TYPOLOGIES OF DAILY RELATIONSHIP QUALITY IN MARITAL AND PARENT–CHILD SUBSYSTEMS:
IMPLICATIONS FOR CHILD ADJUSTMENT

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Abstract

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The ways in which the marital relationship (MR) affects parent–child relationship (PCR) on a daily basis has important implications for children’s developmental outcomes. Most research on this topic, however, has employed a regression-based analytical approach; consequently, the dynamic, day-to-day fluctuations of MR–PCR associations, as well as the heterogeneous, between-family differences, have been largely overlooked. My dissertation project aimed to: (1) understand the within-family variability in the MR–PCR dynamics; (2) identify typologies based on families’ emotional dynamics; and (3) test the associations between family typologies and child adjustment. Different daily MR–PCR typologies were found for fathers and mothers: while the cohesive, fluctuating-cohesive, middle-of-the-road, and spillover type were the four typologies emerged most consistently for fathers and mothers, a compensatory typology was only identified for mothers in this study. Results also showed that externalizing behaviors (reported separately by parents and teachers) were the highest in children of parents in the spillover typology than those in other typologies. Moreover, for families
who were characterized by positive family dynamics (that is, families in the cohesive and fluctuating-cohesive types), higher variability of MR–PCR emotional states was related to more child adjustment problems. The findings shed light on the developmental implications of the variability and typology of family emotional dynamics, furthering our current understanding of the interrelatedness between marital and parent–child subsystems.
This is for my parents, who make me the happiest girl in the world.
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This research originated from my theoretical interests in understanding the day-to-day emotional dynamics among family members, as well as my passion for integrating new quantitative analytical approaches to elucidate developmental theories. Recent advancement in technology has made intensive and high-dimensional data accessible to developmental science; developmental and family researchers, however, have just started taking full advantage of these rich data. My dissertation, therefore, aimed to contribute to this progress by applying grid-sequence analyses to several bursts of daily diary data.

Over the past years, many people have been a source of support and inspiration to me. First and foremost, I would like to thank my parents for their unceasing love and support. They are my rock, my secure base, and my forever role models in my life. Without their encouragement and support, I would never have been able to endeavor this far, both geographically and intellectually. Secondly, I would like to thank my best friends, Haley Gedek, Raquael Joiner, Han Du, Aryanne de Silva, and Peipei Li, who have supported me in different ways. Especially, Haley made me feel at home in this foreign country and has made my time in graduate school so much more colorful and fun. Raquael was always willing to bat around research ideas with me and my discussions with her were critical when I first formed my dissertation idea.
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Children flourish in the context of positive family relationships. From dependent infants to autonomous young adults, every stage of human development benefits from positive interconnections between family members, including marital (or interpartner) and parent–child relationships. Interparental conflict (Davies & Cummings, 1994; Gerard, Krishnakumar, & Buehler, 2006), domestic violence (Jouriles, Rosenfield, McDonald, & Mueller, 2014; Margolin & Gordis, 2000), harsh parenting (Mackenzie, Nicklas, & Waldfogel, 2015; Stormshak et al., 2010), and disengaged parent-child interactions (Harrist & Waugh, 2002), on the other hand, have been shown to cast adverse long-term effects on children’s socioemotional outcomes. In addition to the examination of the unique influences of the marital relationship (MR) and parent–child relationships (PCR), family and developmental scholars are particularly interested in elucidating the interdependent and interactive role of MR and PCR (Easterbrooks & Emde, 1988; Grych, 2002). One important question of foci is: is PCR necessarily affected by MR? If so, do parents feel more irritated, or loving, toward their children in the face of marital distress? Explicating the association between MR and PCR holds implications for understanding the precursors of children’s emotional and behavioral problems, thus eventually informing prevention and intervention programs of child maladjustment.
Confined by traditional laboratory observations or survey-based questionnaires, however, empirical efforts devoted to this area of investigation have adopted a relatively static view of family dynamics. The day-to-day changes and fluctuations in the association between MR and PCR, as well as the between-family differences in these associations, are not yet fully understood. Applying a family-oriented perspective to daily diary data, my dissertation study aimed to delineate a dynamic, fine-grained, and development-oriented picture of the family relationship context and examine its implications for child developmental outcomes.

1.1 MR–PCR Link: A Family Systems Perspective

Toward the goal of understanding developmental antecedents and correlates of child adjustment problems, the first challenge facing researchers is to identify the foci of investigation among the many complex and intricate family dynamics. Fortunately, family systems theory (Cox & Paley, 1997; Minuchin, 1974) has provided a useful theoretical framework for researchers to navigate this area of investigation. Consistent with family systems theory, the family is comprised of multiple subsystems, including marital, parent–child, and sibling subsystems, which are mutually influenced by each other. Among the three, relationship quality in the marital subsystem has been regarded as the cornerstone of family cohesion and happiness (Davies & Cicchetti, 2004; Erel & Burman, 1995). Hostility and destructive conflict in the marital subsystem directly exert an adverse impact on multiple domains of child outcomes, such as difficulties in emotion regulation (Schulz, Waldinger, Hauser, & Allen, 2005), psychopathological symptoms (Kaczynski, Lindahl, Malik, & Laurenceau, 2006), behavior problems (Buehler et al.,
1997), and peer relationships (Parke et al., 2001). Additionally, unfavorable MR has been shown to indirectly affect child outcomes through its connections with parent–child subsystem (Buehler & Gerard, 2002; Cummings & Davies, 2010). The linkage between marital and parent–child subsystems is of major significance, serving as the basis of some popular treatments in family therapy (Feinberg, 2003; Minuchin, 1974; Zemp, Bodenmann, & Cummings, 2016).

Despite its fundamental role in family theory, the nature and magnitude of the MR–PCR link have not been fully understood. Specifically, existing literature has proposed two competing hypotheses to characterize the MR–PCR association, i.e., the spillover and compensatory hypotheses. Consistent with the spillover hypothesis, a distressed marital subsystem evidenced by interpartner difficulties is likely to obstruct effective caregiving behaviors (Kaczynski et al., 2006; Krishnakumar & Buehler, 2000) and bring tensions to PCR (Almeida, Wethington, & Chandler, 1999; Gerard et al., 2006). It is also possible, however, that in the face of marital difficulties, parents are more engaged with and supportive of their child, thus resulting in better PCR (Belsky, Youngblade, Rovine, & Volling, 1991; Brody, Pellegrini, & Sigel, 1986; Engfer, 1988). The notion that PCR may be improved in the context of marital distress is consistent with the compensatory hypothesis. For example, Brody et al. (1986) found that mothers in disharmonious relationships with their spouse are more likely to be involved in teaching their young children, compared with mothers in harmonious relationships. In sum, there was no consensus among existing studies about the associations between MR and PCR.

Greater specification of the MR–PCR link is needed given the importance of family context for children’s development (Erel & Burman, 1995; Krishnakumar &
Buehler, 2000). Empirical efforts devoted to addressing this question investigated many conditions that may have diversified these family dynamics, such as parent gender (Gao, Du, Davies, & Cummings, 2019; Nelson, O’Brien, Blankson, Calkins, & Keane, 2009), self- or spousal-influence (Gao & Cummings, 2019; Ponnet et al., 2013), and timescale of measurement (Kouros, Papp, Goeke-Morey, & Cummings, 2014; Sherrill, Lochman, DeCoster, & Stromeyer, 2017). Although these efforts have advanced a more refined understanding of the MR–PCR association, three main issues remained unaddressed. First, the link between MR and PCR is fluid in daily lives: with the same level of MR positivity, a parent can have high PCR on one day but low PCR on another day. Meanwhile, the day-to-day changes, or across-day variability, of MR and PCR may function as another barometer of family relationship quality, in addition to the absolute levels. Second, although one type of MR–PCR association may be detected because it is the dominant process existing in the entire sample, other types of association may have been undetected due to its less-common existence. Applying a person-centered approach to cluster families into distinct profiles may promote a more refined characterization of relationship dynamics for each family. Third, when it comes to studying the impact of distressed marital and parent–child subsystems on child outcome, the two are typically examined independently; or PCR was examined as a mechanism through which MR exerts its negative influence on child adjustment (e.g., Stroud, Meyers, Wilson, & Durbin, 2015). The intertwined and mutually-influencing associations between the two subsystems, however, were often ignored. Thus, it is time to simultaneously include the two subsystems and examine how different configurations of MR and PCR would inform child development.
Taken together, the field is calling for the delineation of a dynamic, fine-grained, and developmentally-oriented picture of the family relationship context. Guided by family systems theory, developmental psychopathology perspective, and the dynamic systems framework, my dissertation study applied a daily diary approach to 1) investigate the daily variability in the MR–PCR dynamics for each family, 2) determine whether different profiles of MR–PCR associations can be identified within a single sample, and 3) examine the developmental implications of each family profile for child adjustment.

1.2 Additional Insights Gained with Daily Diary Design

The past two decades have witnessed the burgeon of studies that utilized experience sampling methods (ESM) in family research and developmental science (Laurenceau & Bolger, 2005; Repetti, Reynolds, & Sears, 2015). This trend is propelled by the need to ecologically capture “life as it is lived” (for a review, see Bolger, Davis, & Rafaeli, 2003); further, it is empowered by the available technology to collect data in real-life contexts (Harari et al., 2016) and the enhanced statistical toolbox to summarize the data (Bolger & Laurenceau, 2013; Chow, Mattson, & Messinger, 2014; Hollenstein, 2013). Individuals provide reports on emotions and behaviors that occur in the everyday family context either once a day (for a number of consecutive days) or each time an event occurs. For example, parent–adolescent dyads reported about daily conflicts (Chung, Flook, & Fuligni, 2009) and feelings of connectedness (Brinberg, Fosco, & Ram, 2017) with each other; mother–father dyads reported their emotional quality toward each other as well as with the child (Gao & Cummings, 2019). With more closely spaced and repeated assessments, the daily diary method permits investigations of day-to-day
dynamics, including relationship associations on a daily basis and the intra-familial fluctuations over a short period of time, which may otherwise be undetected with traditional designs (Bolger et al., 2003; Repetti et al., 2015).

Specifically regarding family relationships, family researchers have examined factors influencing MR or PCR on daily basis, as well as how such influences may fluctuate day-to-day within a short period of time (e.g., one or two weeks). Empirical findings support the daily fluctuations of family relationships and have identified correlates of family members’ states, behaviors, and/or perceptions (Berg, Wiebe, & Butner, 2011; Chung et al., 2009; Larson & Almeida, 1999). For example, on days when individuals experience more strain and less support in marital relations, they tend to report more negative affect or depressive symptoms (Delongis, Capreol, Holtzman, Brien, & Campbell, 2004; Smith, Breiding, & Papp, 2012). Such emotional negativity may exert tensions on parents’ interactions with their child, which may elevate parent–child conflict and result in problems of children’s emotional wellbeing (Chung et al., 2009).

Although ESM data provide a microscopic view of observing and evaluating family interactions as the context for child development, the view may be so narrowly focused on a single interaction occasion that the within-family, interaction-to-interaction fluctuation may be largely overlooked. In other words, much is known about the constant level and antecedents of family-relationship variables (e.g., parent–child connectedness, parent–adolescent conflict, marital relationship), yet the extent of variability and developmental sequelae of these variables are relatively less studied. For example, with a 2-week-long daily diary assessment, Chung and colleagues (2009) examined the
frequencies of family conflicts and whether such frequencies were a function of family demographics. Results showed that family conflicts remained constant across two time points of the study (i.e., 9th and 12th graders); girls were generally found to report more conflict than boys. Variability in conflict frequencies, however, was not considered in their study. It is possible, for example, that one teenage girl had one conflict with the parent every day, whereas another girl had 5 conflicts on the first day, but no conflict at all in the following four days. Although the average conflict frequencies were the same for these two girls, one had higher variability than the other. Such variability across days may have implications for family or individual functioning. In fact, there has been evidence to show that the variability, rather than intensity and quantity, of individuals’ daily experiences was an essential component of psychological health (Kashdan & Rottenberg, 2010).

