Daily Associations Between Parental Reports of Stress and Sibling Interactions in Middle Childhood

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A Thesis

In the Department of

Education

Presented in Partial Fulfillment of the Requirements

For the Degree of

Master of Arts (Child Studies)

at Concordia University

Montréal, Québec, Canada

August 2023

CONCORDIA UNIVERSITY
School of Graduate Studies

This is to certify that the thesis prepared

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Entitled: Daily Associations Between Parental Reports of Stress and S

and submitted in partial fulfillment of the requirements for the degree of

M.A. Child Studies

complies with the regulations of the University and meets the accepted standards with respect to originality and quality.

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ABSTRACT

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Ali Kerem Araboglu

The family consists of multiple interrelated systems, including the parent-child and sibling subsystems. Few studies adopting a family systems perspective have investigated links between the parent and the sibling subsystems, and in particular, the spillover between parental stress and sibling interactions. This study used a daily diary methodology to investigate whether daily reports of parental stress related and unrelated to sibling interactions were associated with positive and negative sibling interactions, both on the same day and from one day to the next. Phone calls for nine consecutive days were completed by a parent and two siblings between 7 and 11 years of age. This thesis was based on data drawn from parental reports. Within-person analyses indicated a significant daily association between negative sibling interactions and parental stress related to sibling interactions, as well as a significant negative association between positive sibling interactions and parental stress unrelated to sibling interactions. Conversely, none of the cross-lagged associations from one day to the next was significant. Findings are consistent with spillover between parental stress and sibling interactions on the same day (but not from one day to the next), although alternative explanations for observed associations are also considered. Exploratory between-person patterns also indicated that stress related to sibling interactions was linked to negative behaviour between siblings. The results of this study contribute to knowledge on family research with a specific focus on how sibling interactions are associated with parental stress and findings have the potential to inform future studies in this field.

Acknowledgments

I would like to begin by thanking my supervisor, Holly Recchia, for her invaluable support throughout this journey that was not the easiest. I feel incredibly grateful for her endless understanding, patience, empathy, and flexibility. I also feel grateful to have worked with not only such a great supervisor but also an amazing and inspirational person on many levels.

I would like to thank my committee members, Dr. D'Amico and Dr. Petrakos whose classes and stories were key in shaping my perspective towards child development and the family. Their time, availability, and valuable comments and insights have helped me put together a meaningful body of work and they will continue to inspire me in my career.

I want to thank massively to Christine Kinsley, who was not just the PhD student with who I shared data but also one of my best friends throughout this journey. Without her help and guidance, it would not be possible to write this thesis. I am incredibly happy to have known her.

Thank you to all the amazing people in the RAD Lab for a very warm and friendly environment. Your feedback in putting this work together helped me a lot.

I would also like to thank all our research assistants, Amanda, Jasmine, Laura, Zoe, Joanna, Ecem, and Emilie, for their time, effort, and help in collecting data; and to all the parents and children for helping us conduct this research and sharing time and glimpses from their lives.

Thank you to all my friends in Montreal and everywhere else in the world who I consider my family: you were by my side as always and I deeply value everything you bring to my life.

Erika, thank you immensely from the bottom of my heart for your company, love, and support. I am very grateful to have grown together so much and become a solid team.

Finally, to my family, you are everything above and beyond I could ask for. Thank you endlessly for allowing me to embark on this journey and helping me navigate through life.

Dedication

I dedicate this thesis to my own parents, Bilge, and Hayri. You are the reason why I am who I am today and behind any success I am to have in my life and career. There are no words to describe my gratitude for all your unconditional love, emotional and logistical support, and for all your sacrifices as parents despite all the stressful moments while raising me. I will continue to always work hard to keep putting that proud smile on your face. I love and appreciate you with all my heart, beyond any way I can explain here.

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Across their development, children are surrounded and influenced by various people such as those within their most proximal sphere like their parents and siblings, as well as in other settings such as their peers, teachers, and other adults. With respect to these varied interactions, sibling relationships have received less attention from those researching family and other social relationships (McHale et al., 2012). This relationship is an important focus of investigation considering that siblings are such a central part of children's lives, and they play an integral and unique role in children's development (Dirks et al., 2015; Dunn, 1983; Kramer, 2010). Indeed, of all the families in Canada with children, roughly 55% have two children or more (Statistics Canada, 2022), and most people in the United States report growing up with at least one sibling (Knop, 2020). As well, children spend more time with their siblings than with any other family member (Sanders, 2004). Characterized by frequent shifts between moments marked by positive and negative exchanges (Dirks et al., 2015; Ravindran et al., 2015), sibling interactions constitute a particularly interesting area of study.

Regarding interactions within the family, scholars have proposed that exchanges and dynamics within a family can be best explained with respect to the overall network of relationships between its members (Cox & Paley, 1997; Michaelson et al., 2016). Dyadic relationships between family members, such as between two siblings or a parent and a child, can be referred to as subsystems that serve specific functions and influence intrafamily processes (Goldenberg & Goldenberg, 2008; Kwok et al., 2015). Furthermore, daily events experienced within a family setting can affect the mood and emotions of family members and these can be transmitted to other subsystems (Larson & Almeida, 1999). For instance, if a parent has a

stressful day at work, there is a greater likelihood of a potential conflict with their child upon returning home (Larson & Almeida, 1999). Research has also shown that cumulative daily stress has a greater influence on individuals' well-being, compared to the stress arising from major events (Crnic & Greenberg, 1990; Kanner et al., 1981; Krech & Johnston, 1992), which highlights the importance of studying stress at a daily level.

Daily diary methodologies are well-suited to investigate this phenomenon and how influences within a subsystem can spill over to other family members, especially with respect to daily stress (Almeida et al., 1999; Kouros et al., 2014). Relatively little is known, though, about the reciprocal influences between the sibling subsystem and parental stress. While most research on family interactions has focused on how parenting influences children's behaviours and outcomes, some studies also suggest reciprocal or bidirectional patterns. For example, sibling relationship interventions have been shown to reduce maternal dysregulation, emphasizing that children's interactions can also influence their parents' affect (Ravindran et al., 2015). More generally, there are also a limited number of studies to date that used a daily diary design to examine sibling interactions (Hochgraf et al., 2022).

With these issues in mind, the purpose of this study was to capture the reciprocal associations between sibling interactions and parental stress, using a daily diary design. The overarching research questions were as follows: 1) How are daily reports of positive and negative sibling interactions associated with parental stress on the same day? 2) Do positive and negative sibling interactions predict parental stress on the following day? 3) Does parental stress predict positive and negative sibling interactions on the following day? This study was unique in the framework and methodology it adopted while investigating how parental stress and sibling interactions were linked to one another on a daily basis. In this sense, we sought to encourage

new avenues for research, and ultimately, insights that can inform our understandings of family dynamics.

