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RIVERSIDE

Connecting Family History to Parenthood: Marital Instability and Child Outcomes After  
the Journey of Infertility

A Dissertation submitted in partial satisfaction  
of the requirements for the degree of

Doctor of Philosophy

in

Psychology

by

Jing Wang

September 2022

Dissertation Committee:

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Dr. Tuppett M. Yates

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The Dissertation of Jing Wang is approved:

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## ABSTRACT OF THE DISSERTATION

Connecting Family History to Parenthood: Marital Instability and Child Outcomes After the Journey of Infertility

by

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Doctor of Philosophy, Graduate Program in Psychology  
University of California, Riverside, September 2022  
Dr. Misaki N. Natsuaki, Chairperson

The influence of parents' marital instability on children has been thoroughly investigated in the literature. However, how couples' pre-parenthood experiences affect marital relationships and child adjustment outcomes is less understood. One significant pre-parenthood experience is infertility, often shared by both partners but differentially experienced by women and men. Based on a prospective longitudinal study of adoptive families with a history of infertility challenges ( $N = 461$ ), the current dissertation aimed to achieve two goals: (1) to examine the impact of pre-parenthood infertility distress on couples' perceived marital instability trajectories in the 11 years of adoptive parents' parenthood, and to test the moderating effect of social support from the partner and others; and (2) to explore the spillover effect from parents' pre-parenthood infertility distress to child internalizing and externalizing outcomes in early adolescence, with marital instability and overreactive parenting as potential mediators.

Results from growth curve analyses revealed inverse U-shaped curves of marital instability for mothers and fathers. Mothers' infertility distress predicted higher marital instability and a faster increase in marital instability at child age of 4.5 years, and their satisfaction with partner support mitigated the association between infertility distress and marital instability. No such effect was identified for fathers. Results from path analyses illustrated two indirect paths from mothers' infertility distress to child externalizing symptoms at age 11: one via overreactive parenting at child age 7 years, and the other via marital instability in childhood (the average marital instability from child age 18 months to 6 years) and overreactive parenting at child age 7 years. No cascading effect was found linking fathers' infertility distress to child outcomes. Overall, results indicate that adoptive mothers' infertility distress before parenthood serves as a risk factor for marital instability and overreactive parenting, which then spill over to child externalizing problems in adolescence. This dissertation underscores the importance of considering pre-parenthood experiences in later family functioning and child development, and the infertility struggle seems to play a particularly salient role in the family life for women. Discussion elaborates on the differing results for mothers and fathers, and implications for future research and intervention.

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## **Connecting Family History to Parenthood: Marital Instability and Child Outcomes**

### **After the Journey of Infertility**

The association between marital relationship and child development has been a popular topic of investigation in developmental science, clinical psychology, sociology, and family studies. There is a consensus that problems in interparental relationships exert a negative impact on child development, resulting in increased emotional and behavioral problems in children (Cherlin et al., 1991; Cavanagh & Fomby, 2019; Cummings et al., 2006; Davis et al., 2002; Emery, 1982; Grych et al., 2001; Harold & Conger, 1997). Most studies in this line of research – and a broader literature of child development and family studies – conceptualize the existence of a family as the default starting point of investigation. However, little attention has been paid to the couples’ history before becoming parents. How couples (who later become parents) have come to form a family and how much effort and deliberation are required to transition to parenthood may influence the family dynamics in the long run. One often neglected, but potentially important, pre-parenthood experience is infertility. Initially perceived as a physical health problem, infertility is also recognized as a psychological health concern (Lau et al., 2008; McQuillan et al., 2003; Oguz, 2004), which influences couples’ relationships and parenting (Gibson & McMahan, 2004; McGrath et al., 2010; Wang et al., 2021). Furthermore, for heterosexual couples trying to form a family with children, the navigation of the infertility journey is often shared by both partners, but infertility, which is inherently tied to sex-specific reproductive health, is differentially experienced by women and men. Using a prospective longitudinal adoption study, the current research

examines the long-term impact of infertility distress on the trajectories of heterosexual couples' marital relationship instability over 11 years of parenthood and explores the cascading effect of infertility-induced distress on child development.

The below sections will provide a literature review of the following topics. First, I review the prevalence and definition of infertility and then focus on the experience of infertility among adoptive parents – a segment of the parent population with elevated fertility challenges. Second, I discuss the impact of infertility distress on couples' relationship instability over time, followed by the role of social support as a potential moderator. Differences between women and men in the experience of infertility and the relation between infertility distress and marital instability will also be discussed. Finally, I review the literature concerning the associations between parental infertility distress and child outcomes with the mediating role of marital instability and parenting behaviors.