Using daily diary data, my dissertation sought to understand variability of the MR–PCR link across days, as well as its implications for child development. Two challenges arose. First, a methodological tool was needed to process and utilize the bi-variate (i.e., MR and PCR) longitudinal sequence. Second, variability of a bi-variate system (i.e., the link between MR and PCR) commanded a clear definition. In response to these challenges, the present study employed state space grids method and relied on a dynamic systems perspective to understand the variability of intrafamily relationship dynamics.
1.3 Use State Space Grids to Study the System of MR–PCR Link

My dissertation investigated family emotional system by collecting diary data on parents’ perceptions of emotional quality with their spouse and their child each day for 15 days. Because parents are an essential component of both marital and parent–child subsystems, following their perceptions of emotional quality in real time allows us to tap into the ongoing relationship dynamics between the two subsystems. It should be noted that rather than a pure additive combination of the two subsystems (i.e., marital and parent–child), the specific element under study in my dissertation is the intersection, or the dynamic coordination, of the two subsystems that parents are engaged in. To capture, graphically present, and statistically analyze the interactive dynamics of these two interconnected systems, the present study adopted state space grids (SSG; Hollenstein, 2013; Lewis et al., 1999).

SSG plots one element (or component, subsystem) on the x- and the other element on the y-axis, which defines the state space of a system. For the present study, the family system is the higher-order system of interest, defined by the marital and parent–child subsystems. Repeated measures of emotional quality within MR and PCR were mapped onto the x- and y-axis, respectively, as illustrated in Figure 2.1. Within the defined state space (i.e., x-y plane) of the family system, dots indicated the location of joint emotional quality of an individual on a particular day and lines represented how the family system (from one parent’s perspective) move from one location to another over time. Accordingly, each cell on the grid denoted a unique pair of emotional quality values for the two subsystems. As individuals “traveled” through the emotional map from day to day (i.e., dots were connected to form lines), changes and fluctuations of the joint
emotional states emerged. Variability of a family’s emotional states across days, therefore, was conceptualized as structural characteristics of these trajectories. Specifically, more transitions and wider cell range indicated high variability of a system. With the aid of SSG method, the present study was able to capture and analyze the variability of MR–PCR link, facilitating a refined understanding of family relationship dynamics.

1.4 Variability of MR–PCR Link: Insights from a Dynamic Systems Perspective

How does the variability of MR–PCR link relate to healthy family functioning? In other words, does healthy family relationship dynamics characterized by constantly high levels of positivity and affection? Or is having negative moments with other family members fine, but it is how quickly a person recovers from these moments that reveals healthy family relationships in the end? The present study sought to answer these questions with the guide of dynamic systems (DS) perspectives (Hollenstein, 2013; Lewis, 2000; Thelen & Smith, 1994)

The idea of DS is not new to family and developmental researchers. As discussed above, family relationships have been conceptualized as transactional, interdependent, and hierarchical organizations of different subsystems (e.g., Cox & Paley, 1997); additionally, developmental psychopathologists work with an organismic, holistic, transactional framework to investigate individual differences in normal and atypical development (e.g., Cummings, Davies, & Campbell, 2000; Sameroff, 1983). Taken together, DS approaches assume that psychological processes, like all complex systems (e.g., planetary systems, movement of molecules), consist of small system elements.
Depending on how the system under study is defined, elements could include different relationships (e.g., marital, parent–child, and sibling relationships), episodes of interactions (e.g., parent–adolescent conflicts), and exchanges of emotions and behaviors in real time. Nonlinear interactions among these lower-order components over time produces individual differences in developmental trajectories (see review by Lewis & Granic, 1999).

DS methods have been used to study a variety of developmental processes, including socioemotional development (Lewis et al., 1999), parent–child affective interactions (Lunkenheimer, Olson, Hollenstein, Sameroff, & Winter, 2011), and motor development (Thelen & Ulrich, 1991). There is, however, little DS-inspired research on relationship dynamics underlying marital and parent–child subsystems. In fact, DS principles can offer heuristic insights to model and understand the variability of family relationship dynamics.

Following a DS perspective, variability may provide essential information about a system (e.g., individual, dyad, or family) and thus should not be treated simply as noise (Granic, 2005; Nesselroade, 1991; Ram & Gerstorf, 2009; Thelen & Ulrich, 1991). In fact, family scholars and developmentalists have associated (intraindividual) variability with many dynamic concepts, such as plasticity, lability, flexibility, and adaptation. Examined in the context of parent–child interactions, these concepts have been linked to a host of adjustment outcomes, such as delinquency, substance use, externalizing problems, and internalizing problems (Granic, Hara, Pepler, & Lewis, 2007; Granic, Hollenstein, Dishion, & Patterson, 2003; Lewis et al., 1999; Lippold, Fosco, Hussong, &
Ram, 2019). However, little is known about the implications of the variability within a broader context of family system constituted with different subsystems.

Variability across days in the family system that is comprised of a series of MR–PCR states, as is the case in the present study, may reflect a family’s *flexibility* to shift out of negative emotional states. Frictions, disagreements, and conflicts fill daily family lives, perhaps as much as laughter, joy, and gratitude do. A family system’s ability to cope with negative perturbations and return to its homeostasis may represent a family that is functioning well. On the other hand, high variability can also have negative implications. It may suggest a family’s inability to successful reorganize after negative perturbations; additionally, high variability of emotional states may indicate a family’s unstable emotional climate. To discern these two possibilities, the present study investigated how variability of family relationship dynamics was related to child adjustment outcomes.

1.5 Employing A Typological Approach to Study the MR–PCR Link

Another main objective of the present study was to identify different profiles of family relationship dynamics. Moving beyond the traditional variable-oriented analysis—a regression-type method that assumes linear associations between marital and parent–child subsystems, my dissertation study adopted a “family or person-oriented” analysis that makes no priori assumptions about how these two subsystems may interact and manifest.
1.5.1 Variable-Oriented vs. Person-Oriented Approaches.

As have explicated above, a DS perspective emphasizes the hierarchical organization, nonlinear and interactive processes, as well as the heterogeneity nature of family relationships. These principles are not foreign to developmental and family researchers, as they truthfully reflect the nature of day-to-day family interactions. Yet they have not been empirically tested, possibly reflecting the nature of the variable-oriented perspective adopted by most studies (see Bergman & Magnusson, 1997 for a review). In this framework, variables (rather than individuals) are considered the theoretical focus and the linear covariation among variables (rather than the nonlinear combination) is the analytical unit. At least three limitations accompany this framework. First, linear relations among the studied variables cannot completely reflect the complex structures and processes involved in individual functioning or interpersonal interactions. Second, the variable-oriented framework is only able to detect a dominant process within a single sample, leaving other valid, yet less-common, processes undetected. Third, results obtained from this variable-oriented perspective cannot be interpreted to characterize individual persons, because the analyses are achieved by pooling over all individuals in the sample. It should be obvious that a variable-oriented approach is not compatible with our view of examining family relationship contexts, which emphasizes the hierarchical, nonlinear, interactive, and heterogeneous nature of these relations.

Person-oriented approaches (or typological approaches), on the other hand, consider individuals or systems under study as an organized whole, developing and functioning in totality. These approaches assume that the associations between subsystems can be nonlinear and that subgroups may exist within a single sample. Instead
of averaging across individuals to achieve associations among variables (i.e., as in variable-oriented approach), person-oriented approaches cluster individuals by focusing on different patterns of associations across variables. In this way, psychological research can accomplish its original goal of understanding and predicting the individual (Molenar, 2004).

1.5.2 Applications of the Person-Oriented Approach.

Particularly in developmental and family science, there has been a call for (e.g., Bergman & Magnusson, 1997; O’Connor, Hetherington, & Reiss, 1998) and application of (e.g., Belsky & Fearon, 2004; Malinen et al., 2010; Sturge-Apple, Davies, Cicchetti, & Fittoria, 2014; Sturge-apple, Davies, & Cummings, 2010) person-oriented approaches. These studies have provided a nuanced characterization of the complex, nonlinear interplay across multiple subsystems of a family, including the marital and parent–child subsystem. Unlike the variable-oriented approaches, person-oriented approaches (e.g., cluster analyses, latent profile analyses) acknowledge the complex nature of the marriage-parenting association, which is consistent with family systems perspective that more than one type of family functioning exists within the population (Minuchin, 1974).

Various family types have been identified using person-oriented approaches, depicting diverse forms of interrelatedness between marital and parent–child subsystem. In addition to the spillover profile that has received the strongest support from variable-oriented examinations (Erel & Burman, 1995; Krishnakumar & Buehler, 2000), Sturge-Apple and colleagues (2014) detected two other family types in a sample of families with toddlers: adequate-functioning and compartmentalization. Specifically, the adequate-functioning group exhibited low levels of marital violence and conflict, punitive
parenting, and average levels of parental warmth. Families in the compartmentalization group had high levels of marital conflict and anger, while displaying high levels of warmth and low levels of punitive parenting toward the child. Similar typologies were identified within a sample of families with kindergarteners in another study (Sturge-Apple et al., 2010), including cohesive, enmeshed, and disengaged families (which are similar to the adequate-functioning, compartmentalization, and spillover profile, respectively, found in Sturge-Apple et al., 2014). The number of family types is, however, by no means constrained to three. More (or fewer) family types can also be identified in a sample with different demographics (e.g., age of the child, family SES) or psychopathology characteristics (e.g., mothers with depressive symptoms). For example, using marriage and parenting measures obtained during infancy, toddler, and/or preschool years of families in a national study, Belsky and Fearon (2004) identified five differentiated patterns of functioning, including good marriage/good parenting, moderate marriage/moderate parenting, poor marriage/ good parenting, good marriage/poor parenting, and poor marriage/poor parenting. Taken together, these findings provided valuable first steps to examine differences in the interrelatedness between marital and parent–child subsystems. Following in their footsteps, my dissertation study aimed to identify different types of family relationship dynamics by using daily diary assessments and considering both mothers’ and fathers’ perceptions.

1.5.3 Typology of MR–PCR Link Assessed in Daily Lives.

Previous studies with a typological perspective have highlighted the heterogeneity in the interrelatedness between marital and parenting subsystems. Nevertheless, their findings only provided a static view of family dynamics because the assessments were
mostly based on observations or questionnaires during one laboratory visit. For example, in Sturge-Apple et al (2014), spillover families were characterized by the coupling of high levels of marital hostility and harsh parenting, indicating their worse functioning in marriage and parenting compared to others — but only based on reports about their marriage and parenting over the previous year. The day-to-day negative emotional exchanges and influences between marital and parent–child subsystems, a more accurate delineation of a spillover process, however, was not captured by their study. As another example, in Belsky and Fearon (2004), family functioning was measured by means of a composite score, constituted with assessments obtained at three occasions (i.e., during the infancy, toddler, and preschool years); consequently, the typologies achieved with their assessments may only apply to characterizing families’ general functioning in broad strokes. An ecologically valid typology is needed for understanding the intricate and complex dynamics during daily family transactions. Toward this goal, my dissertation sought to identify different family types using parents’ daily perceptions of MR and PCR quality.