Family Systems Theory: Spillover in Family Settings

Family Systems Theory is a key framework for explicating the dynamics of family relationships (Bortz et al., 2019; Hamon & Smith, 2014; Michaelson et al., 2016). This theory asserts that an individual family member's behaviour can be best explained based on their functioning with respect to the network of interpersonal relationships that an individual is a part of, rather than individual behaviour considered in isolation (Cox & Paley, 1997; Michaelson et al., 2016). Science involving families is arguably best understood from a family systems perspective that treats the family unit as a whole rather than the sum of individuals' behaviours and characteristics (Bortz et al., 2019; Cross & Barnes, 2014). As well, the family unit reflects relationships between family members, family strengths, and the reciprocal influence of individual processes on one another (Hamon & Smith, 2014). Kwok et al. (2015) posit that the relationships between different family members constitute subsystems (i.e., parental subsystem, sibling subsystem, child-parent subsystem, etc.) that can intersect with the subsystems of other members to yield complementary relationships, thus, making all subsystems within a family interdependent. The purpose of these subsystems involves performing specific functions or influencing particular processes within a family setting (Goldenberg & Goldenberg, 2008).

A variety of studies have adopted a family systems perspective to investigate the impact of interactions between family members on both within-family subsystems and other settings. For instance, experiencing conflict in multiple family subsystems has been found to increase children's risk of developing conflictual relationships not only within family but also in school settings, which may subsequently lead to socioemotional and behavioural difficulties (Ingoldsby

et al., 2001). Research has also shown that negative interactions between older and younger siblings were linked to maternal behaviour, and overt marital conflict was linked to older siblings' negative interactive behaviour towards their younger siblings (Erel et al., 1998). Other studies have documented links between differential treatment of siblings by parents (i.e., differences in behaviour in dyadic parent-child relationships) and negative socioemotional outcomes for children (e.g., lower self-esteem and possible later emergence of internalizing/externalizing behaviours; McGuire, 2003; McGuire & Shanahan, 2010).

The studies outlined in the previous paragraph imply "spillover" processes within the family. The spillover hypothesis involves the transfer of mood, affect, or behaviour from an environment to another (Almeida et al., 1999). With respect to family research, the subsystems within families constitute such settings and the spillover can entail the transfer of both positive and negative affect (Kouros et al., 2014). For instance, Coleman and Karraker (1998) note that the negative affect arising from sibling altercations may impact parents' responses to their children, which can subsequently lead to less effective parenting due to lower self-efficacy. Similarly, negative perceptions of parenting and parent-child relationships may stem from lower marital satisfaction and a higher level of conflicts between parents (Erel & Burman, 1995). As well, some sibling relationships may be marked by an increase in hostility and emotional distancing upon the spillover of parental conflict onto the rest of the family sphere (Hetherington, 1992).

Alongside spillover processes within the family, compensatory processes might also be at play, wherein challenges associated with one subsystem may be linked to compensatory patterns present in another subsystem (Kouros et al., 2014). That is, while a positive association between the positive or negative affect experienced by different family members or in different

subsystems may indicate spillover, a negative association would provide evidence for the compensatory hypothesis. Spillover and compensatory hypotheses can coexist within the same system, especially due to the temporal and dynamic nature of development (Kouros et al., 2014). Thus, although the expectations of the current thesis reflect the spillover hypothesis, it is important to acknowledge these complexities in patterns within the family.

In sum, family systems theory is a helpful framework for guiding the current investigation of links between sibling relationships and parental functioning. Indeed, as Crnic and Ross (2017) state, "a mother's or father's perception of parenting stress and the implications of that experience reflect systemic processes within the family that are transactional, reciprocal, bidirectional, and developmental in their function" (p. 263). To date, most research has examined spillover hypotheses in the context of intersections between the marital and parent-child subsystems (Almeida et al., 1999; Dix, 1991; Erel & Burman, 1995; Erel et al., 1998), whereas little research has focused on the reciprocal processes and spillover between sibling relationships and parental stress.

Parental Stress Within the Family Context

Stress involves the interaction of one's physiology and psychology, and can be defined as an internal state that arises upon the perception of a threatening or undesired condition or situation (Deater-Deckard & Panneton, 2017). Oftentimes, stress is understood in relation to central life challenges such as work, relationships, finances, biological and psychological needs (Deater-Deckard & Panneton, 2017). Stressors can be acute or chronic: the former often emerges in daily life and is not detrimental in small amounts, which may lead parents to adapt themselves in perhaps proactive ways (Deater-Deckard & Panneton, 2017). Some examples of acute stress involve not being able to meet a deadline, being stuck in traffic, or coming home from work to

manage a child's emotional regulation challenges (i.e., externalizing behaviours). In contrast, chronic stress is generally constant and stable across a certain period of time; for instance, having a chronic physical condition, being unhappy with one's job and having a continuous conflict with another person (Stefaniak et al., 2022). Along these lines, occasional challenges related to the daily responsibilities of raising a child can fall under acute stressors while a recurrent pattern of parenting practices precipitating negative emotionality in children can be an example of a chronic stressor. Although daily stress has a shorter span, research has shown that the cumulative effects of this particular form of stress are particularly predictive of individuals' well-being (Crnic & Greenberg, 1990; Kanner et al., 1981; Krech & Johnston, 1992), highlighting the importance of investigating daily stress.

Individuals differ in the ways they experience stress (Cohen et al., 1983; Stefaniak et al., 2022). The experience of stress is contingent on an individual's cognitive appraisal of events and the personal significance they attribute to a stimulus (Lazarus, 1963). The effects of stressors can be observed when a) the situation is perceived as constituting a threat or demand, and b) there is an inadequate number of resources available to manage the situation (Cohen et al., 1983; Lazarus, 1963). Given such interpersonal differences in perceiving and responding to stress, people differ in their degree of stress reactivity (Stefaniak et al., 2022). Deater-Deckard and Panneton (2017) describe how both children's and parents' levels of stress reactivity and capacity for stress regulation impact the dyadic relationships within the parent-child subsystem. These differences can arguably play an important role in the stress levels that different family members report, as well as how much they perceive other family members as playing a role in causing this stress.

In relation to parenting, specifically, parental stress may stem from having to adapt to the

demands and challenges of raising children (Crnic & Ross, 2017; Hukkelberg & Naerde, 2022). For instance, ensuring that their children follow a particular eating and sleeping routine, learn the necessary social and life skills, and have cohesive relationships with others around can all be associated with parental stress. It is extremely unlikely for parents not to experience any parental stress (Putnick et al., 2010). Indeed, stress is a continuous and inevitable process people experience throughout development, and it can occur in relation to any dyadic relationship, such as in a subsystem between a parent and a child (Deater-Deckard & Panneton, 2017). In a cross-sectional study that investigated the types of stresses that Swedish mothers (with infants/toddlers between 6 months and 3 years of age) experience, Östberg and Hagekull (2000) found that negative life events, child caretaking challenges, a high overall workload, high maternal age, low social support, a larger number of children in the family, and perception of the child as difficult and/or unpredictable were all directly associated with higher levels of stress.

It is crucial to consider the context and types of parental stressors being reported. Krech and Johnston (1992) found that mothers judged their children's behaviour to be more problematic and requiring a more intense behavioural response in stressful contexts (e.g., while also having to manage an intense workload from one's job), compared to in non-stressful contexts (e.g., a lot of time available with no pressing daily tasks). Further, as noted earlier, daily stressors instigate higher overall levels of stress and more intense negative emotional and psychological symptoms, compared to major life events (Crnic & Greenberg, 1990; Kanner et al., 1981; Krech & Johnston, 1992). In sum, types of stresses, along with differences in parental self-regulation regarding thoughts, behaviours, and emotions in response to difficult experiences, can yield to subsequent qualitative differences in parenting stress (Deater-Deckard & Panneton, 2017), which can have reciprocal impacts within a family system.