## **Infertility**

Infertility is a common health issue in modern societies across the world. A global estimate reveals that nearly 72.4 million couples experience infertility (Boivin et al., 2007), with approximately 15% of the population affected in high-income countries and 9% – 30% in low-income countries (Petraglia et al., 2013). Globally, the age-standardized prevalence of infertility increased by 15.0% (from 1366.85 to 1571.35 per 100,000) for women and 8.2% (from 710.19 to 768.59 per 100,000) for men from 1990 to 2017 (Sun et al., 2019). In the United States (U.S.), according to the 2015-2019 National Survey of Family Growth (NSFG), over 13 percent of women aged 15-39 years had

impaired fecundity, difficulties conceiving or bringing a pregnancy to term (Centers for Disease Control and Prevention, 2021).

Infertility is broadly defined as the difficulty or inability to conceive, but it has received multiple definitions from different disciplines (Boivin et al., 2007). Clinical researchers define it as the absence of conception after 12 months of regular, unprotected intercourse (Seibel, 1997; Larson, 2005), while epidemiological researchers use the recommended definition by the World Health Organization (WHO), which is childless after 24 months of unprotected intercourse (Rowe et al., 1993; Rutstein & Shah, 2004). On the other hand, demographers consider infertility as the inability of a non-contracepting, sexually active couple to have a live birth, usually in population-based studies with complete birth histories (Larsen & Menken, 1989). Psychologists interested in the psychological ramifications of infertility may define infertility more globally as a self-perceived challenge to conceive, which may not require medical diagnosis (Chandra et al., 2005; McQuillan et al., 2003). Self-reports are considered more inclusive than formal diagnoses of fertility problems (e.g., Daly, 1988), as not all couples who face fertility challenges seek medical treatment.

Regardless of how infertility is operationalized, couples who wish to have children feel challenged and distressed when they face the risk of espousing parenthood, which is usually considered a deserved and desired social role (Greil et al., 2010). In most societies, heterosexual couples carry the social expectation to reproduce, and such an expectation can lead to psychological complications when fertility is elusive (McGrath et al., 2010). As a solution to cope with infertility and to achieve parenthood, many couples

choose adoption. In qualitative studies, fertility problems have been identified as a primary reason couples decide to adopt (Goldberg et al., 2009; Malm & Welti, 2010). A recent report from adoptive parents who underwent domestic infant adoption in the U.S. showed that 80% of adoptive parents cited “unable to have a child biologically” as a primary reason to pursue adoption (Wang et al., 2021). Given the prevalence of infertility among adoptive parents, exploring their experiences and the impact of fertility struggles is meaningful. However, research on adoptive families has primarily focused on adopted children’s psychological outcomes, neglecting parents’ experiences, especially their pre-parenthood struggles, such as fertility issues in their journeys to parenthood (Hendry & Netherwood, 2010). Guided by the theoretical principle that development is cumulative (Cummings et al., 2006; Elder, 1998; Masten & Cicchetti, 2010; Sroufe & Rutter, 1984), the current dissertation seeks to connect the dots from adoptive parents’ pre-parenthood infertility experiences to their marital and family functioning during the 11 years of parenthood.

### **Marital Instability**

A stable marital relationship is a key contributor to a healthy family environment, which influences child development (Cavanagh & Fomby, 2019). As the focus of this investigation, marital instability is viewed as the opposite of the continuum of marital cohesion and indicates a “shaky” marital relationship (Booth et al., 1984). Higher marital instability is indicated by emotions, thoughts, and actions in couples that are pulling them apart, ranging from troubled emotional and cognitive states (e.g., feeling that their relationship is in trouble and thinking about getting a divorce) to behaviors (e.g., talking

to others about the possibility of ending the marriage) that potentially lead to family dissolution. In this way, marital instability is considered as a process and taps on to couples' propensity to dissolve the marital relationship, even though divorce may not be the final outcome.