Using daily diary data to identify family typology not only increases ecological validity, but also provides a way to examine inter-family differences in intra-family dynamics (Brinberg et al., 2017). For every family, completing daily diaries allows researchers to obtain a longitudinal data sequence that contain information of both the content (i.e., the relative level compared to other families) and the structure (i.e., intra-family variability, or flexibility of emotional experiences in the current study) of daily family functioning. Family typology identified through daily diary data, therefore, can be examined on their differences in intra-family variability— a critical indicator of family
functioning (Granic et al., 2003; Kashdan & Rottenberg, 2010). In other words, how stable (or variable) a family is in (or across) certain emotional states can be another important factor to aid the identification of family typology. For example, if daily diary data were available for the families in Sturge-Apple and colleagues’ (2014) study, those spillover families might be distinguished from the compartmentalization ones not only in their higher levels of, but also less variability in, harsh parenting. In order to examine the inter-family differences in the intra-family variability with a person-oriented (family-oriented, in this case) approach, the field is calling for analytical techniques to examine longitudinal sequence holistically (Brinberg, Ram, Hülür, Brick, & Gerstorf, 2018; Lichtwarck-Aschoff, Kunnen, & van Geert, 2009). In response to this call, my dissertation study employed grid-sequence analysis (Brinberg et al., 2017, 2018) to identify typology of family functioning assessed with daily diaries.

1.5.4 MR–PCR Typology: Differences in Parent Gender.

Father-child relationships have been demonstrated to be more vulnerable to poor marital functioning than mother-child relationships (Cummings, Merrilees, & George, 2010; Davies, Sturge-Apple, Woitach, & Cummings, 2009; Gao & Cummings, 2019; Kaczynski et al., 2006; Krishnakumar & Buehler, 2000). For example, Stroud and colleagues (2011) observed parent–child dyadic interactions in laboratory tasks and found that marital functioning was only related to fathers’, but not mothers’, responsiveness to children’s attention-seeking signals. As the emotional gatekeeper and conflict conciliator of the family, mothers tend to regard poor mother-child relationship as a personal failure (De Luccie, 1995; Pleck, 1983) such that they may devote more effort to blocking the spillover of marital distress to the mother–child relationship. For fathers, on the other
hand, their role as a parent tend to be blended with that as a spouse; consequently, fathers’ parenting may be more easily compromised in the face of marital distress.

Collectively, existing variable-oriented studies have found gender differences in the MR–PCR association. It is reasonable to expect that the MR–PCR typology may also vary by parent gender. Although fathers and mothers from the same family go through marital and parenting ups-and-downs together, they may exhibit different patterns of interplay between the marriage and parenting domains. Specifically, the compensatory profile may be more common for mothers than fathers given mothers’ greater emphasis on good parenting. This hypothesis is bolstered by the fact that all findings supporting the compensatory MR–PCR association have been found in the maternal, rather than paternal, link (Belsky et al., 1991; Brody et al., 1986; Engfer, 1988). Unfortunately, only one study (Malinen et al., 2010), to our knowledge, has investigated family typologies for mothers and fathers simultaneously. Moreover, little research has been conducted with a daily diary design that would allow a closer examination of the phenomenon. Therefore, my dissertation study identified maternal and paternal family typologies based on differences in the daily MR–PCR, and subsequently examined differences in maternal and paternal MR–PCR typology.

1.6 Implications for Child Development

The goal of my dissertation went beyond only understanding family types formed by holistic differences in intra-family dynamics. More importantly, the present study aimed to examine the developmental implications of different family types. Specific research questions generated from this goal included: 1) did profiles of family
relationship dynamics identified with parents’ daily reports correlate with children’s adjustment outcomes concurrently and longitudinally? 2) Were family profiles stable across time for each family? If not, how were changes in family profiles associated with changes in children’s adjustment problems across the same period?

1.6.1 Family Types and Children’s Adjustment.

Cumulative evidence has shown that children are at greater risk to develop emotional and behavioral problems when their families are characterized by high levels of marital discord and/or parenting difficulties (e.g., Cummings & Davies, 1994, 2002; Buehler & Gerard, 2002; Repetti, Taylor, & Seeman, 2002; Morris et al., 2007). Most of these studies took a variable-oriented perspective in which functioning in marital and parent–child domains were examined separately to predict children’s adjustment; or parenting variables were examined as a mediating process through which marital conflict affected child adjustment (e.g., Buehler, Benson, & Gerard, 2006; Gerard et al., 2006; Kaczynski et al., 2006). Few studies have endeavored to study the implications for children’s well-being of different family types that were identified through different patterns of interconnections between marital and parent–child relationship quality (e.g., Belsky & Fearon, 2004; Johnson, 2003; Lamela, Jongenelen, Pinto, & Levendosky, 2018; Lindblom et al., 2017; Sturge-Apple et al., 2014).

Socioemotional functioning is the most frequently assessed developmental sequel in these studies with the typological perspective. These include children’s externalizing and internalizing behaviors, social skills, academic achievement, and physiological functioning. In general, children from *disengaged* families (or *spillover* families, characterized by poor relationship quality in both marital and parent–child subsystems)
are consistently found to exhibit fewer competencies and more problems than those from other family types (e.g., Belsky & Fearon, 2004; Lamela et al., 2018; Sturge-Apple et al., 2010). For example, using a series of latent growth curve models to delineate toddlers’ (Sturge-Apple et al., 2014) and preschoolers’ (Sturge-Apple et al., 2010) trajectories of functioning, Sturge-Apple and colleagues found that children from disengaged families had more aggressive behaviors in the beginning, greater incline in the trajectories of externalizing behaviors, and faster decline in the trajectories of basal cortisol levels. While the disengaged families endure two sources of stress (i.e., marriage and parenting), the compensatory families (or compartmentalization families) only experience a stressful marital relationship, with parenting practices seemingly unperturbed. Would children benefit from growing up in such families compared with the disengaged ones? Initial evidence supported a “yes” answer to this question. With a national sample of children in early childhood, Belsky and Fearon (2004) compared the Poor-Marriage/Good-Parenting (i.e., compensatory) with the Consistently Risky group (i.e., spillover) and found that toddlers from the compensatory group outperformed the spillover group on a host of outcome variables, including externalizing behavior problems and cognitive performance. Interestingly, the Good-Marriage/Poor-Parenting group, despite the fact that it only conferred risks in one domain (i.e., parenting), did not differ on any of the measured child outcomes from the Consistently Risky group (Belsky & Fearon, 2004). Such findings suggested a stronger protective role of the well-functioning parent–child relationship than marital relationship. In other words, the influence of marital negativity could be buffered by sensitive parenting to foster positive child development; yet it does not appear to work the other way, however.
1.6.2 Changes of Family Types and Children’s Adjustment.

Families may change their membership of typology. Over time, parents may become better at separating their role as a spouse from that as a parent (Gao & Cummings, 2019), such that one’s parenting is less likely to be compromised by negative experiences in the marital subsystem. Accordingly, a family that is initially identified as a spillover family may change into a compartmentalization family. Likewise, an adequate-functioning family may be encumbered with unexpected stressors (e.g., unemployment, health problem) and change to other family profiles. Consistent with the view of developmental psychopathology on family process (Cummings et al., 2000), both the initial state and the changes in family environment should be considered understanding individuals’ functioning. To our knowledge, only one study has tested how changes in family typology were associated with changes in children’s functioning: Johnson (2003) found that children’s externalizing behavior decreased more than 2 standard deviations from Grade 1 to Grade 4, when their family type was observed to change from not cohesive type in kindergarten to cohesive type in Grade 4.

In sum, the last aim of my dissertation was to examine how family typologies identified through daily diary reports were related to children’s adjustment concurrently and longitudinally. Moreover, the present study aimed to test whether changes in family typologies, or the instability of family typologies, held implications for child adjustment. Fathers’ and mothers’ daily reports were used separately to identify family typologies, given the gender differences of the interplay between MR and PCR quality observed by existing studies. Our investigation of these research questions has the potential to inform prevention and intervention work: for example, family types that confer the greatest risk
for child development should be prioritized to receive financial and psychoeducational aids.

1.7 The Current Study

Happy and healthy family relationships nourish children’s emotional and behavioral development. Understanding the interrelatedness between marital and parent–child subsystems (i.e., the marital and parent–parent child relationship, MR–PCR link), therefore, holds important implications for intervention and prevention programs that target children’s adjustment. Despite the recent advancement, two main limitations in this research area remained unaddressed.

First, the fluid nature of the MR–PCR link in daily lives has rarely been captured. With the same level of MR positivity, a parent can have high PCR on one day, but low PCR on another day. Additionally, families may differ in their flexibility of moving from negativity-charged days and returning to normal/positive days. Second, the heterogeneity of MR–PCR links across families has been overlooked. One type of MR–PCR association may be detected because it is the dominant process existing in the entire sample, yet the other type of association may have been undetected due to its less-common existence. In response to the above limitations, my dissertation study aimed to delineate a dynamic, fine-grained, and developmentally-oriented picture of the family relationship context and further examine how different profiles of family relationship dynamics affect children’s adjustment problems. Guided by family systems theory, dynamic systems framework, and developmental psychopathology perspective, the present study employed state space grid (SSG; Hollenstein, 2013; Lewis et al., 1999)
analysis in conjunction with the sequence analysis (Sankoff & Kruskal, 1983) to address the following three aims:

1) Investigate the daily variability of the MR–PCR dynamics. For each family, two emotional state space grids were charted (one for the father and the other one for the mother; with MR and PCR plotted correspondingly on the x- and y-axis) based on parents’ daily reports of their emotional quality with the spouse and the child over a 15-day period. Different typologies for fathers and mothers were expected; moreover, differences between the variability in paternal and maternal emotional trajectories on SSGs were also expected.

2) Determine whether different profiles of MR–PCR associations could be identified within a single sample. With the aid of sequence analysis, we aimed to identify distinct patterns of intrafamily dynamics and create meaningful typologies of daily family dynamics. No specific hypothesis was advanced given the lack of research using similar analytical approaches. Some general hypotheses involved discovering a variety of relationship dynamics, such as the frequently-reported spillover and compensatory typologies. Additionally, our unique measurement burst design (i.e., three bursts of 15-day daily diaries) enabled investigation of the across-year stability of intra-family dynamic.

3) Investigate the developmental implications of each typology for child adjustment outcomes measured concurrently and longitudinally (i.e., two years later). Specifically, we hypothesized that family topologies identified at each wave were related to children’s adjustment assessed at the same time. Furthermore, family typologies identified at Wave 1 were hypothesized to predict children’s adjustment outcomes at Wave 3. Moreover, we expected to find that changes in typology would be related to changes in children’s developmental outcomes across the two-year assessment period.
CHAPTER 2:  
METHOD

2.1 Participants  
Couples and their child participated in this three-year prospective study, which was conducted in a small city in the Midwest. Participants were recruited from the community through flyers, newspaper, TV, and radio advertisements, community events, and letters distributed to local schools and neighborhood residents. To be eligible to participate, the couples had to be living together for at least 2 years with a 7- to 17-year-old child who lived with them for majority of the time. 299 couples participated at Wave 1 (W1), from which 250 remained at Wave 2 (W2) and 248 were retained at Wave 3 (W3). Families lost to attrition at either W2 or W3 did not differ from the retained families on any of the study variables (i.e., marital and parent–child relationship) at W1 or any demographic variables measured, including child gender, marital status, family income, or mother education. Fathers from families that dropped out at both W2 and W3 had lower education than those who stayed in the study, \( t = -2.26, p < .05 \).