Being responsible for childrearing can be challenging on its own, and the recurrence of a spillover of other daily, uncontrollable stressors onto parents' lives can have substantial impact on the rest of the family members (Deater-Deckard & Panneton, 2017). Baker et al. (2003) state that there is a reciprocal link between children's challenging behaviours and parental stress that changes qualitatively over time, based on the child's characteristics and the parenting environment. That is, stress levels can vary based on child's developmental stage and the consequent demands that parents need to address: a very stressed parent unable to respond to such needs may demonstrate parenting behaviours that can lead their children to respond in adverse and challenging ways (Baker et al., 2003). There is also evidence that behavioural problems portrayed by children can impact the stress levels of their parents, even after controlling for prior stress – though, a reverse pattern can also be observed (Baker et al., 2003). In sum, in research involving families, it may be useful to measure parental stress on a daily basis, and in conjunction with the specifics of children's behaviour that are expressed in different dyadic subsystems, to have a better understanding of any potential "spillover" within the family system.

The Nature and Features of Sibling Relationships

The scholarly literature emphasizes that sibling relationships serve a unique context for development (Dirks et al., 2015; Kramer, 2010). Children spend a greater amount of time with their siblings than with any other person, even including their parents (Sanders, 2004). Sibling relationships are involuntary and often lifelong (Kramer, 2014; Kramer & Baron, 1995), and the interminability of this relationship (at least during childhood) constitutes a safe and relevant environment to practice skills and better understand emotions (Kramer, 2014). This is especially the case inasmuch as sibling relationships can be emotionally/affectively charged; a key feature

of sibling relationships involves frequent shifts between experiencing negative emotions (e.g., based on having conflict) and positive emotions within short spans of time, highlighting the ambivalent nature of these relationships (Dirks et al., 2015; Ravindran et al., 2015).

This ambivalent nature leads some to refer to sibling relationships as the "quintessential love-hate relationship" (Campione-Barr & Killoren, 2019, p. 221) and it can be illustrated by a variety of markers such as antagonism, dispute, and competition on the one hand and sources of support such as collaboration, companionship, and kindness on the other (Furman & Buhrmester, 1985). In other family subsystems, ambivalence may be regarded as more problematic, but sibling relationships provides a suitable context for this ambivalence to yield to developmental opportunities (Campione-Barr & Killoren, 2019). For instance, exclusively positive dynamics can impede children from developing some adaptive skills, such as conflict management and overall social understanding, that can be learned from the conflictual interactions in the safety of home setting. Conversely, however, frequent and destructive conflict can also negatively impact the harmony within the family (Kramer & Baron, 1995). It is worth noting that sibling warmth and negativity are relatively independent dimensions of the relationship (Dunn, 1983; Furman & Buhrmester, 1985). Continuous and frequent negativity within the sibling subsystem can be problematic and may lead to a higher number of internalizing and externalizing symptoms (Buist et al., 2013; Dirks et al., 2015; Hochgraf et al., 2022). For instance, particularly high levels of sibling conflict in middle childhood to adolescence can lead to more depressive symptoms, whereas high levels of sibling intimacy are linked to less depressive symptomatology (Kim et al., 2006). Furthermore, sibling warmth predicts daily variations positive mood in children (Hochgraf et al., 2022). It remains to be seen how sibling warmth and negativity are uniquely related to the affective experiences of their parents, particularly parental stress.

Another central feature of sibling relationships involves the prominence of both reciprocal and complementary interactions (Dirks et al., 2015). Reciprocal interactions refer to even and returned exchanges (i.e., equal power dynamics) during conflict or play (Campione-Barr & Killoren, 2019). They involve exchanges such as taking turns, sharing, or collaborating, thus resembling the types of interactions characteristic of friendships. On the contrary, complementary interactions such as teaching or caretaking are similar to those observed in parent-child subsystems, as they are more hierarchical and can involve unequal distribution of power, potentially due to overall differences in age and experience accumulated (Campione-Barr & Killoren, 2019; Howe & Recchia, 2005). Both reciprocal and complementary exchanges between siblings play a key developmental role and the nature of such exchanges may arguably relate to a potential spillover of affect onto other family members or subsystems.

Parenting of Siblings

Along with meeting the needs of each child separately, parents of siblings are also involved with managing the interactions between their children (Ravindran et al., 2015). One potentially challenging task for parents involves helping young siblings get along with each other (Kramer & Baron, 1995). Given that sibling relationships last for life and interactions with brothers and sisters shape children's development (Cox & Paley, 1997), it is arguably important for parents of siblings to help their children develop positively-framed relationships. This can set the stage for supportive relationships between children at later stages of life (Kramer, 2010). However, this may not be an easy task, given the emotionally loaded nature of raising siblings who may alternate frequently between having warm and conflictual interactions (Dirks et al., 2015; Ravindran et al., 2015). In addition, research shows that, within a family environment, sibling conflict has a stronger association with psychopathology than other factors such as

sibling warmth and/or parental differential treatment (Buist et al., 2013), further highlighting the importance of investigating unique associations with positive and negative sibling relationship dimensions with respect to the broader family picture.

Challenging moments between parents and children are key in triggering heightened negative emotional arousal in parents (i.e., stress, low mood), which may have negative outcomes such as hindering adaptive parenting behaviours (Dix, 1991). Related to this, parents often perceive their children to have conflict; their major concerns with respect to sibling relationships involves sibling rivalry, conflict, and agonism, whereas they tend to be less concerned with a lack of sibling warmth (Kramer & Baron, 1995). This may suggest that the negative interactions between siblings may be noticed and reported by parents more readily than an absence of positive interactions between them.

Experimental evidence also suggests that sibling interactions have an impact on parents' affective regulation (Ravindran et al., 2015). In a study that tested the effectiveness of a sibling intervention program, small groups of siblings from ages 4-8 were taught prosocial skills such as emotion regulation, perspective-taking, conflict management and their parents were briefed on how these tools could be applied within the home setting. Results showed that mothers reported lower emotional dysregulation scores after the intervention, indicating that sibling relationship can also be associated with parental affect and suggesting bidirectionality associations between these subsystems (Ravindran et al., 2015). In sum, taking into account the literature on spillover and parental stress, it may be anticipated that greater parental stress will be linked to greater reports of conflict between siblings.

Daily Diary Studies in Family Research Involving Siblings

The purpose of a diary involves documenting the events and states that one experiences

on a daily basis (Wheeler & Reis, 1991). This design enables multiday recordings and assessments based on specific questions that participants can be asked in relation to specific research goals. Diary methods aim to capture events and moods around the time that they take place through intensive and recurring self-reports (Iida et al., 2012). Daily diaries are becoming increasingly popular in research, and are commonly used in various research domains including health psychology (McKenzie & Cutrer, 2009; Skaff et al., 2009), child studies (Lämsä et al. 2011; Morrow et al., 2014), peer relationships (Chung et al., 2011), and family research (Almeida et al., 1999; Laurenceau & Bolger, 2005). Notable advantages of this design include the possibility of examining events close to the time that they take place, thus, reducing retrospective bias (Bolger et al., 2003).