Generally, couples' relationship instability is negatively associated with the intercouple relationship quality (Yeh et al., 2006) and positively related to hostility between partners (Matthews et al., 1996). It is intertwined with, but distinct from, two indicators of couple-level relationship indices, i.e., marital quality and family instability (including marital dissolution). First, marital instability and quality/well-being are empirically inversely related, but low marital quality does not necessarily result in an unstable marriage, nor vice versa (Booth & White, 1980). Relationships can have low quality and satisfaction yet are stable without discussion or contemplation of dissolution (Veroff et al., 1995). Additionally, while marital instability has been used interchangeably with family dissolution or divorce (Booth et al., 1983), couples can consider dissolving a marriage for a long time without taking any legal action (i.e., divorce), or they may be able to restore equilibrium over time. Divorce and separation, therefore, are possible consequences of marital instability rather than instability itself (Booth et al., 1983). Most prior research on the union of marriage often focuses on one event, such as entering the marriage or divorce (Perelli-Harris & Lyons-Amos, 2015). While these studies provide informative knowledge on the predictors and consequences of forming/dissolving a marriage, they do not allow for examining changes in marital instability over time. To address this research gap, the current investigation tracks

couples' affective state (how couples feel about their relationship), cognition about the relationship (what they thought about doing in response to their feelings), and certain actions (what they have done about their feelings and thoughts) that carry the potential for divorce (Booth et al., 1983).

Moreover, each partner in the relationship could have distinctive perceptions of their marital instability. One of the partners might be very satisfied with the current state of the relationship and consider having a stable relationship, while the other may have lower gratification and want to terminate this relationship (Booth et al., 1983). An investigation of divorced couples found that women often feel dissatisfied with their marriage and consider separation longer than men (Hetherington, 2003). Accordingly, this dissertation seeks to study independent perceptions of marital instability from each partner involved in marital relationships.

**Changes in Marital Instability Over the Course of Parenthood.** Tracking the changes in the marital relationship is important because its quality and structure evolve over time (Belsky et al., 1991). Most research on the longitudinal change of the marital relationship concurs that relationship quality in marriage peaks in the newlywed period and then declines over time (Proulx et al., 2017). For example, starting from the newlywed stage and over the course of marriage, declines are found in couples' marital adjustment, love, and shared activities (Pineo, 1961; Gosselin et al., 2015; Lavner & Bradbury, 2010; Vaillant & Vaillant, 1993), marital happiness (James, 2015a), relationship adjustment (Don & Mickelson, 2014; Lorber et al., 2015), as well as marital

communication (James, 2015b), with the possibility of a rebound in later years (Kamp Dush et al., 2008; VanLaningham et al., 2001).

Tracking marital relationship over the years in marriage is informative, but less is known about how it changes over the course of parenthood. Welcoming a child into the family affects intercouple relationships, often bringing positive changes to the stability of their relationship. For instance, previous work has shown that marriage is more stable with the presence of a child, but this stabilizing effect seems to diminish as the child grows up (Waite & Lillard, 1991). Morgan and colleagues (1988) posited that children help establish new obligations and attachment between parents, thus, their presence improves interparental relationship stability. Numerous studies confirmed this claim, indicating a positive association between the presence of children and marital stability (Berrington & Diamond, 1999; Jennings, 2017; Mencarini & Vignoli, 2018; Nguyen & Tran, 2017). However, the helpful role of child presence in the interparental relationship seems to be qualified by the age of the child. While children in younger years help stabilize couples' relationships, research suggests a nil or negative impact from older children. For example, Cherlin (1977) reported that school children aged 6 to 17 do not affect marriage stability. This result is further supported by Andersson (1997) and Svarer (2005), showing that children's stabilizing effect on marriage stops after toddlerhood. Similarly, Steele and colleagues (2005) found that the bonding effect of children on the family is much weaker in older children than preschoolers. Perhaps, as children age, they become more capable of taking care of themselves and can better cope with marital dissolution, thereby reducing dependency between family members (Heaton, 1990). As

suggested by Wu and Penning (1997), when child-rearing responsibilities diminish, the effect of children on marital instability may decline as well. Besides, parents' concern over losing contact with the child because of divorce is also likely to decrease as the child grows up (Knoester & Booth, 2000; Poortman & Seltzer, 2005). Taken together, couples' relationship stability is likely to be higher at the beginning of parenthood but decrease over time, as the presence of children may promote stability initially but constrain it as children age.

While these studies set a foundation for exploring the changes in the marital relationship over the course of parenthood, to date, little is known about the longitudinal trajectory of marital instability during parenthood of those who had formerly struggled to become parents. Therefore, the first aim of the current study is to examine the marital instability trajectories for adoptive mothers and fathers over 11 years of parenthood.