237 families (out of the 299) at W1 completed the father-reported and mother-reported daily diaries, in addition to the laboratory portion of the study. Because one goal of the present project was to examine the stability/consistency of family type, it was essential that the analytical sample had participated all three assessment occasions.
Therefore, families in which at least one parent missed one diary assessment (out of three) were removed from final analyses. The final analytical sample consisted of 152 father–mother dyads.

Most couples were married for an average of 13 years ($SD = 6.68$), and one couple was living together but not married. Parents’ mean age was 40.50 years ($SD = 6.84$, range = 25 to 70) and 37.99 years ($SD = 6.17$, range = 24 to 70) for fathers and mothers, respectively. Children were 7 to 17 years old ($M = 11.10$ years, $SD = 2.31$; 53.3% girls), including 103 in middle childhood (age 7 to 11), 36 in early adolescence (age 12 to 14), and 13 in late adolescence (age 15 to 17). The distribution of children’s age was not skewed (skewness = .197) despite the imbalance across age groups.

Participants were representative of the community from which they were drawn (Papp, Kouros, & Cummings, 2009). Based on mothers’ reports, the median family income was in the US$40,001–$65,000 range ($n = 72$); 1 family reported a combined family income less than US$10,000, 8 reported a family income between US$10,001 and US$25,000, 32 reported a family income between US$25,001 and US$40,000, 19 reported a family income between US$65,001 and US$80,000, 18 reported a family income above US$80,000, and two mothers did not report this information. 94.1% of the mothers were European American, 3.3% were African American, 1.3% were Hispanic, and two mothers did not report their ethnicity or race. With regard to fathers, 92.1% were European American, 4.6% were African American, 2.6% were Hispanic, and one father was mixed race.
2.2 Procedure

Couples and their child visited the laboratory at each of the three waves spaced one year apart. During their visits, mothers and fathers completed questionnaires, including items about marital satisfaction, marriage length, child gender, and child adjustment. In addition, couples were instructed to complete a daily paper diary entry everyday consecutively for 15 days, beginning the next day following the laboratory visits. Occasional exceptions were allowed in which parents might miss a day or two when they were out of town. In such situations, parents were instructed to simply extend the period of diary days so that in the end, they filled out a total of 15 diary entries. All families completed the diary at the end of each day and parents were instructed not to discuss their answers with each other. Fathers and mothers mailed back their dairies separately when 15 entries were completed. Each family received $140 for their participation. The study procedure was approved by the university’s institutional review board, and parent consent and assent from children were obtained.

2.3 Measures

2.3.1 Relationship Quality.

MR and PCR were assessed via daily diaries. Concerning the measurement of MR, on a scale ranging from 0 (negative) to 9 (positive), both parents responded each day to the question “what is the emotional quality of your relationship with your spouse that day?” With regard to PCR, on the same scale, they also rated the overall emotional quality of their relationship with their child that day. Consistent with a functionalist perspective on emotions (Davies & Cummings, 1994), we assumed that participants
would best reflect and report their own perceptions for the emotional quality with their spouse and the child, and that this task did not require, and would not necessarily benefit from, special training. Therefore, we did not provide training for completing the diaries about emotional qualities of daily interactions. See Table 2.1 for specific descriptive statistics for MR and PCR reported by both fathers and mothers at each wave.
TABLE 2.1
DESCRIPTIVE STATISTICS OF THE MAIN STUDIED VARIABLES

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<tr>
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<td>–</td>
<td></td>
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<tr>
<td>19.</td>
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<td>.18*</td>
<td>–</td>
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<td>.39**</td>
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<td>-.02</td>
<td>-.08</td>
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<td>-.04</td>
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<td>.02</td>
<td>.13</td>
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</table>

NOTE: W = Wave; PR = parent-report; TR = teacher-report; ext = Externalizing; int = internalizing.
2.3.2 Child Adjustment– Parent Report.

Mothers and fathers completed the internalizing and externalizing problems subscales of the Child Behavior Checklist (CBCL; Achenbach, 1991) at all three measurement occasions. The internalizing problems subscale (30 items) reflects children’s anxious, withdrawn, and depressive symptomatology. The externalizing problems subscale (33 items) reflects children’s aggressive and delinquent behaviors. Parents rated children’s behaviors during the previous 6 months on a three point Likert scale (0 – not true, 1 – somewhat or sometimes true, 2 – very true or often true). Scores were summed and averaged across parents to create a parent-composite score of internalizing (Cronbach’s α ranged from .73 to .87, Wave 1-3) and externalizing problems (Cronbach’s α ranged from .75 to .89, Wave 1-3).

2.3.3 Child Adjustment– Teacher Report.

For a more complete understanding of children’s adjustment, teacher’s perceptions of the participating child’s behavioral problems were also assessed by the Teacher Report Form (TRF) of the Child Behavior Checklist (Achenbach, 1991b). Unfortunately, despite our best efforts, we were not able to recruit every child’s teacher to participate in the study. Of the 152 participating families, only 100 children at Wave 1 and 2 and 122 children at Wave 3 had a corresponding teacher reporting on the TRF. Internal consistency coefficients were acceptable for TRF internalizing (ranging from .78 to .86) and externalizing behaviors (ranging from .78 to .87).
2.4 Analytical Plans

The current project employed three stages of analyses to investigate the specified research questions. The first stage focused on visualizing and understanding the emotional interplay between marital and parent–child subsystems for each parent. State space grids (SSGs) were constructed for each parent at each time point. The second stage focused on examining inter-family differences, aiming at identifying family typology and evaluating the stability of these profile membership. Sequence analysis (fused with state-space grid analysis, see Brinberg et al., 2017), agglomerative hierarchical cluster analysis, and ANOVA were used in this stage. Finally, the third stage focused on examining developmental implications for child adjustment of the previously identified typology.

2.4.1 Stage I: Intra-Family Analyses.

SSGs were constructed for each parent at each wave with Gridware 1.1 (Lamey, Hollenstein, Lewis, & Granic, 2004). For fathers’ SSG, his reported emotional quality with the spouse (i.e., MR) was plotted on the x axis and his emotional quality with the child (i.e., PCR) was plotted on the y axis. Mothers’ SSGs were constructed in the same way. Each x-y coordinate then represented a particular emotional state in the family for a parent. The parent’s trajectory (i.e., sequence of emotional states) was drawn as it proceeded in a temporal sequence over the 15 diary-reporting days, capturing all emotional states between marital and parent–child subsystems experienced by this parent (Granic & Hollenstein, 2003; Granic & Lamey, 2002). Each grid was then divided into 100 “cells” using the 10-point Likert-type scale on x- and y-axes. Figure 2.1(a) illustrated the 10×10 SSG for a mother from Wave 1 of our study.
Figure 2.1 A state-space grid example trajectory for a mother (family ID =101) at Wave 1. Figure 2.1(a) is obtained using Gridware 1.15a and presents the trajectory on a $10 \times 10$ (i.e., 100-cell) grid; arrows indicate the direction of movement. Figure 2.1(b) is obtained using R ggplot function and presents the trajectory on a $3 \times 3$ (i.e., 9-cell) grid; exacted sequence of this mother’s emotional states is presented at the bottom of Figure 2.1(b), in the order of their temporal occurrence across the 15 assessment days.

Step 1. Variability measures. To quantify the variability of each family’s relationship dynamics (i.e., how variable a parent’s emotional states are on each SSG), three parameters were used, including transitions, cell range, and visit entropy. The first parameter, transitions, is the number of movements between cells on the SSG. Higher values of transitions indicate more frequent changes of emotional states and therefore more variability. The second parameter, cell range, is the count of the total number of unique cells visited by the trajectory. A greater number of cells indicate a greater range of emotional states therefore a greater variability. The third parameter, visit entropy, quantifies the predictability or the orderliness of state sequences; on two extremes, a sequence of random events has high entropy whereas a completely ordered sequence has low entropy. Calculation of visit entropy follows Shannon and Weaver (1949)’s formula:
\[ \Sigma(P_i \cdot \ln (1 - P_i)) \]

In which \( i \) is an index of each cell on the grid and \( P_i \) is the probability in cell \( i \). \( P_i \) is calculated by the number of visits to cell \( i \) divided by the total number of visits in the entire trajectory.

Step 2. Mother vs. father differences. Dependent \( t \) test was conducted to examine whether mothers and fathers from the same family would differ in the three measures of variability (i.e., transitions, cell range, and visit entropy).

Step 3. Across-Wave Differences. Repeated-measure analysis of variance (ANOVA) tests were conducted to examine whether mothers’, as well as fathers’, variability of emotional states changed across years.

2.4.2 Stage II: Inter-Family Analyses

The goal of the second analytical stage was to identify typologies of families. To this end, three analytical steps were taken, including obtaining sequences of cells for the newly constructed 3×3 (i.e., 9-cell) SSG, calculating dissimilarity among these sequences, and applying cluster analytic technique to the dissimilarity matrix to obtain family types. Readers interested in technical details beyond the brief description below are referred to Brinberg and colleagues’ work (Brinberg et al., 2017, 2018).

Step 1: Obtain sequences. Sequences of each parent’s emotional states (i.e., cells on each SSG) across the 15 diary-reporting days need to be constructed at Step 1, such that cluster analyses could be applied at later steps to identify typologies for family relationship dynamics. The original 10×10 SSG constituted 100 cells to represent all possible emotional states; obtaining sequence for these 100 emotional states resulted in
too much computational resources of the present dataset. As a result, other ways of dividing SSGs into cells were sought after.

Our first attempt to derive new cutoff points for dividing cells was guided by the empirical distributions of fathers’ and mothers’ reports of emotional quality: ratings of emotional quality reported by fathers and mothers were both highly skewed, with strong tendency to rate emotional quality high. For example, 24% and 29% of ratings were equal to 9 for mother-rated MR and PCR, respectively at Wave 1; see Table 2.1 for descriptive statistics for both parents’ daily diary ratings at each wave. To reflect the pattern of these empirical distributions, three cut-points (i.e., 5.5, 7.5, and 8.5) were first selected to divide the entire distribution into four sections based on percentiles (i.e., below 25th percentile, 25th to 50th percentile, 50th to 75th percentile, above 75th percentile). The resulting family typology of this 3-cut-point method, however, was difficult to interpret: at least two of the identified family types were too similar in their sequence patterns to be distinguished and were further evaluated.

One factor accounting for the similarity was the lack of differentiation between individuals who reported 9 about their relationship quality and individuals who reported 8. Resulting typologies of the 3-cut-point method contained two groups with similar patterns yet only different levels of relationship quality. To address this problem, a second way of choosing cut-off points was used, with ratings= 8 and ratings= 9 grouped together, resulting in only two cutoff points (i.e., 5.5 and 7.5). Correspondingly, the distribution of both marital relationship quality (MR, displayed on the x-axis) and parent-child relationship quality (PCR, displayed on the y-axis) were separated into 3 sections: 0–5, 6–7, and 8–9.
As shown in Figure 2.1(b), the SSG was divided into $3 \times 3 = 9$ cells using the two cut-points, 5.5 and 7.5. These plots were obtained using the base, ggplot2, and reshape package in R (R Core Team, 2015; Wickham, 2007, 2016). To prepare each family’s SSG for later sequence and cluster analysis, each cell of the SSG was labeled with a letter, such that every cell had a categorical name to be referred to. A sequence for each parent was then formed by extracting the letters of the cells in temporal order. For example, Figure 2.1(b) presented the SSG and corresponding sequence for the same mother whose trajectory was depicted in Figure 2.1(a). The order of colors represented the order of cells visited, and grey cells were inserted whenever missing value occurred.