A key rationale in using daily diary methods is that everyday experiences can have both acute and cumulative impacts on individuals' well-being and levels of stress (Crnic & Greenberg, 1990; Gunthert & Wenze, 2012; Kanner et al., 1981; Krech & Johnston, 1992). This makes the daily diary method a suitable and important tool in research involving stress, emotions, and family relationships, considering that the stress experienced within one subsystem in a family can transfer to another one (Almeida et al., 1999; Kouros et al., 2014).

Daily diaries can be used for three types of research goals: gathering reliable information about individuals, capturing changes within individuals over a certain period of time (and how these fluctuations vary across people), and attempting to conduct causal analysis with respect to predicting these fluctuations over time (Bolger et al., 2003). More specifically, daily diaries allow researchers to analyze how mood and states can change from one day to another, both within an individual and/or a dyadic relationship, for instance, between a married couple or within a sibling pair, with respect to their own psychological "baselines."

To provide a few examples, one study investigated tension spillover between marital and parent-child dyads within families (Almeida et al., 1999). Each parent filled out a short diary questionnaire independently for forty-two consecutive days. Results indicated that both fathers and mothers reported a higher degree of tense interactions with their children on the days following an episode of marital tension, illustrating how daily diary studies can be used to capture cross-lagged associations. This illustrates the value of daily diary methods for determining spillover between family members, as well as within and between person differences. Another daily diary study investigated the impacts of school closures due to COVID-19 on sibling dynamics amongst Latinx children in the U.S. (Sun et al., 2021). Of particular interest was how an increase in shared time between siblings impacted positivity and negativity in their daily interactions. In addition to home visits and afterschool sessions, children were called for seven consecutive evenings: the results showcased a lower degree of sibling negativity within families with less sibling negativity pre-pandemic. While this study and other recent research (Hochgraf et al., 2022) were notable in their use of daily diary method in sibling research, these studies did not specifically focus on the presence of potential spillover between subsystems within the family.

In sum, daily diary methods are useful in capturing the intricacies of day-to-day emotional states, as well as reciprocal interactions and possible spillovers within family settings. However, to date, there is a notable shortage of daily diary studies that focus specifically on the daily associations between parental stress and sibling interactions; both in terms of the strength of these concurrent daily associations, as well as whether they predict one another from one day to the next.

Current Study

To date, only a limited number of studies in sibling research have adopted a family systems perspective, leaving room for exploring associations between parental stress and sibling interactions. Particularly, the spillover from negative sibling interactions onto parental stress and vice versa is an understudied area.

Taking into account the existing literature, the present study aimed to investigate how positive and negative sibling interactions were related to daily variations in parental stress. In particular, we distinguished between stress that parents reported was related or unrelated to sibling interactions, to attempt to specifically identify when parental stress was experienced as resulting from exchanges between their children. Another main goal of the study involved investigating concurrent (within a day) and cross-lagged associations (from one day to the next) between parental stress and reports of sibling interactions. For instance, do positive and negative sibling interactions predict parental stress on the following day? Alternatively, does parental stress predict positive and negative sibling interactions on the following day?

In line with these research questions, we expected to observe concurrent associations between parental stress and sibling interactions. Specifically, we particularly anticipated an association between parental stress and negative sibling interactions, rather than between parental stress and (fewer) positive sibling interactions. This expectation was based on past research suggesting that parents see lack of sibling warmth as less alarming than sibling conflicts (Kramer & Baron, 1995). We also anticipated that concurrent associations with parental stress would be particularly evident for stress related to sibling interactions (rather than stress unrelated to sibling interactions). Finally, with respect to cross-lagged associations, we anticipated that parental reports of their own stress would predict their reports of the sibling interactions on the

following day because of a potential spillover. This spillover might result from the nature of parents' interactions with their children, as challenging moments between parents and children can lead to more negative emotional arousal on parents, which can subsequently impact parenting behaviours (Dix, 1991). Simultaneously, a reverse pattern could also be observed, with siblings' interactions predicting parental stress on the following day. In other words, parental stress and sibling interactions could be reciprocally interrelated.

Method

Participants

This thesis formed part of a larger study examining sibling relationship dynamics, with a focus on family members' perspectives on daily sibling interactions and its interplay with broader aspects of the sibling relationship (e.g., sibling relationship quality) and the family system (e.g., parenting style, parental daily hassles). The study received ethics approval from the Concordia University Human Research Ethics Committee (Certificate # 30015276). The current thesis focused on daily associations between parental reports of their daily stress and their children's sibling interactions, although the broader study also included a variety of measures based on children's reports as well as a questionnaire battery for parents. While these procedures are summarized below, only measures relevant to the current thesis are described in detail.

Participants were recruited via groups on social media platforms, online ads, and databases of participants from previous unrelated studies. Inclusion criteria required that each participating family include at least two siblings between the ages of 7 and 11 years old who resided together in one home and have lived together full time for at least one year. The study focused on this specific age range for various reasons. First, daily diary approaches conducted with younger children may not be feasible from a logistical stance (see Hochgraf et al., 2022).

Furthermore, we sought to capture sibling relationship dynamics and parenting in the relatively understudied period of middle childhood, whereas comparatively more research has focused on early childhood and adolescence. It was also required that parents and children were comfortable completing the measures and interviews (daily phone calls) in English. Parents were asked to provide written informed consent and children to verbally assent to procedures. Participants were free to withdraw from the study at any time, without any penalties.

The analytic sample for this thesis consisted of 51 families. Although data collection is ongoing, the current sample consisted of families recruited between September 20, 2021, and May 1, 2023. The mean age for older siblings was 131 months old (*SD* = 9.59 months, range = 107 – 145 months) and for younger siblings was 104 months old (*SD* = 14.26 months, range = 84 – 144 months). The sibling dyads consisted of 18 mixed-sex pairs (10 older brothers and 8 older sisters), and 33 same-sex pairs (14 sets of boys and 19 sets of girls). The 19 girl sibling pairs included 3 sets of twins (5.8% of the overall sample).

Parents reported on their own and their children's ethnic/racial backgrounds; percentages are reported in Table 1. Regarding family income, 49.01% had a household income above $100,000, 15.69% had an income between $81,000 and $100,000, 9.80% had an income between $51,000 and $80,000, and 11.76% of families reported incomes below $51,000. Six families preferred not to report their income. While all participants lived in Eastern Canada and the U.S., the majority of the participating families was Canadian (84.31%), and the rest of the sample was from the U.S. (15.69%). Of the overall sample, 54.90% were part of the English linguistic minority in a mainly French-speaking region of Canada. Overall, 86.27% of participating children spoke English regularly at home.

The average age for participating parents was 40.69 years (*SD* = 4.43). A vast majority of

the parents identified as mothers (96.08%) while only 3.92% of the sample was represented by fathers. Most of the participating parents lived with a partner (88.24%) while 11.76% were single parents. With respect to level of education, 41.18% of the parents were university graduates and 37.25% had postgraduate degrees.

Table 1

Percentage of Participant Ethnic Background: Parents, Older Sibling, and Younger Sibling

Background	Parent %	Older sibling %	Younger sibling %
Indigenous peoples	1.96	3.92	5.88
Black	1.96	5.88	3.92
East and Southeast Asian	13.73	13.73	13.73
West Central Asian or Middle Eastern	3.92	5.88	5.88
White	66.67	70.59	70.59
Latin, Central and South American	3.92	5.88	7.84
Other	5.88	3.92	3.92
Missing data	7.84	7.84	7.84

Note. Values in a column can sum to greater than 100%, as some participants reported more than one ethnic/racial background. The demographics form also had another option for South Asian Origins (Punjabi, etc.), however, no participating parents selected it.