### **The Effect of Infertility on Couples' Relationship Instability**

Involuntary childlessness is widely recognized as a stressor that has the potential to threaten the stability of individuals and their relationships (Covington & Burns, 2006). The *stress and coping* theory (Lazarus & Folkman, 1984; Monat & Lazarus, 1991) has been widely used by clinical researchers to explain and intervene in behavioral consequences of individuals with infertility (Stanton & Dunkel-Schetter, 2013). According to the broader literature on stress and coping (e.g., Lazarus & Folkman, 1984), when stressors – perceived or actual threats that tax one's resources and jeopardize their well-being – prevent individuals from achieving a valued identity (e.g., parenthood), this challenge may cause stress, especially when the identity is salient to them (McQuillan et

al., 2003). For couples with the goal of becoming parents, the inability to have a child is expected to be a significant stressor in life, which contains the dimensions that people find stressful, including unpredictability, negativity, uncontrollability, and ambiguity (Stanton & Dunkel-Schetter, 2013). In turn, it has the potential to threaten important life goals, exhaust personal resources, and create challenges in interpersonal relationships (Covington & Burns, 2006). Infertility serves as both an acute and a chronic stressor because of the associated emotional distress that accumulates over time. For instance, even after accepting childlessness or achieving parenthood through adoption, individuals with the history of infertility can still experience the continuation or reemergence of distress in various contexts (Covington & Burns, 2006). As such, infertility may be a developmental problem that impedes the growth of both the self and the family in the long run.

Medically, infertility is treated as a personal and private condition, but most researchers and practitioners agree that infertility is best understood as a social construct and experience negotiated by both the sufferers and others in their social environment (Greil et al., 2010). The *family systems theory* (Bowen, 1993; Cox & Paley, 1997), accordingly, aids our understanding of infertility within the family context. A premise of this framework is that family is a continuously evolving system, within which the individual, marital, and parent-child subsystems are highly intertwined (Davies & Cicchetti, 2004; Minuchin, 1985). As such, infertility – and its treatment and coping – is recognized as a developmental issue that creates further challenges in couples' marital and family systems as it disrupts their movement to different stages in the family life

(e.g., family expansion, parenthood; Covington & Burns, 2006). For instance, infertility may force couples to reevaluate their own life goals and affiliation with each other. Those who find infertility more challenging in life might, in turn, experience more struggles in relationships with partners because the emotions of shame, guilt, and anger affect communication and satisfaction with each other (Gerrity, 2001). For couples who decide to adopt a child after facing infertility, challenges may also include a feeling of loss due to the yearned-for biological child as a psychologically present but physically absent member of the family and a feeling of insecurity because of the hereditary ambiguity in parents' ties with the adopted child, which can be emotionally painful and have long-lasting effects on the couples (Burns, 1987). In particular, after couples enter into parenthood, stable family functioning requires a collective reorganization among family members, and unresolved or prolonged infertility distress may jeopardize and compromise this potential.

Abundant empirical work has documented that the experience of infertility affects individuals' psychological well-being, resulting in personal distress, mental health problems, and a lower quality of life (Lau et al., 2008; Oguz, 2004). Quantitative studies found that individuals with fertility issues experience higher levels of psychological distress (Dyer et al., 2009; Gao et al., 2013), anxiety (Albayrak & Günay, 2007), and depression (Gao et al., 2013; Fassino et al., 2002), compared with their counterparts without fertility problems. Qualitative studies, similarly, emphasize infertile couples' feelings of worthlessness and inadequacy (Williams, 1997), life disruption (Ulrich & Weatherall, 2000), and social isolation (Parry & Shinew, 2004). Women are especially

vulnerable to the news of infertility than men, given the societal emphasis on women's role of being a mother (Abbey et al., 1991a) and their own internalization of motherhood as a central aspect of their identity (Greil et al., 1988; Covington & Burns, 2006; Ulrich & Weatherall, 2000).

Given the harm infertility inflicts on personal well-being, one may expect that the distress experienced in infertility also puts great psychological strain on interpersonal relationships, particularly relationships between the partners (Greil et al., 2018). Interestingly, however, empirical research investigating the effect of infertility on marital relationships at the couple-level yields inconsistent results. Some studies demonstrate an expected negative impact of the infertility experience, but others do not. For example, Andrews and colleagues (1991) interviewed couples with infertility issues and found increased marital conflict, decreased sexual self-esteem, and more negative evaluations of marriage compared with a presumed-fertile group. Couples also described compromised intimacy and a reduced sense of togetherness between each other after infertility experiences (Goldberg et al., 2009). Some quantitative studies also supported this prediction, suggesting that infertility may increase marital distress (Connolly et al., 1987) and discord (Connolly et al., 1992), and sexual dysfunction (Monga et al., 2004), and result in a decrease in marital quality (Wang et al., 2007) and adjustment (Monga et al., 2004; Schmidt et al., 2005). Couples who have difficulty producing a child spontaneously are also more likely to divorce or separate (Che & Cleland, 2002; Rutstein & Shah, 2004), and to have a shorter duration of marriage (Gibson, 1980). It is likely that one partner in the infertile couple may feel guilty and consider separation or divorce for not