Step 2: Sequence analysis. Sequence analysis was originally used in biology to identify and group DNA sequences that are similar. The technique is well-suited in the current project because the sequence of SSG cells are also ordered categorical elements that are similar to the four nucleotides — A, C, T, and G. Dissimilarity between two sequences is quantified as the minimum cost of transforming one sequence to another sequence via three actions: insertion, deletion, and substitution. Each action has an associated cost. Following typical procedures and previous research, I set insertion and deletion costs equal to 1 (Brinberg et al., 2017; MacIndoe & Abbott, 2004) and determined substitution cost using Manhattan (city-block) distance (travels are only allowed along the sides of cells). For example, the cost of substitute A with A was 0, A with B was 1, A with C was 2, and A with I was 4, and so forth. The weight of substitution cost aligned with the intuition that larger moves in the emotional SSG required much more energy (i.e., more costly) than smaller moves. To accommodate missingness, an additional row and column were added in which the cost of substitution
to and from missingness any state to the missing state was half the highest substitution cost (i.e., cost of substitution cost of missingness is 2). Thus, the dimension of the resulting substitution cost matrix was 10 × 10 (number of cells + 1 × number of cells +1).

After establishing the cost matrix, I found the minimum transformation cost using the three aforementioned actions (i.e., insertion, deletion, and substitution) in an optimal matching algorithm (Needleman & Wunsch, 1970) for every pair of sequences. An \(N \times N\) (\(N\) is the number of families, \(N = 152\) in this project) dissimilarity matrix was constructed with each element indicating the cost of transforming any given sequence into another. This sequence analysis was conducted using the \textit{TraMineR} and \textit{TraMineRextras} packages in R (Gabadinho, Ritschard, Müller, & Studer, 2011; Studer & Ritschard, 2016).

Step 3: Identify typology. After obtaining the sequence of every SSG and constructing the dissimilarity matrix, I employed cluster analytic techniques to the dissimilarity matrix to identify typology for fathers’ and mothers’ SSG. Specifically, agglomerative hierarchical cluster analysis was executed in R’s \textit{cluster} package (Maechler, Rousseeuw, Struyf, Hubert, & Hornik, 2016) to obtain typology, consistent with Brinberg and colleagues' (2017, 2018) procedure.

Step 4: Describe typology. Families within each subgroup had similar sequences and the subgroups together constituted a typology of intrafamily dynamics for fathers and mothers separately in each wave. One goal of Step 4 was to describe the prototypical emotional state space for families within each subgroup. Names were then assigned to each group in light of its prototypical pattern of emotional state space. Given the exploratory nature of this project, no priori hypotheses were made. Another goal of Step 4 was to examine whether the identified subgroups differed by child age. Previous
research showed that compared to younger children, adolescents exhibited greater variability in parent–child emotional dynamics (Brinberg et al., 2017; Granic et al., 2003). For this reason, it is important to discern whether the typology of family emotional state space is a function of child age. Finally, I examined whether fathers and mothers from the same family tended to affiliate with the same subgroup using kappa (κ) coefficients.

2.4.3 Stage III: Developmental Implications

Analyses at Stage 3 were conducted to examine how typologies of intra-family dynamics were concurrently correlated with and predictive of child adjustment outcomes.

Step 1: Concurrent correlations. At each time point, multivariate analyses of variance (MANOVA) were used to examine whether families with different patterns of intrafamily emotional dynamics would have children with different levels of adjustment problems (including child internalizing and externalizing problems reported by both parents and teachers).

Step 2: Longitudinal predictions. I examined the relationship between family type identified at Wave 1 and children’s adjustment outcomes assessed at Wave 3, controlling for Wave-1 child adjustment. Again, MANOVA tests were employed.

Step 3: Stability of family type and its implications. The goal of step 3 at Stage III was to examine the relationships between changes in family typology and changes in child adjustment over the two-year time span of the current study (i.e., from Wave 1 to Wave 3). First, I summarized the number of families who remained in the same profile as well as those who changed profile. Theoretically, there would be $m \times (m - 1)$ ways of changing profiles from Wave 1 to Wave 3 ($m$ is the number of profiles identified in each
wave). In the ideal situation, we would examine how each change was related to child adjustment; however, the current study was limited in power to detect any effects given its sample size. Therefore, I regrouped families as either adequate-functioning or not adequate-functioning at each time point \((m = 2)\). A mixed 2 (between-family type at Wave 1) \(\times\) 2 (between-family type at Wave 3) \(\times\) 2 (within-adjustment scores at Wave 1 and Wave 3) ANOVA were used to test whether changes in children’s adjustment over 2 years were systematically related to changes in family typology during the same time frame.
CHAPTER 3:
RESULTS

3.1 Stage I: Intra-Family Analyses

State-space grids were constructed for each parent (both the father and the mother) every year for three years. Consistent with the aims of the study, one focus of analyses was whether fathers and mothers from the same family differed in the variability of their emotional quality. As shown in Table 3.1, mothers’ grids consistently (with one exception) showed more variability of emotional quality than fathers’ grids, reflected in three variability measures: transitions, cell range, and visit entropy. Another distinct question was whether patterns of variability changed or were stable across years. Results showed neither fathers’ nor mothers’ measures of grid variability were found to be different across waves. In other words, both fathers’ and mothers’ flexibility of changing emotional states seemed to be stable over years.
### TABLE 3.1

**MEAN DIFFERENCES BETWEEN MOTHERS’ AND FATHERS’ VARIABILITY MEASURES AT EACH WAVE; ACROSS-WAVE DIFFERENCES OF EACH VARIABILITY MEASURES FOR FATHERS AND MOTHERS.**

<table>
<thead>
<tr>
<th>Variability Measures</th>
<th>Transitions</th>
<th>Cell Range</th>
<th>Visit Entropy</th>
</tr>
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<tr>
<td></td>
<td>Mean (SD)</td>
<td>Range</td>
<td>M-F diff t (df)</td>
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<tr>
<td>Wave 1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>M</td>
<td>9.06 (3.42)</td>
<td>0-14</td>
<td>2.71 (151)**</td>
</tr>
<tr>
<td>F</td>
<td>8.07 (3.73)</td>
<td>0-14</td>
<td></td>
</tr>
<tr>
<td>Wave 2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>M</td>
<td>8.68 (3.21)</td>
<td>0-14</td>
<td>1.47 (151)</td>
</tr>
<tr>
<td>F</td>
<td>8.20 (3.34)</td>
<td>0-14</td>
<td></td>
</tr>
<tr>
<td>Wave 3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>M</td>
<td>9.03 (3.03)</td>
<td>0-14</td>
<td>2.25 (151)**</td>
</tr>
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<td>F</td>
<td>8.22 (3.42)</td>
<td>0-14</td>
<td></td>
</tr>
<tr>
<td>Across-wave diff</td>
<td>M</td>
<td>F (2,302) = 1.00, p &gt; .05</td>
<td>F (2,302) = 2.03, p &gt; .05</td>
</tr>
<tr>
<td></td>
<td>F</td>
<td>F (2,302) = .12, p &gt; .05</td>
<td>F (2,302) = .36, p &gt; .05</td>
</tr>
</tbody>
</table>

*NOTE: M=mothers, F=fathers, diff=differences*

3.2 Stage II: Inter-Family Analyses

After obtaining SSGs for each parent and evaluating the differences between gender and across waves, another goal of the present study was to examine whether families could be clustered into different types based on the patterns of their SSGs. The clustering was done six times (i.e. father SSG, as well as mother SSG, independently for
each of three waves of this study) and the number of clusters was selected based on two
criterions. First, dissimilarity between the subgroups was large, such that each subgroup
represented distinct patterns of intrafamily emotional dynamics. Second, the size of each
subgroup was sufficient and the number of subgroups was interpretable: too many
subgroups with a small size would be less likely to be replicated with a different sample
and would be difficult to interpret.

A four-cluster grouping solution was consistently supported. That is, a typology
of four subgroups representing different patterns of intrafamily relationship dynamics
was indicated according to the criteria described above for both fathers and mothers at
each wave. Figures 3.1, 3.2, and 3.3 present the identified groups of sequences for
families at Wave 1, 2, and 3, respectively. To depict the prototypical relationship
dynamics of parents within each subgroup, a family from each of the subgroups was
selected and its SSG was presented next to the grouped sequence.
Figure 3.1 Four-cluster profiles of intrafamily relationship dynamics for mothers (left panel) and mothers (right panel) at Wave 1, with an accompanying exemplar parent’s SSG (state space grid). In each profile, all trajectories are grouped together with each row representing one family (e.g., there are 33 rows for Type 1 Cohesive mothers).
Figure 3.2 Four-cluster profiles of intrafamily relationship dynamics for mothers (left panel) and mothers (right panel) at Wave 2, with an accompanying exemplar parent’s SSG (state space grid). In each profile, all trajectories are grouped together with each row representing one family (e.g., there are 72 rows for Type 1 Cohesive mothers).
Figure 3.3 Four-cluster profiles of intrafamily relationship dynamics for mothers (left panel) and mothers (right panel) at Wave 3, with an accompanying exemplar parent’s SSG (state space grid). In each profile, all trajectories are grouped together with each row representing one family (e.g., there are 74 rows for Type 1 Cohesive mothers).
To facilitate interpretation, I assigned names to each subgroup. Type 1, *cohesive* families, included parents who consistently reported high levels of emotional quality both with their child and with their partner. By comparison, *spillover* families (Type 2) reported low levels of both marital and parent-child relationship quality every day. *Fluctuating cohesive* (Type 3) families were similar to *cohesive* families in that they reported high levels of emotional quality, but differed in the amount of variability over time; that is, parents in the *fluctuating cohesive* subgroup were more variable in their reported daily relationship quality than parents in the *cohesive* group. The difference between these two subgroups (i.e., Type 1 and 3) was also indicated by significant differences in all three variability measures (i.e., transitions, cell range, and visit entropy), as shown in Tables 3.2, 3.3, and 3.4. Lastly, Type 4 families reported moderate levels of MR and PCR (between values found for *cohesive* and *spillover* families) with much variability, thus they were named as *middle-of-the-road* families (i.e., Type 4).