Procedure

After contacting the research team to indicate interest in participating, parents received an email with an online LimeSurvey link which directed them to a questionnaire packet that consisted of a consent form, demographic information, as well as various questionnaire assessments that did not form the focus of the current thesis. Upon completing this packet, parents were sent another email to arrange an initial meeting via Zoom, which aimed to (a) brief the parents and the sibling pair on the details of the study (i.e., procedures to follow during daily calls, resources available, compensation structure, etc.), (b) obtain children's assent, (c) assess children's sibling relationship quality (this measure was not included in the current thesis), and

(d) decide on a time for each evening of the daily/nightly calls.

After this initial meeting, one parent and both children were interviewed via phone, normally on nine consecutive days by a research assistant who asked them questions regarding the positive and negative interactions that have taken place between siblings that day; for parents only, we also assessed their self-reported stress. These phone calls lasted approximately 15 – 20 minutes whereby we spoke to each family member separately. This daily diary portion of the study started with a call on a Saturday, with the intention to hold the calls for nine consecutive days (ending on a Sunday). In the event that participants needed to skip a call during this nine-day sequence, additional day(s) were added to the end of the study. Upon completing nine days of calls, families were eligible for a compensation of up to $35 (i.e., $3 a day per family, with a $8 bonus for completing all daily calls). The current thesis was based on data drawn from these daily diary reports provided by parents. Of these 51 participating families, in 3 families, participating parents did not complete one of the daily calls, resulting in 8 days of daily diary data for each. Another family only has 4 days of data (two days of weekend and two days of weekday data) and were retained in the sample. Thus, in total, the final dataset included 451 daily diary entries.

Measures

Daily Diaries

For nine days of daily calls, a checklist method was used. Participants were called by a research assistant via phone. The daily calls took place between 4 – 8:30 p.m. to ensure that the siblings have had the opportunity to spend time together during that day prior to the calls. The daily diary questions were used to investigate parental stress and the sibling pair's interactions. As noted above, daily diary data were collected from all three participating members of each

family, but to simplify the study design, the current thesis focused solely on parent reports.

Positive and Negative Sibling Interactions. Parents were asked a series of questions about positive and negative interactions that may have happened between the siblings on each day. For each question, participants responded on a three-point scale: *not at all (0), a little (1),* or *a lot (2).* The two blocks of questions pertaining to each child's behaviour were presented in a random order; each block included questions about a variety of positive (five items; e.g., "did [Child 1] share anything with [Child 2] today?") and negative behaviours (five items; e.g., "did [Child 2] say something mean to [Child 1] today or tease them in a mean way?") in a fixed order (see Appendix A, questions 2 and 3). As well, a final set of six dyadic questions were included (see Appendix A, question 4; e.g., "did your children play together today?"; "did your children fight today?") as part of the positive and negative scales.

Parental Stress. Parents were also asked how stressed they have felt on that day, based on "reasons related to how the siblings were interacting with each other", and "reasons unrelated to your children" (see Appendix A, questions 6 and 7). Although the diary also included a third parental stress-related question ("how stressed were you today for other reasons related to your children?"), it was omitted for the purposes of the current study, given that this research aimed to focus on parental stress that is specifically linked to sibling interactions. These questions related to parental stress were single-measure items, and participants responded on the same three-point scale, *not at all (0), a little (1),* or *a lot (2)*.

Plan of Analysis

Overall daily measures of siblings' positive and negative interactions based on parent reports were computed by averaging the relevant daily diary items on each day. Thus, an overall positive sibling interaction score (based on 13 items per day) and an overall negative sibling

interaction score (based on 13 items per day) were calculated for each of the nine days. The daily parental stress variables (related and unrelated to siblings' interactions) were single-item measures, based on the same three-point scale, *not at all (0), a little (1),* or *a lot (2)*.

Preliminary analyses were conducted to explore between-family associations between study variables and associations with demographics variables (children's ages, genders, household income, etc.). Analyses to test the primary research questions were conducted via generalized mixed models using the GAMLj module in jamovi. A series of within-person models were constructed to examine (a) concurrent daily associations between sibling interactions and parental stress, (b) cross-lagged associations wherein reports of sibling interactions on a given day were used to predict parental stress on the following day, and (c) cross-lagged associations wherein reports of parental stress on a given day were used to predict sibling interactions on the following day. Variables were group-mean centered for analysis to focus on variations within a person unconfounded with between-person differences. For each of these three aims, a series of four models were constructed to examine separately the two forms of parental stress (i.e., related and unrelated to sibling interactions) in relation to reports of positive and negative sibling interactions. Thus, a total of 12 models was tested.

Results

Descriptive Statistics

Bivariate correlations, means, standard deviations, and the range of the four key study variables (stress related to sibling interactions, stress unrelated to sibling interactions, overall positive sibling behaviour, and overall negative sibling behaviour) are reported in Table 2. On average, parents reported having more stress unrelated to sibling interactions than stress related to sibling interactions, $t(50) = 5.84$, $p < .001$. Parents also reported a higher number of overall

positive sibling behaviour than overall negative sibling behaviour, $t(50) = 9.29$, $p < .001$. To provide context for the average values, it is also worth recalling that the range for scores was between 0 and 2.

Correlations were used to assess how the key four variables were related to each other; namely, we examined associations between parents' overall reports of stress unrelated to sibling interactions, stress related to sibling interactions, overall positive sibling behaviour, and overall negative sibling behaviour (i.e., averaged across daily diary days). Results are also depicted in Table 2. There was a significant positive association between stress related to sibling interactions and stress unrelated to sibling interactions. Similarly, as expected, stress related to sibling interactions was strongly associated with overall negative sibling behaviour. No other significant associations were observed.

Table 2

Descriptive Statistics and Correlations of Key Study Variables

	Stress unrelated to sibling interactions	Stress related to sibling interactions	Overall positive sibling behaviour	Overall negative sibling behaviour
Stress unrelated to sibling interactions	-			
Stress related to sibling interactions	.32*	-		
Overall positive sibling behaviour	.09	-.04	-	
Overall negative sibling behaviour	.27	.71***	.17	-
Mean	.71	.40	.65	.28
SD	.33	.33	.25	.19
Min.	0	0	.14	.02
Max.	1.56	1.11	1.25	.81

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

Preliminary Analyses of Associations with Demographics Variables

Correlations were used to investigate associations between the key study variables and the following demographic characteristics: a) household income, b) parental education, c) single parent household, d) older and younger siblings' gender, e) age of the sibling dyad, f) age gap between siblings. Results are depicted in Table 3. Household income showed significant negative associations with stress unrelated to sibling relationships and with overall positive sibling behaviour. Living in a single parent household was positively associated with overall negative sibling behaviour. No other significant associations were found with demographics variables.

Table 3

Correlations with Demographic Variables

	Household income	Parental education	Single parent	Older sibling gender	Younger sibling gender	Sibling dyad age	Sibling age gap
Stress unrelated to sibling interactions	-.30*	-.15	.26	.27	-.07	.03	-.02
Stress related to sibling interactions	-.18	-.14	.20	.02	-.01	-.06	-.08
Overall positive sibling behaviour	-.38*	.06	.17	.12	.04	.07	-.05
Overall negative sibling behaviour	-.26	-.18	.29*	-.04	-.09	-.20	-.12
Mean	6.07	6.96	1.12	1.53	1.57	117.46	26.84
SD	1.30	1.17	.33	.50	.50	10.45	12.40

Note. Household income was scored on a scale from 1 (less than $20,000) to 7 (above $100,000*)*.