being able to provide a biological child to their partner (Onat & Beji, 2012a). Anecdotal evidence suggests that difficulty having a child broadens the distance between the couple, weakens family foundation, and for some, leads to divorce (Behboodi-Moghadam et al., 2013). Individual differences in reactivity to the news of infertility matters as well. Van Der Merwe and Greeff (2015) found that among infertile couples, infertility-related distress is inversely related to the quality of marital communication, satisfaction with sexual relationship, marital intimacy, and overall marital adjustment. Other studies confirmed the connection between infertility distress and lower marital satisfaction (Newton et al., 1999), and impaired marital functioning, such as increased marital conflicts and lower sexual satisfaction (Andrews et al., 1992). Perhaps, when individuals consider infertility very challenging, they find it particularly difficult to communicate the struggle and feelings to their partner and therefore have increased relationship concerns (Galhardo et al., 2020).

On the other hand, a cluster of studies suggests no negative impact of infertility on marital satisfaction (Ravel et al., 1987; Repokari et al., 2007) or sexual function (Leiblum et al., 1998). Some even find higher marital satisfaction (Drosdzol & Skrzypulec, 2009), dyadic adjustment (Onat & Beji, 2012b), and marital stability (Pinborg et al., 2013) in couples who have infertility issues compared with their fertile counterparts.

Both theory and empirical evidence may explain such an inconsistency in the effect of infertility on marital relationships. For example, the *stress and coping theory* posits infertility as having the potential for both benefit and harm (Covington & Burns,

2006). As a stressor, infertility could generate psychological distress and disrupt couples' relationships (Greil et al., 2010; Stanton & Dunkel-Schetter, 2013). However, when individuals have adequate resources for coping, such as social support, the negative impact of the stressor, in this case, infertility, may be reduced or tolerated (Lazarus & Folkman, 1984). As suggested by Wallach and Menning (1980), differing outcomes may result from people's attempts of trying to resolve infertility issues: some may regress to unstable functioning while others come out of the crisis with more strength and emotional insight. Marital benefit, in particular, is a common experience among infertile couples, especially when they are willing to communicate with and support each other (Abbey et al., 1995; Schmidt et al., 2005). Some couples seem to consider their infertility journey as an opportunity for growth in relational domains, such as improved communication (Leiblum et al., 1987) and strengthened intimacy with the partner who shares the infertility experience (Greil et al., 1988). Perhaps, while infertility is challenging to all individuals who wish to have a biological child, the experiences of going through such a stressful challenge with the partner also provide an opportunity to communicate with their partner and plan the future together as a couple (Luk & Loke, 2015), which increases their commitment and promotes a closer relationship with emotional intimacy between partners (Drosdzol & Skrzypulec, 2009).

**The Differential Impact of Infertility on Women and Men.** When considering reproductive health, such as infertility, and its impact on couples' relationships, gender and gender stereotypes play an essential role (Greil et al., 2018). As noted earlier, compared with men, women have stronger reactions to infertility and tend to blame

themselves for the inability to naturally conceive (Fisher et al., 2012; Greil et al., 1988). Most prior research on infertility explored the gender differences in the mean levels of distress (Greil et al., 2010) and consistently found more infertility-related stress in women compared with men (e.g., Casu & Gremigni, 2016; Harata et al., 2012; Karaca & Unsal, 2015; Klemetti et al., 2010). Such different reactions in response to infertility between women and men can be illustrated in several perspectives. First, culturally-subscribed bias, such as a societal emphasis on motherhood as a primary role for women (Greil, 1988) and an implicit but pervasive assumption that infertility treatment involves only women (Abbey et al., 1992; Greil et al., 1988), often explains the elevated emotional toll of fertility problems that women carry. As suggested by a qualitative study, the femininity of women, but not the masculinity of men, is impaired by the infertility experience (Inhorn, 2003). Women who could not give birth to a child are usually defined or labeled in relation to the “lack” of a biological and social relationship with children (Letherby, 1994), and therefore, greater stigmatization is experienced by women even in the case of male infertility causing childlessness (Mumtaz et al., 2013). In addition, women themselves are also more likely to consider infertility as a role failure and a challenge to their motherhood and womanhood (Greil et al., 1988; McCormick, 1980), and thus, forgoing a desire for pregnancy and parenthood is associated with more distress for women (White & McQuillan, 2006). Indeed, women usually consider infertility a devastating experience and have feelings of losing control over their lives, whereas men find infertility disappointing but not devastating and not threatening to their identities (Barnes, 2014; Greil et al., 1988). Furthermore, among various life stressors, women