Interestingly, although the typology remained the same for fathers at Wave 2 and 3 (see the right panels of Figures 3.2 and 3.3), it changed for mothers (see the left panels). Specifically, *middle-of-the-road* group (Type 4) was not identified for mothers; a new group, Type 5, emerged and was named *compensatory* group based on the characteristics of their relationship dynamics. Mothers from the *compensatory* group reported high levels of relationship quality with their child in spite of their low relationship quality with the spouse on the same day.
TABLE 3.2
MEAN DIFFERENCES AMONG CLUSTER GROUPS WITH DIFFERENT INTRAFAMILY RELATIONSHIP DYNAMICS FOR MOTHERS AND FATHERS AT WAVE 1

<table>
<thead>
<tr>
<th>Wave 1 Mother</th>
<th>Variability Measures</th>
<th>df</th>
<th>F</th>
<th>p</th>
<th>Type 1 Cohesive</th>
<th>M (SD)</th>
<th>Type 2 Spillover</th>
<th>M (SD)</th>
<th>Type 3 Fluctuating Cohesive</th>
<th>M (SD)</th>
<th>Type 4 Middle-of-the-Road</th>
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<td>Type 2</td>
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<td>Type 4</td>
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<td>F</td>
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<td>M (SD)</td>
<td>M (SD)</td>
<td>M (SD)</td>
<td></td>
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<tr>
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<td>0.040</td>
<td>8.43 (3.79)</td>
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<td>8.63 (5.09)</td>
<td>6.41 (4.97)</td>
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<td>6.75 (5.17)</td>
<td>5.09 (4.94)</td>
<td>6.11 (4.99)</td>
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<td>0.538</td>
<td>3.26 (7.79)</td>
<td>4.04 (9.49)</td>
<td>3.26 (4.74)</td>
<td>6.11 (11.39)</td>
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<td>3.07 (3.62)</td>
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</table>

NOTE: PR = parent-report; TR = teacher-report; ext = Externalizing; int = internalizing. F and p values are from the overall MANOVA tests with degrees of freedom. Significant pairwise comparisons tested with Tukey’s honest significance test correction were indicated by numeric subscripts: 1,2,3,4,5. Bolded were subgroups that were found to exhibit prominent differences.
TABLE 3.3
MEAN DIFFERENCES AMONG CLUSTER GROUPS WITH DIFFERENT INTRAFAMILY RELATIONSHIP DYNAMICS FOR MOTHERS AND FATHERS AT WAVE 2

| Wave 2 Mother | Variability Measures | Type 1 | | Type 2 | | Type 3 | | Type 4 | | Type 5 |
|---------------|----------------------|--------|---|--------|---|--------|---|--------|---|--------|---|
|               |                      | Cohesive | | Spillover | | Fluctuating Cohesive | | Middle-of-the-Road | | Compensatory |
|               |                      | df | F | p | M (SD) | | M (SD) | | M (SD) | | M (SD) |
| Transitions   |                      | 3,143 | 3.43 | 0.019 | 9.71 (3.13) | | 8.50 (2.96) | | 10.60 (2.76) | | - |
| Cell range    |                      | 3,143 | 6.97 | <.001 | 5.58 (1.88) | | 4.42 (1.28) | | 6.45 (1.80) | | - |
| Visit entropy |                      | 3,143 | 6.03 | 0.001 | 1.54 (.39) | | 1.34 (.30) | | 1.72 (.31) | | - |
| PR ext problems |                   | 3,141 | 2.12 | 0.101 | 5.74 (4.28) | | 8.81 (9.00) | | 6.14 (3.77) | | - |
| PR int problems |                   | 3,141 | 0.73 | 0.53 | 4.56 (4.15) | | 5.75 (5.73) | | 5.53 (4.67) | | - |
| TR ext problems |                   | 3,92  | 1.10 | 0.353 | 2.68 (5.85) | | 5.60 (8.21) | | 3.15 (6.75) | | - |
| TR int problems |                   | 3,92  | 2.80 | 0.044 | 2.96 (3.96) | | 5.73 (5.39) | | 2.30 (2.37) | | - |

Note: The table provides mean differences among cluster groups with different intrafamily relationship dynamics for mothers and fathers at Wave 2. The table includes data for variability measures such as transitions, cell range, and visit entropy, as well as child adjustment problems such as PR ext problems ( Executor problems by Parent ) and TR ext problems ( Executor problems by Teacher ).
<table>
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<th>Variability Measures</th>
<th></th>
<th>Type 1</th>
<th></th>
<th>Type 2</th>
<th></th>
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<td>F</td>
<td>p</td>
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<td>Spillover</td>
<td></td>
<td>Fluctuating Cohesive</td>
<td></td>
<td>Middle-of-the-Road</td>
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<td>3</td>
<td>7.52 (4.08)</td>
<td>3,4</td>
<td>10.96 (2.14)</td>
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<td>8.95</td>
<td>&lt; .001</td>
<td>4.80 (1.81)</td>
<td>3</td>
<td>4.08 (2.00)</td>
<td>3</td>
<td>6.17 (1.65)</td>
<td>1,2,4</td>
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<tr>
<td></td>
<td></td>
<td>Visit entropy</td>
<td>3,141</td>
<td>10.19</td>
<td>&lt; .001</td>
<td>1.38 (.38)</td>
<td>3</td>
<td>1.14 (.60)</td>
<td>3,4</td>
<td>1.68 (.28)</td>
<td>1,2</td>
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<td>0.96</td>
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<td>3.31 (4.71)</td>
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</table>

NOTE: PR = parent-report; TR = teacher-report; ext = Externalizing; int = internalizing. F and p values are from the overall MANOVA tests with degrees of freedom. Significant pairwise comparisons tested with Tukey’s honest significance test correction were indicated by numeric subscripts: 1,2,3,4,5. Bolded were subgroups that were found to exhibit prominent differences.
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<th>$M$ (SD)</th>
<th>$M$ (SD)</th>
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<tr>
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<td>0.058</td>
<td>9.72 (3.13)</td>
<td>3.29 (2.92)</td>
<td>11.02 (2.72)</td>
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<td>10.73 (1.79)</td>
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<td>1.61 (.37)</td>
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<td>6.69 (5.20)</td>
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<td>0.963</td>
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TABLE 3.4 (CONTINUED)

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<th>Type 1 Cohesive</th>
<th>Type 2 Spillover</th>
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<th>Type 4 Middle-of-the-Road</th>
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<td><strong>1.14 (.42)</strong>*</td>
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<td>4.00 (4.88)</td>
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</tbody>
</table>

NOTE: PR = parent-report; TR = teacher-report; ext = Externalizing; int = internalizing. F and p values are from the overall MANOVA tests with degrees of freedom. Significant pairwise comparisons tested with Tukey’s honest significance test correction were indicated by numeric subscripts: 1,2,3,4,5. Bolded were subgroups that were found to exhibit prominent differences.
Moderate levels of consistency in family type across time was indicated in the present study, as shown in Table 3.5. For example, of the 33 mothers who were identified as cohesive during W1 assessment, 25 (75.8%) were still seen as cohesive at W3, whereas 1 (3%) was seen as spillover, 4 (12.1%) were seen as fluctuating cohesive, and 3 (9.1%) were seen as compensatory at W3. Similarly, cohesive fathers at W1 mostly stayed in the same family profile (62.9%) at W3, although the rest diverged into other profiles. Mothers who were clustered into spillover subgroup, however, exhibited little stability over years: only 2 families (out of 11) remained in the spillover profile at W3.

The four identified clusters at each wave did not differ as a function of child age or child gender ($p_s > .05$) for either fathers or mothers, with only one exception: at Wave 2, the four types of fathers’ relationship quality differed significantly in child age, $F(3,141) = 3.83, p < .05$. Post hoc analysis with Tukey’s honest significance test correction indicated that fluctuating cohesive (Type 3) families had older children than cohesive (Type 1) families.

Finally, Cohen’s $\kappa$ coefficients were obtained to evaluate whether there was agreement between same-family father’s and mother’s profile membership. There was fair agreement between father’s and mother’s affiliated clusters, $\kappa = .236, p < .001$ at Wave 1, $\kappa = .127, p < .01$ at Wave 2, and $\kappa = .179, p < .001$ at Wave 3. That is, fathers and mothers from the same family tended to have similar patterns of relationship dynamics. It should be note that although $\kappa_s$ were differed significant from 0, the strengths of agreement were not strong (most statisticians prefer $\kappa > .6$).
3.3 Stage III: Developmental Implications

3.3.1 Concurrent Associations.

The meaning of the identified family typologies was further explored by examining their associations with child adjustment outcomes. That is, analyses were conducted to test whether children’s adjustment outcomes (including externalizing and internalizing problems) varied by family types at each wave by means of multivariate analyses of variance (MANOVA) in SPSS. All the MANOVA tests included child age and child gender as covariates. Results for Wave 1, 2, and 3 were summarized in Tables 3.2, 3.3, and 3.4, respectively.

The typology obtained for Wave-1 maternal intrafamily relationship dynamics differed significantly on parents’ report of children’s externalizing problems, $F(3,137) = 3.55, p < .05$. Children from cohesive families ($MT_{1} = 5.50$) had lower levels of parent-report externalizing problems than children from spillover ($MT_{2} = 10.21$) or middle-of-the-road ($MT_{4} = 8.73$) families. Similar results emerged for Wave-1 paternal typology: there was a significant main effect of paternal typology in relation to children’s externalizing problems reported by parents, $F(3,132) = 2.67, p < .05$. Fathers reporting higher levels of daily relationship quality with both the spouse and the child (i.e., the cohesive fathers) had children with fewer externalizing problems ($MT_{1} = 5.93$) than fathers from the spillover ($MT_{2} = 8.63$) and middle-of-the-road ($MT_{3} = 8.54$) groups. See Table 3.2 for full results.

At Wave 2, no significant main effects of maternal or paternal typology were found on parent-reported child adjustment. Typologies relate significantly, however, to teacher-reported child adjustment. Specifically, mothers with different types of
relationship dynamics had children with different levels of teacher-reported internalizing problems, $F(3, 92) = 2.80, p < .05$. Follow-up tests indicated that mothers whose relationship dynamics were characterized as spillover had children with more internalizing problems ($M_{T2} = 5.73$) reported by the teachers than those whose typologies were characterized as cohesive ($M_{T1} = 2.96$) or fluctuating cohesive ($M_{T3} = 2.30$). By comparison, paternal typologies were differentiated by children’s teacher-reported externalizing problems, $F(3, 92) = 5.72, p < .01$. Follow-up tests showed that children of fathers with spillover relationship dynamics ($M_{T2} = 8.35$) exhibited higher levels of externalizing problems than children of fathers reporting cohesive ($M_{T1} = 1.87$), fluctuating cohesive ($M_{T3} = 1.66$), and middle-of-the-road ($M_{T4} = 3.37$) relationship dynamics. Full results of the MANOVA tests at Wave 2 were summarized in Table 3.3.

Mothers’ typologies at Wave 3 differentially related to children’s externalizing problems as reported by parents, $F(3, 141) = 2.90, p < .05$. Specifically, children of mothers whose relationship dynamics were characterized as spillover ($M_{T2} = 9.68$) had higher levels of externalizing problems than children whose mothers’ relationship dynamics were cohesive ($M_{T1} = 5.55$) or fluctuating cohesive ($M_{T3} = 6.69$). See Table 3.4 for full results of MANOVA tests at Wave 3.

I hypothesized that children from families with more variable intrafamilial relationship dynamics would have fewer adjustment problems. Initial exploration of this hypothesis was not supported, given that no significant difference of child adjustment problems was found between cohesive (Type 1) and fluctuating cohesive (Type 3) families (see Tables 3.2, 3.3, and 3.4 for detailed results). The power of detecting meaningful effects might have been compromised by the dichotomization of family type.
(i.e., Type 1 vs. Type 3); using variability as a continuous variable and examining the bivariate correlations between variability and child adjustment problems may facilitate the exploration of this hypothesis. Therefore, I chose to only focus on Cohesive (Type 1) and Fluctuating Cohesive (Type 3) families who, on average, showed high levels of daily relationship quality with both the spouse and the child ($N = 88, 112, \text{ and } 122$ mothers at Wave 1, 2, 3, respectively; and $N = 67, 90, \text{ and } 89$ fathers at Wave 1, 2, 3, respectively); then, bivariate correlation analysis was run on the subsample of families at each wave to examine whether the three variability measures (i.e., transitions, cell range, and visit entropy) were related to child adjustment problems.