Parental education was scored on a scale from 1 (no high school) to 8 (postgraduate degree).

Single parent status (1 = dual, 2 = single) and gender (1 = boy, 2 = girl) were binary variables.

Dyad age (i.e., average age of children in the dyad) and age gap between siblings were measured in months.

** $p < .05$*

How are Daily Reports of Positive and Negative Sibling Interactions Associated With Parental Stress on the Same Day?

Within-person models with random intercepts were used to test our primary research questions. Initially, we computed unconditional models for each of the four variables to examine the proportion of the variance associated with variations within and between individuals. The intraclass correlations (ICCs) were .36, .40, .23, and .16 for negative sibling interactions, positive sibling interactions, stress related to sibling interactions, and stress unrelated to sibling interactions, respectively. This indicates that, in each case, the majority of the variability was in relation to variations across days within families (rather than differences between families).

To test our first set of questions, we examined concurrent daily associations between parental stress and sibling interactions (Table 4). We had expected to find a significant association between parental stress and negative sibling interactions but not between parental stress and (fewer) positive sibling interactions. We had also hypothesized that concurrent associations with parental stress would be particularly evident for stress related to sibling interactions. Our findings were partially consistent with these hypotheses. Specifically, we found a positive association between daily stress related to sibling interactions and reports of negative sibling behaviour on the same day. However, we also observed a negative association between daily reports of positive sibling behaviour and stress unrelated to sibling interactions. Additional analyses were conducted below to explore this latter unexpected result. Neither of the other concurrent daily associations was significant (see Table 4).

Table 4

Concurrent Daily Associations Between Siblings Interactions and Parental Stress

	Same day stress related to siblings *b (SE)*	Same day stress unrelated to siblings *b (SE)*
Intercept	.39 (.05)***	.71 (.05)***
Positive sibling interactions	-.06 (.09)	-.41 (.10)***
Intercept	.39 (.05)***	.71 (.05)***
Negative sibling interactions	1.18 (.10)***	-.08 (.13)

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

Do Positive and Negative Sibling Interactions Predict Parental Stress on the Following Day?

The second research question investigated if positive and negative sibling interactions predicted parental stress on the following day. We had hypothesized that positive interactions would predict less stress and that negative interactions would predict more stress. However, no significant associations were observed (see Table 5).

Table 5

Associations Between Sibling Interactions and Parental Stress on the Following Day

	Next day stress related to siblings *b (SE)*	Next day stress unrelated to children *b (SE)*
Intercept	.39 (.05)***	.72 (.05)***
Positive sibling interactions	.05 (.09)	.03 (.09)
Intercept	.39 (.05)***	.72 (.05)***
Negative sibling interactions	.17 (.12)	-.01 (.14)

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

Does Parental Stress Predict Positive and Negative Sibling Interactions on the Following Day?

The third research question concerned if parental stress predicted positive and negative sibling interactions on the following day. We hypothesized that parental stress would predict more negative interactions and fewer positive interactions, respectively. However, no significant associations were observed (see Table 6).

Table 6

Associations Between Parental Stress and Sibling Interactions on the Following Day

	Next day positive sibling interactions *b (SE)*	Next day negative sibling interactions *b (SE)*
Intercept	.63 (.04)***	.27 (.03)***
Stress related to siblings	-.05 (.03)	-.03 (.02)
Intercept	.63 (.04)***	.27 (.03)***
Stress unrelated to siblings	-.02 (.03)	-.02 (.02)

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

Additional Exploratory Analysis

Additional analyses were run to explore if the significant results found with respect to the first research question could be explained by a third variable. In particular, we ran the same analysis controlling for a potential weekend effect (by coding weekend days as 1 and weekdays as 0). The results showed that, even after controlling for the weekend, a significant negative association (albeit relatively lower in its magnitude), was found between daily stress unrelated to sibling behaviour and daily reports of positive sibling behaviour on the same day, b(SE) = -.33 (.11), $p < .01$. The same pattern was observed with respect to the association between daily stress related to sibling interactions and daily reports of negative sibling behaviour on the same day. Specifically, this positive association was still significant even after controlling for the weekend, b(SE) = 1.20 (.04), $p < .001$. Thus, the associations between these variables did not appear to be accounted for by a weekend effect.

Discussion

The goal of the current study was to investigate how different types of parental stress were linked to positive and negative sibling interactions, both within the same day and from one day to another. The study addressed the following research questions: (a) How are daily reports of positive and negative sibling interactions associated with parental stress on the same day?; (b) Do positive and negative sibling interactions predict parental stress on the following day?; and (c) Does parental stress predict positive and negative sibling interactions on the following day? The following sections will address the findings with respect to these questions, as well as exploratory analyses examining between-person associations.

Concurrent Daily Associations between Parental Stress and Sibling Interactions

Prior to the data analysis, we had expected to find a significant association between

parental stress and negative sibling interactions, but not between parental stress and (fewer) positive sibling interactions. We had also hypothesized that concurrent associations with parental stress would be particularly evident for stress related to sibling interactions. In other words, we had expected that greater parental stress would be linked to greater reports of negativity between siblings. Our hypotheses were partially confirmed. Analyses revealed a significant association between negative sibling interactions and parental stress related to sibling interactions, whereas the association between positive sibling interactions and parental stress related to sibling interactions was not significant. These findings are aligned with scholarship suggesting that stress can occur in various subsystems in a (Deater-Deckard & Panneton, 2017), and are also consistent with research suggesting that parents are more concerned about sibling conflict than a lack of sibling warmth (Kramer & Baron, 1995). Our results may indicate that on days when negative interactions between siblings are more conspicuous, parents may experience stress related to these interactions.

Unexpectedly, however, we also found a significant inverse association between parental stress unrelated to sibling interactions and positive sibling interactions. On days when parents reported less stress unrelated to their children, they also reported a higher number of positive sibling interactions. One explanation can be that parents judge their children's behaviours to be less positive on days when they are under stress (Krech & Johnston, 1992). In other words, on days when parents are experiencing high levels of stress unrelated their children's interactions, their perception of their children's interactions may be affected accordingly, with parents reporting an overall lower number of positive sibling behaviours. Similarly, when parents are experiencing low levels of stress unrelated to their children, their perceptions of their children's interactions may be more positive. Examining children's own reports of positive sibling

interactions may be useful in testing whether this form of observer bias may account for our findings, by assessing how parents' stress is differentially related to their own and their children's reports of sibling interactions.

Alternatively, it could equally be the case that a third factor may have accounted for this association between parental stress unrelated to sibling interactions and positive sibling interactions. We ran additional analyses to examine one potential confound; we reasoned that, on the weekend, parents may be less stressed and children may also have the opportunity and time to engage in more positive exchanges. However, this did not appear to account for the association. Nevertheless, it is possible that there are other daily third variables that might account for both parental stress unrelated to sibling interactions and the lower levels of positive sibling interactions, for instance, a rainy day where all family members may experience bad mood, or a flood in the basement that may directly influence the home environment. Thus, it is possible that this association between parental stress unrelated to sibling interactions and positive sibling interactions was spurious, especially considering that the association between parental stress related to sibling interactions and positive sibling interactions was not significant.