seem to consider the infertility-related issue as an especially difficult challenge, while men rate the difficulty of infertility the same as that of other stressors (Andrews et al., 1992). Specifically, higher levels of stress, regardless of the sources, were associated with reduced family functioning and life quality for both partners, but this association was greater for women when the stress came from trying to solve a fertility-related problem (Andrews et al., 1992).

If infertility is a more salient stressor in life for women, would the effect of infertility distress on perceived marital relationship instability be stronger for women than for men? According to some studies, the answer is yes. For example, infertility experiences harm perceived marital quality (Drosdzol & Skrzypulec, 2009) and relationship satisfaction (Greil et al., 2018) for women but not men. Similarly, Monga and colleagues (2004) found poorer marital adjustment in wives with infertility than fertile wives but no difference among husbands. Infertile women also experience greater discontent in marriage over time compared with infertile men (Hirsch & Hirsch, 1989). However, other studies indicate no gender differences among couples with infertility issues in their marital adjustment (Cserepes et al., 2013; Onat & Beji, 2012b; Peterson, 2006; Ulbrich et al., 1990), sexual satisfaction (Berg & Wilson, 1991), and relationship satisfaction (Bayley et al., 2009). Therefore, whether the impact of infertility on subsequent marital relationships is different between women and men remains largely inconclusive. This question is further complicated by whether and when couples transition to parenthood through adoption. Hjelmstedt and colleagues (1999) suggest that in reaction to infertility, women are more distressed with the difficulty of having a child,

while men are more concerned about the social role of becoming a parent. The logic follows that because adoption is a way to achieve the social role as a parent but is not a solution to have a biological child, infertility distress may linger as a salient stressor longer and stronger for adoptive mothers than for fathers.

**Gaps in the Literature on Infertility and Marital Instability.** It is worth noting that there are a few research and methodological gaps in the literature investigating the association between infertility experiences and marital relationships. First, most studies investigate the impact of infertility on couples' relationships by comparing infertile and fertile couples, but less research addresses the influence of the variation in infertility-related distress within infertile couples. Second, most research examines marital quality, conflict, or adjustment as the outcome, while a lack of work has explored the impact of infertility distress on marital instability, and much less had shown longitudinal relations. Third, prior work, qualitative or quantitative, relies heavily on clinical samples (i.e., couples who formally received a medical diagnosis of infertility or those who underwent infertility treatment) and on female participants. Such a sample selection excluded couples who have infertility issues but could not afford or choose not to go through treatment and ignored the experience of many men who may or may not have infertility themselves. Finally, little is known about the infertility experiences of couples who later became adoptive parents despite the fact that the rate of infertility in this population is incredibly high (Cudmore, 2005; Wang et al., 2021). Therefore, the second aim of this dissertation is to examine how infertility distress predicts the 11-year trajectories of marital relationship instability in adoptive parents who underwent fertility challenges.

Considering the differential impact of infertility on women and men, I explore this question for mothers and fathers separately.

### **Mitigator of Infertility Distress: Social Support**

The experience of infertility is greatly shaped by a variety of social relationships, both within and outside couples' relationships (Schmidt et al., 2005). As noted earlier, *the stress and coping theory* suggests that how one is impacted by life stressors depends on their appraised resources, among which the perceived social support is of vital importance (Lazarus & Folkman, 1984; McQuillan et al., 2003). Social support has been defined as the perception of having a companion who is available to provide care and support, and is commonly provided by sources from the partner, family, and friends (Martins et al., 2014; Walen & Lachman, 2000). Anecdotal evidence suggests that social support is an important coping mechanism among couples going through fertility challenges (Abbey et al., 1991b), and reveals infertile couples' demand for spouses' emotional support and compassion, as well as the support provided by family, friends, and society (Jafarzadeh-Kenarsari et al., 2015). Consistent with this finding, prior quantitative work identifies the importance of partner support, suggesting that low partner support is associated with more infertility stress for both women and men (Martins et al., 2014) and higher levels of anxiety and depression for women with infertility (Albayrak & Günay, 2007; Matsubayashi et al., 2004). In contrast, sharing feelings and supporting each other decreases individual distress and improves the marital relationship for infertile couples (Casu et al., 2019; Ying et al., 2015). Additionally, with common social concerns related to the fear of social isolation and alienation from family and friends among

