how often did the child find another activity to do when asked?

Appendix 9. Demographics form for Time 2 Data

DEMOGRAGPIHCS

Date of Visit: _____   Family ID: _____

First born

Childcare: Think about all of the time in a typical week that your child is not with you

(the mother). During that time, who is looking after him/her?

Father (hours):

Relatives (grandparents, aunt etc) Hours:

Child-minder (hours):

Nursery (hours):

Babysitter (hours):

Nanny (hours):

Other _____

Baby

First name: ………………………………………

Gender: □   Boy   □   Girl

Date of birth: ☐☐ / ☐☐ / ☐☐☐☐ (dd/mm/yyyy)

Childcare: Think about all of the time in a typical week that your baby is not with you

(the mother). During that time, who is looking after him/her?

Father (hours):

Relatives (grandparents, aunt etc) Hours:

Child-minder (hours):

Nursery (hours):

Babysitter (hours):

Nanny (hours):

Other _____

About the Pregnancy & Birth of your second-born

Was the end of your pregnancy straightforward?

What about the labour (was it a caesarian)?

If no, describe.

Birthweight:

Gestational age in weeks:

Developmental milestones

Have there been any delays in your baby's development?

_____

Did\does your baby have any medical problems? If yes, details:

_____

Has your baby been hospitalized in the past, other than at the time of birth? What was

the reason?

_____

For how long was s/he hospitalized? _____

Mother interviews interview – end of visit

"This final interview lasts about 5 minutes. We are interested in hearing about how it

went when your second child arrived. Is it alright if I record it – so that I don't have to

try and write everything down now, and I can listen properly."

How did your first-born child react?

How is she/he reacting since then?

Is that what you expected or is it different than what you expected?

Did having a second child affect your relationship with your first-born name?

How does your first-born get along with the baby?

What would have been the main challenges for your family since the birth?

What about the main highlights?

Thank you so much! Also, would you mind if we sent a short online questionnaire again for your partner to complete? We want to give fathers an opportunity to share their views too. We look forward to seeing you in the future!

Partner e-mail:

Appendix 10. Additional Time 2 Questionnaire (The items used to measure sibling behaviour from Sibling Relationships in Early Childhood (SREC)

Brothers and sisters do very different things with one another. Please use the 5-point scale below and circle the answer you believe best describes the feelings and behaviours of your child toward his/her sibling.

1	2	3	4	5
Never	Seldom	Sometimes	Often	Always

1. Shares play things when brother/sister wants to play with them.

2. Is happy to see brother/sister after they have been apart.

3. Misses brother/sister when they are apart.

4. Feels jealous of brother/sister.

5. Is happy when brother/sister goes away.

6. Gets angry with brother/sister.

7. Initiates play or interactions with brother/sister.

9. Has fun or a good time with brother/sister.

11. Comforts or soothes sibling when he/she is upset.

12. Teases or annoys sibling.

13. Accepts sibling as a playmate.

15. Stays away from sibling if possible.

17. Frowns or pouts when sibling has to be with him/her.

18. Does nice things for older sibling.

Scale Construction

1. **Positive Involvement**: sum of items 1, 2, 3, 7, 9, 11, 13, and 18

2. **Conflict and Rivalry**: sum of items 4, 6, 8*, 10, 12*, 14, 16*

3. **Avoidance**: sum of items 5, 15*, 17*

* These items were taken from Schaefer and Edgerton's (1981) SIB questionnaire