From a family systems perspective, there is evidence in the literature for "spillover"; children's behavioural problems can be associated with the stress levels of their parents and vice versa (Baker et al., 2003), challenging moments between parents and children are associated with heightened negative emotional arousal in parents (Dix, 1991), and promoting prosocial and emotional regulation skills in children can also reduce parental dysregulation scores (Ravindran et al., 2015). Our results concerning links between parental stress and children's negative exchanges provide tentative evidence consistent with such a spillover effect, warranting additional research to examine these patterns further.

Cross-lagged Associations: Do Sibling Interactions and Parental Stress Predict Each Other From One Day to the Next?

Given that challenging moments between parents and children can be linked to parents' negative emotional arousal (Dix, 1991) and that such an arousal can arguably be transferred to other subsystems within a family (Almeida et al., 1999; Kouros et al., 2014), we had hypothesized that parental reports of sibling interactions would be associated with parental stress on the following day. This expectation was based on the notions that frequent and destructive conflict between siblings could negatively impact the harmony within a family setting (Kramer & Baron, 1995) and as well as observed links between parental stress and children's challenging behaviours over time (Baker et al., 2003). We had also kept in mind that parents are involved in helping young siblings get along well with each other and that this may have an emotionally loaded nature for them due to siblings' frequent shifts between demonstrating positive and negative behaviours towards each other (Dirks et al., 2015; Kramer & Baron, 1995; Ravindran et al., 2015).

Our hypothesis was not confirmed, as such an association was not observed with respect to cross-lagged associations from one day to the next. There are various possible explanations for this lack of significant results. It is possible that parents perceive both positive and negative sibling interactions as an integral part of daily life, and this may have resulted in a potential "reset effect," with participating families treating every day as a new one. The literature on sibling relationships also suggests that parents' major concerns with respect to sibling interactions involve rivalry, conflict, and agonism (Kramer & Baron, 1995), and parental reports of relatively lower levels of overall negative sibling interactions in our study may have been a factor in the results we obtained. In other words, these nonsignificant patterns may not generalize

to a sample of more distressed families.

The same principle of spillover applied in our reasoning behind the hypothesis that parental reports of their own stress would be associated with their reports of the siblings' interactions on the following day. This hypothesis was also based on the finding that some sibling relationships may show higher levels of hostility and emotional distancing upon the spillover of parental conflict onto the other subsystems (Hetherington, 1992). Thus, we expected to see a spillover from parental stress onto the sibling subsystem on the following days (Deater-Deckard & Panneton, 2017; Putnick et al., 2010).

This hypothesis was also not confirmed as no significant associations were found between parental stress and sibling interactions on the next day. It is possible that a similar "reset effect" took place with respect to these variables investigated. This may be linked to the idea that the stress that parents reported could be more acute than chronic, and thus less predictive of the nature of sibling interactions on the next day. It is also crucial to acknowledge that our daily diary questions aimed at capturing parental stress were based on a single item scale with only three points (0 = not at all, 1 = a little, 2 = a lot), which is a factor that potentially limits variability. This three-point scale may thus have not been adequately sensitive in assessing variations in parental stress. Furthermore, the questions we used to assess daily stress have not been validated by previous research. It could also perhaps be helpful to measure another process variable, such as the quality of parents' interactions with their sibling pair, to capture more directly how their stress informed (or not) their exchanges with their children.

Findings from Exploratory Analyses of Between-Family Differences

The main goal of the current study was to investigate concurrent and cross-lagged associations with respect to parental stress and positive and negative sibling interactions by

examining within-person patterns. However, our preliminary analyses of between-person patterns also revealed interesting associations with respect to between-family differences that may be investigated more in-depth by future research. Across our sample, we found that parents who reported one type of stress (e.g., related to their children) were also likely to report the other type of stress (e.g., unrelated to their children). This may be potentially explained by the underlying experience of having high levels of parental stress (independent of the type of stress), given that people differ in their qualitative subjective experiences of stress based on their self-regulatory capacities and resources available due to their life circumstances (Cohen et al., 1983; Deater-Deckard & Panneton, 2017; Lazarus, 1963; Östberg & Hagekull, 2000; Stefaniak et al., 2022).

Furthermore, we found that being a single parent was associated with reports of negative sibling behaviour, and household income was negatively associated with stress unrelated to sibling interactions. This suggests that the lower a family's income was, the more parents were stressed due to reasons unrelated to their children. Both being a single parent and having a relatively low household income may add extra chronic stress on parents' shoulders, which may impact their stress perception and reactivity (Lazarus, 1963).

The negative association between household income and overall positive sibling behaviours is more difficult to explain based on past research. One possibility is related to the compensatory hypothesis, which posits that challenges associated with one family subsystem may be linked to compensatory patterns in another subsystem (Kouros et al., 2014). Thus, the inverse association between family income and parental stress may also be playing a role here. That is, in order to compensate for the stress experienced within the parent subsystem, children in the sibling subsystem may show more positive behaviours towards one another. Clearly,

however, this interpretation is speculative and should be explored further in a larger and more socioeconomically diverse sample.

Overall, it is also worth noting that parents in this sample reported that their participating children demonstrated significantly more overall positive sibling behaviour than negative sibling behaviour. While there is no single explanation, it is possible that this may be linked to parental standards whereby parents focus more on the constructive aspects of raising siblings, such as the reciprocal and complementary interactions (Dirks et al., 2015), and therefore, may be more attuned to noticing and reporting positive sibling behaviours than the negative ones. Beyond parents' attunement to children's behaviours, other observational studies confirm that positive sibling behaviours are more frequent than is sometimes assumed (e.g., Tavassoli et al., 2019). It is also important to recall that sibling warmth and negativity are separate dimensions independent from each other (Dunn, 1983; Furman & Buhrmester, 1985) and that ambivalence is a defining feature of sibling relationships (Dirks et al., 2015; Ravindran et al., 2015). In some ways, this ambivalence may be adaptive, inasmuch as exclusively positive dynamics may impede children from developing adaptive skills like conflict management, whereas negativity between siblings, if continuous and frequent, may lead to a high number of psychopathological symptoms (Buist et al., 2013; Dirks et al., 2015; Hochgraf et al., 2022).

Limitations and Future Directions

Arguably the most notable limitation in this study design involves the diversity of the sample. A considerable number of the participants who took part were from an English-speaking minority within a French speaking province, or other predominantly English provinces and/or states. Recruitment was also limited to families residing in Canada and the US. We did not have a wide variety of ethnic backgrounds in our sample, which mostly consisted of participants who

identified as White. Keeping in mind that the contexts in which children spend their lives will influence children's experiences with siblings (McGuire & Shanahan, 2010), the lack of variability in ethnic backgrounds potentially failed to capture cultural differences regarding sibling relationships and limited the generalizability of the findings of this study. As well, most parents who opted to participate were mothers (96.10%), another factor that likely influenced the generalizability of the findings to other parents who do not identify as mothers.