individuals experiencing infertility (Galhardo et al., 2020), family and friend support also helps individuals adjust better to the stress of infertility (Mahajan et al., 2009; Martins et al., 2011). Taken together, support from both the partner and sources outside the core family may function as a psychological modifier of the distress inflicted by infertility. Such a beneficial effect may be especially relevant for couples' relationships, as the broader literature on marital relationships emphasizes the importance of intimacy, including feelings of being validated, understood, and cared for, which is consistent with the definition of social support (Abbey et al., 1995; Duck et al., 1988). Indeed, previous research indicates that social support plays a significant role in improving marital relationship functioning and is recognized by couples as the most preferred method to cope with infertility distress (Peterson et al., 2006).

While social support during the difficult time of navigating infertility is beneficial for both women and men (Jafarzadeh-Kenarsari et al., 2015; Martins et al., 2014), evidence suggests that women are more likely to benefit from it. Researchers have long known that women indicate a greater need for social support than men (Shumaker & Hill, 1991; Taylor, 2011). Particularly, social support is crucial for women under stress, as friendship and social closeness are key components of stress management (Taylor et al., 2000). Meta-analyses on gender differences in stress coping found that women are more likely to seek and use social support as an approach to recover from various stressors and are more likely to benefit from it than men (Luckow et al., 1998; Schwarzer & Leppin, 1989; Tamres et al., 2002). Some studies looking at couples facing stress from infertility revealed similar patterns. For example, among couples with infertility, a significant

association was found between stress and social support for women, not men (Sreshthaputra & Vutyavanich, 2009). Women are more likely to actively seek social support when coping with infertility distress, while men tend to keep it to themselves (Kowalcek et al., 2001). When men join support seeking activities, they most likely treat it as a way to support their spouse, but derive little personal benefits for themselves (Peterson et al., 2006). However, this pattern is far from definite. A review article suggests both women and men benefit from partner support to combat infertility-induced stress (Ying et al., 2015). Recently, the need for research on social support for men with infertility has been called (Fisher & Hammarberg, 2012; Richard et al., 2017). Therefore, the third aim of this dissertation is to explore the association between infertility distress and marital instability with the role of social support as a potential mitigator and separately examine this relation for women and men.

### **Prolonged Infertility Distress and Child Outcomes**

Does parents' pre-parenthood experiences of infertility matter for child development in the long term? While no study to my knowledge directly answers this question, previous research demonstrates that marital relationships and parenting behaviors seem susceptible to the impact of infertility-induced distress (Gana & Jakubowska, 2016), which may subsequently affect child adjustment.

Abundant research has established the association between marital problems and internalizing and externalizing problems in children and adolescents (e.g., Buehler et al., 2007; Cummings et al., 2012; Davies et al., 2002; El-Sheikh et al., 2006; Harold et al., 2004; for reviews, see Davies & Cummings, 1994; Grych & Fincham, 1990; Harold &

Sellers, 2018). Specifically, marital instability predicts child maladjustment, such as anxious/depressive behaviors (Osborne & McLanahan, 2007), externalizing and delinquent behaviors (Fomby & Cherlin, 2007; Lee & McLanahan, 2015), and poor cognitive (Cooper et al., 2011) and school functioning (Heard, 2007). The consistency in findings of this association inspired the development of theories to explain its mechanisms. Research identified both direct pathways from problematic interparental relationship to children's heightened sensitivity (Grych & Fincham, 1990) and emotional insecurity (Davies & Cummings, 1994; Cummings & Davies, 2002; Grych et al., 2003) and indirect pathways through disrupted parenting behaviors to child problems (Erel & Burman, 1995; Fauber et al., 1990; Harold & Sellers, 2018). The focus on parenting as a mechanism undergirding the association between parents' marital relationships and child outcomes is rooted in the conceptualization of spillover (Benson et al., 2008), which suggests that mood, affect, and behavior transfer across family systems (Cox et al., 2001; Engfer, 1988). Indeed, the problematic relationship between parents reduces the consistency and effectiveness of parental behaviors, which in turn affect children (Dix, 1991). As parents get absorbed in marital problems, they are less likely to attend to children's emotional needs and tend to behave in a harsh and hostile manner towards children (Belsky, 1986; Sherrill et al., 2017).