Contrary to the previous hypothesis, results showed that higher variability were associated with more adjustment problems. For example, parent-report child externalizing problems were positively correlated with the variability of mothers’ relationship dynamics (Wave 1, $r = .251, p < .05$, for cell range and $r = .245, p < .05$ for visit entropy; Wave 3, $r = .215, p < .05$, for cell range and $r = .204, p < .05$ for visit entropy). In addition, parent-reported child internalizing problems were positively associated with mothers’ grid transitions ($r = .236, p < .01$) and visit entropy ($r = .188, p < .05$) at Wave 3. No significant association between fathers’ variability of relationship dynamics and child adjustment problems was found.

3.3.2 Longitudinal Predictions.

Using multivariate analysis of co-variance (MANCOVA), I examined whether family typology identified at Wave 1 would predict children’s adjustment problems assessed at Wave 3, controlling for Wave-1 adjustment outcomes, child age, and child gender. Results showed that Wave-1 typology did not predict any of the adjustment
outcomes assessed at Wave 3. Additionally, I tested whether Wave-2 typology would predict Wave-3 child adjustment, controlling for Wave-2 adjustment, age, and gender. No significant effect was found.

3.3.3 Stability of Family Type and Its Implications.

Table 3.5 summarized how family relationship dynamic typology in the current sample changed from Wave 1 to Wave 3 (i.e., across two years) for mothers (on the left side of the table) and for fathers (on the right side of the table). Most mothers ($N = 25$), as well as most fathers ($N = 22$), who were clustered into the cohesive group at Wave 1 continued to be clustered into cohesive type at Wave 3. Other Wave-1 cohesive mothers ($N = 4$) and fathers ($N = 10$) were identified as fluctuating cohesive at Wave 3. Additionally, most fluctuating cohesive mothers ($N = 28$) and fathers ($N = 16$) at Wave 1 changed their group membership to cohesive at Wave 3; although some of them (18 mothers and 9 fathers) continued to be identified as fluctuating cohesive at Wave 3. Families who exhibited adequate-functioning relationship dynamics (i.e., those who were identified as either cohesive or fluctuating cohesive subgroup) seemed to remain stable in their group membership: most of these families either stayed in the same subgroup or changed to the other subgroup. Thus, I regrouped families such that there were only 2 groups at each time point: adequate-functioning (including cohesive or fluctuating cohesive subgroups) or not adequate-functioning group (including spillover or middle-of-the-road/compensatory subgroups).
TABLE 3.5
FREQUENCY TABLE OF FAMILY TYPOLOGY AT WAVE 1 AND WAVE 3.

<table>
<thead>
<tr>
<th>Wave 3</th>
<th>Mothers</th>
<th>Wave 3</th>
<th>Fathers</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Missing</td>
<td>Type1</td>
<td>Type2</td>
</tr>
<tr>
<td>Missing</td>
<td>3</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Type 1: Cohesive</td>
<td>0</td>
<td>25</td>
<td>1</td>
</tr>
<tr>
<td>Type 2: Spillover</td>
<td>0</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Type 3: Fluctuating Cohesive</td>
<td>2</td>
<td>28</td>
<td>2</td>
</tr>
<tr>
<td>Type 4: Middle-of-the-road</td>
<td>0</td>
<td>16</td>
<td>7</td>
</tr>
</tbody>
</table>
A mixed-effect MANCOVAs were used to examine whether changes in children’s adjustment over 2 years were systematically related to changes in family functioning during the same time frame. A significant 2 (between family factor: family type at Wave 1) × 2 (between family factor: family type at Wave 3) × 2 (within family factor: adjustment scores at Wave 1 and Wave 3) 3-way interaction was found for parent-reported child internalizing problems, \( F(1,136) = 5.91, p < .05 \). Figure 3.4 was drawn to unpack the meaning of this significant 3-way interaction: while children from the other three groups were reported by their parents to have fewer internalizing problems at Wave 3 than Wave 1, an increase in internalizing problems was observed in children who came from families that were identified as adequate-functioning at Wave 1 yet became non adequate-functioning at Wave 3. In other words, a family that was unstable in its type of daily relationship dynamics, particularly when it ceased to be identified as an adequate-functioning family, tended to confer risk for the child’s development of internalizing problems.
Figure 3.4 Plot of the significant 2 (between family factor: family type at Wave 1) × 2 (between family factor: family type at Wave 3) × 2 (within family factor: adjustment scores at Wave 1 and Wave 3) 3-way interaction. It shows changes in parent-report child internalizing problems over time (i.e., from Wave 1 to Wave 3). Solid lines represent families who were not adequate functioning at Wave 3; dotted lines represent families who were adequate functioning at Wave 3. Lines with circles represent families who were assessed as not adequate functioning at Wave 1; lines with triangles represent families who were assessed as adequate functioning at Wave 1.
CHAPTER 4:
DISCUSSION

Family emotional environment is a richly woven fabric for each family, providing the initial immediate social context for children’s socioemotional development. The two most important relationships that constitute a family’s emotional environment and have received the greatest research attention are marital and parent-child relationships (MR and PCR). From day to day, these intertwined relationships are woven into the fabrics of family emotional environment, giving rise to unique patterns of emotional dynamics and affording an immediate developmental context for the child in the household. Little research progress has been made, however, in 1) addressing the daily relationship dynamics, 2) identifying different patterns of these dynamics, or 3) examining the developmental utility of the identified typologies. Therefore, these three research questions were explored by the present study utilizing the state-space grid analyses in conjunction with sequence analysis. Our present study was among the first empirical efforts to examine the developmental implications of different family typologies derived with daily diary data. In addition to its empirical contributions, our study also advanced new avenues for the analyses of inter-family differences in intra-family dynamics.

The first question examined the intra-family relationship dynamics by focusing on fathers’ and mothers’ variability of emotional states. On the state-space grids constructed
for each parent at each wave of assessment, parents with greater variability of emotional states exhibited more transitions across cells, wider cell range, and higher visit entropy. Results showed that compared to fathers, mothers from the same family revealed more variability in their emotional states during the 15-day diary reporting period. That is, mothers’ emotional states constituted by relationship quality with the spouse and with the child fluctuated more than that of fathers. We speculate that mothers’ more variable emotional states may be related to longer time spent with the child (Craig, 2006) such that high numbers of mother-child interactions throughout a day would elicit emotions in mothers, hence exerting more perturbations in their emotional systems and resulting in higher fluctuations, compared to fathers who simply did not have as much father-child exposure within a day. Such speculation is supported by previous research that has found mothers reported more tensions with their child on a daily level than fathers (Almeida et al., 1999). Given that each emotional state in the present study was a conjoint state defined by MR and PCR, variability of emotional states thus illuminated a wholistic fluctuation of a family emotional system. Thus, our findings extend previous research that only focused on father-mother differences in one specific component of a family (i.e., marital or parent-child subsystem) to characterize the overall system dynamics.

Variability of emotional states during 15 typical days of family life seemed stable across the two-year assessment period. Measures of variability within a family did not change over the years; rather, each segment of the woven fabric of families’ emotional environment seemed to exhibit similar patterns. Such results may indicate that the daily diary method was a valid tool to capture families’ day-to-day relationship dynamics, yet cautions must be exercised when interpreting this null result given the wide range of child
age in our sample. Over-year changes in family emotional dynamics might have gone undetected due to child age differences at each measurement occasions. Future studies with a more homogenous sample in child age are needed.

The second aim of our study was to identify typologies of daily family emotional dynamics by characterizing different profiles of the interconnections between marital and parent-child subsystems. At our first measurement period (i.e., Wave 1), four specific family typologies were consistently identified for both fathers and mothers. Solutions extracted a cohesive type profile, consistent with previous empirical and clinical classification of families who showed high levels of emotional quality in both marital and parent–child subsystems (Johnson, 2003; Lindblom et al., 2017; Minuchin, 1974; Sturge-Apple et al., 2010). Families classified as spillover type exhibited low levels of functioning in marital and parent–child subsystems, opposite to the pattern of relationship dynamics in cohesive type families. Found in the middle were the middle-of-the-road type families whose values of MR and PCR were between the previous two family types. Interestingly, we identified a new family profile, fluctuating cohesive type, in which families were characterized by their highly variable emotional states in the presence of similar levels of high relationship quality as the cohesive families.

The simultaneous identification of cohesive and fluctuating cohesive families in our study highlights ways in which the current understanding of family relationship dynamics may be refined. For example, prior studies that have focused on family typologies have consistently found a well-functioning group characterized by high levels of warmth and closeness in both marital and parent–child subsystems (e.g., Cohesive subgroup in Struge-Apple et al 2010; Good-Marriage/Good-Parenting subgroup in
Belsky & Fearon, 2004; *Adequate-Functioning* subgroup in Sturge-Apple et al., 2014). Taking advantage of the repeated measures (i.e., daily diary) and the state-space methodology, our study captured heterogeneity in these well-functioning families and found two ways in which “cohesiveness” manifested itself: families may consistently exhibit positive emotional quality every day, or their emotional quality may fluctuate from day to day while maintaining a high emotional level in general. Such a finding advocates for a more nuanced understanding of family relationship dynamics (Brinberg et al., 2017; Laurenceau & Bolger, 2005; Ram & Gerstorf, 2009). Not only the *content* (i.e., the relative level in comparison to other families) but also the *structure* (i.e., intra-family variability) of family relationship dynamics matter when it comes to clustering families.

Following the calls for incorporating longitudinal design in assessing family typology (Lamela et al., 2018; Sturge-Apple et al., 2010), the present study employed measurement burst design to empower the examination of stability and changes in family profiles. Two pieces of findings require further discussion. First, a new typology with different characteristics of family dynamics emerged for mothers at later assessment points. Particularly, a *compensatory* profile was identified as a new profile for mothers at Wave 2 and 3. Mothers from the *compensatory* group reported high emotional quality with their child in spite of the low emotional quality they experienced with their spouse on the same day. These mothers might seek to form strong emotional ties with the child to compensate for the negativity that they experienced with their spouse. Although a compensatory association between marital and parent–child subsystems has been long forwarded by theoretical propositions and clinical classifications, empirical findings supporting this family profile have been mixed (Belsky et al., 1991; Gao & Cummings,
Ponnet et al., 2013; Sherrill et al., 2017). It may be that previous findings were mostly obtained by variable-centered approaches; only the most dominant pattern of family dynamics was picked up, leaving the less commonly seen compensatory profile undetected (Bergman & Magnusson, 1997). With a person-centered, pattern-based approach, the present study provides some of the first evidence in support of the compensatory profile, especially for mothers. Second, there existed only a moderate level of consistency in family typology across the two-year time span of this project (i.e., three assessment occasions). While families with more adequate functioning in both marital and parent–child subsystems (i.e., the cohesive and fluctuating cohesive families) mostly stayed in their original or adjacent profile, spillover families were more likely to change profiles at later time points. This result corroborates findings in Johnson (2003) to indicate that family typologies are subject to change over time: a family that is identified as spillover at one point for its distressed marital and parent–child relationship may be identified as cohesive at a later time point for well-functioning marital and parent–child subsystems. Although we could not rule out the possibility that such instability might be accounted by significant life events (e.g., unemployment, relocation, birth of a new child) that may have occurred within the family at the time of assessment, our results did send an encouraging message that there is plasticity for social workers and family therapists to work with families to promote positive family functioning.