While we captured some interesting findings that involved between-family differences, our small sample size of 51 families limited our power to detect between-person effects and also our ability to examine how between-family variations moderated within-person patterns (although within-person analyses were based on 451 datapoints). This is one of the reasons that the current study investigated the constructs of interest primarily with respect to the individual baselines of participants. In future research, it will be useful to investigate differences between families more in depth, with a larger and more representative sample. For instance, is overall sibling relationship quality related to the daily associations between sibling interactions and parental stress? Do these associations vary between families where parents are experiencing higher and lower levels of stress overall?

Additionally, the data analyzed for the purposes of this study was solely quantitative, and considering that every family has unique experiences, a lack of qualitative data may have potentially limited how much depth was captured with respect to any specific family, as well as the intricacies within their dynamics. For instance, during the debriefing session at the end of the nine daily calls, some parents provided feedback that our daily diary questions made both parents and participating children more aware of their interactions and their behaviours toward one another. However, it was not possible to capture nuances of this sort with the measures and

analyses implemented for the purposes of this study.

The daily diary design was a suitable one for the present study, considering that we asked parents to report their stress levels and interactions of their children close to the time they took place. While this was an effective method to capture stress on a daily basis, as well as how it related to interactions in other subsystems within a family, it was also linked with some logistical problems with respect to continuity in data collection. For instance, there were some instances when families were not available for a daily call for nine consecutive days/evenings (e.g., skipping a Wednesday and continuing the study on Thursday), which may introduce error variability into the estimates related to the cross-lagged associations.

Our hope is that this investigation can inform future studies focusing on the overall emotional tone and emotion reactivity observed within a family setting (Morris et al., 2007). The results can have the potential to inspire future research focusing on promoting prosocial skill-building in siblings and educating parents on the interplay of their own stress and sibling dynamics (Feinberg et al., 2012). For example, an existing intervention that is found to be effective involves the More Fun with Sisters and Brothers program (MFWSB), which aims to improve sibling relationships in childhood (ages 4-8) and includes a component on educating parents to help their children transfer their social-emotional skills to home and other contexts by focusing on areas such as parental reactivity and emotion regulation (Ravindran et al., 2015). Thus, it may be fruitful for parental stress to be examined further in future sibling intervention research, potentially as both a target and outcome of intervention.

Implications and Conclusions

As mentioned, the results of this study have the potential to inform future research aiming to shed light on intrafamily processes and interventions designed to improve the overall

emotional tone in a family setting. These findings may thus be of interest to parents, teachers, and professionals by illuminating processes from a family systems perspective and adding to the portrait of exchanges within the family. These results underline the ambivalent feature of sibling relationships and reiterate that family is a complex whole that extends beyond the sum of individuals' behaviours and set of characteristics (Cross & Barnes, 2014). While we aimed to document the strength of the associations between certain variables, we caution that our design did not permit us to establish causality. These correlations rather inform potential future studies to conduct further analyses with respect to causality (e.g., experimental designs) and to assess other potential third variables that may have played a role in accounting for these patterns.

This study aimed to explore the concurrent and cross-lagged associations between different types of parental stress and sibling interactions. Our findings suggested that there is indeed a concurrent daily association between parental stress related to sibling interactions and overall negative sibling behaviour. We also found an inverse association between parental stress unrelated to sibling interactions and overall positive sibling behaviour. While we observed a spillover between these variables on the same day, we did not find any cross-lagged associations: there were no significant associations with respect to sibling interactions predicting parental stress on the next day; or parental stress predicting sibling interactions on the next day. Overall, then, our findings are consistent with the anticipated spillover between parental stress and negative sibling interactions on the same day (but not from one day to the next), although alternative explanations for the observed associations are also possible. We also observed some interesting between-family associations (e.g., with household income) although these findings should be interpreted with caution given the small and relatively homogeneous sample.

Overall, this study highlights the value of using a daily diary methodology to examine

within-family processes across subsystems. To date, little research has documented these patterns vis-à-vis interactions in sibling relationships. In this respect, we hope that our study inspires research involving intra- and inter-family processes regarding parenting and sibling relationships.

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Appendix A

Daily Diary – Parent

NOTE: The items in **BOLD** are used as the basis for the positive and negative sibling interaction scores in this thesis; *italicized* items refer to negative interactions and those with asterisks (*) refer to positive interactions. Underlined items refer to parental stress variables included in the present thesis.

Hi [mother name], this is [RA name]. I'm calling about the Daily Diary Sibling study. Is now a good time? Great, let's begin.

1. How was your day today? (1 = really bad, 2 = sort of bad, 3 = okay, 4 = sort of good, 5 = really good)

Now I'm going to ask you some things that might have happened today between [child1; C1] and [child 2; C2] and I want you to tell me how much it happened today. I want you to tell me about today only, since this morning, not other days.

[The following two blocks, 2 and 3, were randomized, keeping the same order of questions in each.]

Now I will ask questions about [C1/C2] and if they did any of the following to [C2/C1] today. Your response choices are not at all, a little, or a lot.

2. Did your C1 [name inserted during interview] do any of the following to their sibling today? (not at all, a little, a lot for each one)
    a. **Did C1 help C2 today?***
    b. ***Did C1 say something mean to C2 today or tease C2 in a mean way?***
    c. **Did C1 share anything with C2 today?***
    d. ***Did C1 say that they didn't want to play with C2 today or leave C2 out?***
    e. **Did C1 teach C2 anything today?***
    f. ***Did C1 hit, push, or kick C2 today?***
    g. ***Did C1 take something of C2's away today, or not give it back? (Can be a toy, personal item, etc.)?***
    h. **Did C1 cheer up or make C2 feel better today?***
    i. ***Did C1 break or wreck any of C2's stuff today?***
    j. **Did C1 say something nice to C2 today?***
3. Did your child 2 [name inserted during interview] do any of the following to their sibling today? (not at all, a little, a lot for each one)
    a. **Did C2 help C1 today?***

   b. ***Did C2 say something mean to C1 today or tease C1 in a mean way?***
   c. **Did C2 share anything with C1 today?***
   d. ***Did C2 say that they didn't want to play with C1 today or leave C1 out?***
   e. **Did C1 teach C2 anything today?***
   f. ***Did C2 hit, push, or kick C1 today?***
   g. ***Did C2 take something of C1's away today, or not give it back? (Can be a toy, personal item, etc.)?***
   h. **Did C2 cheer up or make C1 feel better today?***
   i. ***Did C2 break or wreck any of C1's stuff today?***
   j. **Did C2 say something nice to C1 today?***

4. Now I'll ask you about what C1 and C2 did together today. (not at all, a little, a lot for each one)
   a. **Did [your children] play together today?***
   b. **Did [your children] have fun together today?***
   c. ***Did [your children] bother each other today?***
   d. **Did [your children] joke around together today?***
   e. ***Did [your children] fight today?***
   f. ***Did [your children] pick on each other today?***

Great, thank you. Now I'll ask you some questions about you in relation to [your children].

5. How much did you intervene into conflicts between [C1 and C2] today? (not at all, a little, a lot)
6. How stressed were you today for reasons UNRELATED to your children? (not at all, a little, a lot)
7. How stressed were you today for reasons RELATED to how [child 1 and child 2] were interacting with each other? (not at all, a little, a lot)
8. How stressed were you today for OTHER reasons related to your children? (not at all, a little, a lot)
9. How many hours would you say [child 1 and child 2] spent together today? (open-ended, numerical)
10. What was the best thing that happened between [child 1 and child 2] today? (open-ended, text)