The compensatory profile was found only for mothers’ typology (at Waves 2 and 3). That is, a family type in which parents tended to report better emotional quality with the child to compensate for the marital negativity was observed only in mothers, but not fathers, of our sample. This result coalesced with existing findings achieved from
variable-centered approaches (Belsky et al., 1991; Gao & Cummings, 2019; Stroud et al., 2011) to show that marital distress may have a greater impact on father–child than mother–child relationships. Mothers are considered to be the “gatekeepers” of caregiving practices (Parke, 2002) and have been found to put forth more effort to counteract the unfolding cascade of marital negativity into child-rearing contexts (Belsky et al., 1991; Denham, Bassett, & Wyatt, 2010). Therefore, there may be more mothers than fathers who are invested in maintaining a good relationship with the child in face of marital distress, constituting a typology referred to as compensatory in the present study. The different typologies observed for mothers and fathers highlight the importance of differentiating fathers’ and mothers’ experienced relationship dynamics.

Developmental implications of different family typologies were examined as the third main research question of the present study. Consistent with findings from prior work (Brinberg et al., 2017; Johnson, 2003; Lamela et al., 2018; Sturge-Apple et al., 2014), the present study found associations between family patterns and children’s adjustment. Overall, children from the spillover families had the worst adjustment outcome, as indicated by the highest levels of externalizing problems reported by both their parents (at Wave 1 and 3) and their teachers (at Wave 2). While this pattern of findings was not consistent across all three assessments and thus should undergo future replication before drawing conclusions about risks conferred by the spillover typology, it does require some plausible interpretations. First, the general emotional climate in a spillover family does not provide a supportive environment for children’s emotional and behavioral development. Emotionally exhausted from constantly feeling distressed toward their spouse and child, parents who were identified in the spillover profile may no
longer possess enough emotional resources to patiently interact with the child, address their emotional needs (Thompson & Meyer, 2007), or discipline them when necessary. Additionally, children from these families are likely to be drawn to family difficulties, revealed by heightened distress, dysregulated behaviors, and negative reappraisals (Cummings & Davies, 1996). In turn, such preoccupation and concern about family difficulties may compromise children’s adjustment and detract them from demands at school (Cummings, Cheung, & Davies, 2013). It should be noted, however, that our longitudinal examinations did not find a predictive link between typologies and adjustment outcomes at a later time. Thus, the extent to which the spillover typology prospectively undermines children’s adjustment remains unclear and will need to be examined by future studies.

Whereas spillover families seemed to confer the highest risk for children’s adjustment, cohesive families may have provided a desirable family context. This is supported by the least adjustment problems of children from cohesive families, which replicated findings from previous research utilizing person-centered approaches (e.g., Johnson, 2003; Sturge-Apple et al., 2010). These children’s advantages in adjustment outcomes, compared with their peers in spillover groups, not only were noticeable to the parents, but also manifested in school settings as reported by their teachers. Hence, our study adds further evidence to the beneficial developmental utility of the cohesive family profile.

We continued to examine only the cohesive and fluctuating cohesive families more closely. Intriguing results were achieved and thus warrants further discussion. Specifically, post hoc pairwise comparisons showed that children from cohesive families
were comparable with children from fluctuating cohesive families in both parent-reported and teacher-reported adjustment behaviors. Because these two family profiles were similar in the levels of relationship quality, yet differed in the extent of variability, the lack of significant difference between children’s adjustment outcomes indicated that variability might not be a thwarting or facilitating factor to children’s development, at least as assessed by internalizing and externalizing outcomes. This preliminary conclusion, however, was negated by a closer examination of the link between the variability of family emotional quality and children’s adjustment outcomes. When we used measures of variability as continuous variables and examined their associations with children’s adjustment, results showed that higher variability was related to more externalizing, as well as internalizing, child problems reported by parents. As one of the first forays to understanding the variability of family emotional states across days, the present study found that a fluctuating emotional environment within a family, despite the general cohesive relationship dynamics, might exert a negative impact on children’s adjustment. This result contrasted with previous findings that greater parent–child emotional variability was related to improvement in children’s externalizing behaviors (e.g., Granic et al., 2007; Hollenstein, Granic, Stoolmiller, & Snyder, 2004). It should be noted that previous research assessed variability during parent–child problem-solving tasks that only lasted minutes; within this short time period, variability, or families’ ability to change emotional states according to contextual demands, may rather have reflected flexibility in family interactions, which was essential for solving the problem. Variability as it is operationalized in our study, on the other hand, was used to characterize fluctuations of families’ emotional states across days. When a family’s
general emotional environment changes from day to day, it may no longer be suitable to be interpreted as flexible; rather, it may denote a volatile family environment characterized by inconsistent emotional states across days. It is difficult for children from these families to learn appropriate emotion regulation skills, which could put these children at greater risks for developing various adjustment problems (Lippold, Hussong, Fosco, & Ram, 2018). In short, findings from the present study suggest that across-day variability of emotional states within a family may be a detrimental factor to influence child adjustment in the cohesive and fluctuating cohesive groups.

Changes in family typology from Wave 1 to Wave 3 were found to be linked with children’s internalizing behaviors reported by their parents. Consistent with a transactional model of development (Cummings et al., 2000), this finding showed that children’s adjustment outcomes were a result of both their current and their previous family experience. When families were seen as adequate functioning at Wave 1 but were classified as non-adequate functioning at Wave 3, children’s internalizing problems increased. It seemed that changes of a family emotional environment toward an undesirable direction may result in negative effects on children’s functioning. As for the developmental sequel of families who remained in the inadequate group, our finding was surprising. Specifically, when families were observed to be of inadequate functioning at both assessment occasions, rating of children’s internalizing problems reported by the parents actually decreased, which directly contradicted what we would have expected for a family environment with unceasing negativity. One speculation is that the decline of children’s internalizing problems may have indicated an adaptive mechanism developed by those children who were continuously exposed to an unfavorable family context.
Unfortunately, the small sample size of the present study did not give us much confidence to forward any speculations for this finding. We encourage future studies with larger sample sizes and similar designs to examine this question.

4.1 Methodological Implications: Daily Diary Data and Grid-Sequence Analyses

As discussed above, the present study extends and strengthens research on the interconnections between marital and parent–child subsystems from multiple aspects. These unique contributions would not have been achieved without the aid of the daily diary design or the application of grid-sequence analyses. Here, we summarize avenues through which our methodology can be used to understand family relationship dynamics.

First, daily diary studies produce intensive longitudinal data that allow for delineating intrafamily variability (Laurenceau & Bolger, 2005). Because intrafamily variability can be mapped to many properties of family characteristics, such as stability, plasticity, and flexibility, the adoption of daily diary method is particularly valuable and compliments traditional longitudinal panel methods to capture family dynamics at the daily level. Second, state-space grids extract and plot information from two variables simultaneously (in our study, the two variables are MR and PCR), re-representing bivariate time series data into univariate time series. The interrelated, transactional nature of family dynamics thus is better captured with state-space grids. In addition to the application to examining bivariate associations, state-space grids have also been used to investigate dyad-level constructs such as parent–child connectedness across days (Brinberg et al., 2017), parent–child emotional behaviors in problem-solving tasks (Granic et al., 2007; Lunkenheimer et al., 2011), and husband-wife emotional dynamics
across days (Brinberg et al., 2018). Third, family typologies with distinct patterns of intrafamily dynamics were identified by sequence analyses and cluster analyses. With no prior assumption about the way intrafamily dynamics manifest, as is often the case in variable-oriented approaches, our “family-/person-oriented” approach enables a holistic examination of longitudinal sequence data. Moreover, it allows researchers to discover new family typologies and to explore whether certain family typologies indicate risks or opportunities for intervention efforts. Taken together, applying grid-sequence analyses to daily diary data highlights new avenues for understanding intra-family relationship dynamics in the context of inter-family differences and developmental implications.

With rapid advances in technology, collecting, processing, and analyzing multivariate experience sampling data is becoming less costly and more efficient. Meanwhile, there have been repeated calls for ecological assessment (Bamberger, 2016; Laurenceau & Bolger, 2005) and pattern-based understanding (Bergman & Magnusson, 1997; Nurius & Macy, 2010) of family dynamics. These two trends intersect and afford great opportunities for family and developmental researchers to further our current understanding of complex family dynamics. We hope the application of grid-sequence analyses to daily diary data in our study can spark inspirations and we are enthusiastic for the prospects and advancement enacted by this new methodology.

4.2 Limitations and Future Directions

Despite the strengths, our study has several limitations manifesting at both the empirical and methodological levels. Empirically, the participating families in our study had children within a wide range (i.e., 7–17 years old). The resulting typologies may be
different for families with middle-childhood children and late-adolescence teens, as adolescence has been theorized as a transitional period in which fast-pacing changes in the family emotional states can occur (Granic et al., 2003; Lichtwarck-Aschoff et al., 2009). Although the identified family subgroups in our study did not differ in child age, we cannot rule out the possibility that different taxonomies would be obtained for families whose child was at a different developmental stage. This possibility remains to be examined by future studies that have a confined age range of their child sample.

Second, our sample was predominantly composed of European American intact families; the findings thus are not generalizable to other samples and other populations, such as divorced families and populations with diverse racial compositions. A more confined and complete understanding of family typologies calls for research on diverse populations.

Third, although we controlled for child age and child gender in all analyses, family emotional dynamics may be susceptible to the influence of other daily-level characteristics, such as the number of interactions/conflict a parent had with the spouse and with the child, as well as stressful life events that occurred that day. A more refined measure of family members’ emotional quality would help us to better understand the family emotional dynamics. Fourth, our assessment of emotional quality in the parent–child relationship did not incorporate the child’s perspective. Fortunately, it would not be difficult to add child’s input in future studies, because the state-space grids can be easily extended to state-space cubes in order to accommodate an additional dimension.

Several constraints of our methodology warrant discussion. To start with, like almost all studies involving longitudinal data, the present study faced challenges of missing data. Unique to the grid-sequence analyses, one occasion of missingness may
result in ambiguity about where the corresponding state is located in the grid. Moreover, when many occasions included missingness, there may not have been enough information to work with for typology identification at the cluster analyses stage. One parent’s failure to participate in the diary assessment can also restrict our ability to compare maternal and paternal typologies. In our effort to circumvent these problems, our study only included families who had simultaneous (i.e., mother and father) and relatively complete (i.e., > 10 out of 15 days) daily diary reports. Unfortunately, the extent to which missingness can affect grid-sequence analyses is still unknown; we look forward to specific recommendations about how to deal with missing data from developmental methodologists who are devoted to refining this new technique. Second, our study used a $3 \times 3$ (9 cell) grid after considering the distribution of daily diary scores as well as the interpretability of achieved typologies. We acknowledge that a finer grid configuration (e.g., the $10 \times 10$ grid) may offer additional information; after all, degrading data from a 10-point Likert scale to 3-point scale results in loss of information. Too many cells, however, can invoke interpretation challenges. Therefore, we encourage future researchers to carefully design their measurement tools so that their gridding choice can be mapped to their theoretical framework. For example, the difference between a score of 8 and a score of 9 is theoretically meaningful.

4.3 Conclusions

In summary, the present study applied a family-centered approach to daily diary data and identified different family types with distinct relationship patterns. Examination of typology differences in child internalizing and externalizing behaviors further
elucidates the utility of family typology in understanding children’s development. Moreover, variability of families’ emotional states not only facilitates identification of family typologies but also has implication for children’s adjustment outcomes. In line with the tenets of developmental psychopathology, both previous and current family environment of a child are critical for developmental sequelae. The characteristics of family profiles, along with their differential associations with children’s adjustment outcomes, may inform family policies and preventive interventions.


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