Under this framework, process-oriented studies explored the mediating role of dysfunctional parenting between marital problems and child outcomes. Notably, empirical work confirmed the significance of harsh or overreactive parenting in explaining the spillover effect. For instance, a meta-analysis study documenting the

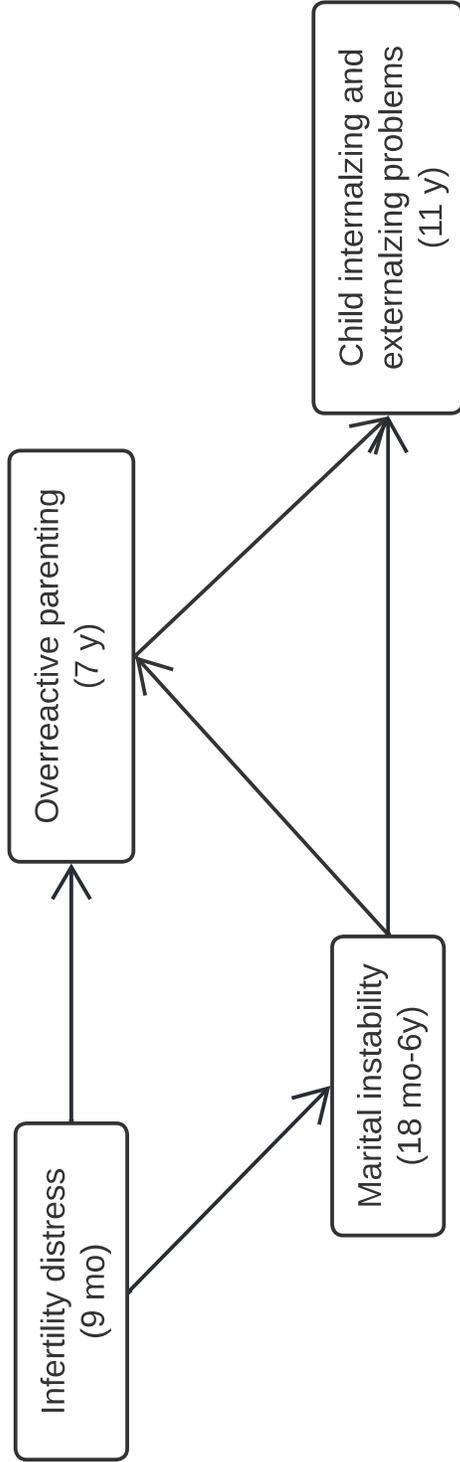
associations between marital problems and ineffective parenting found that the correlations are the strongest between marital conflict and parents' harsh discipline behaviors or lack of acceptance toward the child (Krishnakumar & Buehler, 2000). As a subdomain of harsh parenting, overreactive parenting refers to harsh parenting behaviors in child discipline, such as yelling at or insulting the child (Miller-Lewis et al., 2006). Longitudinal studies based on the same data as those used in the current investigation found harsh or overreactive parenting to mediate the relation between marital hostility and anger problems in toddlers (Rhoades et al., 2011), and between interparental conflict and internalizing problems in children (Harold et al., 2013; Stover et al., 2016). Overreactive parenting also mediates the association between marital adjustment and child internalizing and externalizing symptoms (O'Leary & Vidair, 2005). These results are consistent with *the family stress and role strain theory*, which suggests that parents may exacerbate real or imagined child problems when faced with dissatisfaction and uncertainty in their marital relationships (Emde & Easterbrooks, 1985; Krishnakumar & Buehler, 2000). Furthermore, family-focused intervention work demonstrates that adding an intervention segment to improving partners' relationships in parenting programs could have important benefits for children (Cowan et al., 1991; Cowan & Cowan, 2002). Collectively, interparental relationship problems appear to reduce parenting resources and aggravate overreactive parenting, which contributes to both internalizing and externalizing problems in the child (Schoppe-sullivan et al., 2007).

Although there are a plethora of studies examining interparental relationships, negative parenting, and child outcomes, very few empirical studies have expanded the

scope of the investigation to include parents' infertility experiences as an important developmental context of family history. However, theories of parenting and family functioning argue that marital relationships and parenting may be influenced by enduring individual characteristics, which at least partially result from the person's developmental history (Belsky, 1984). *The parenting process model* (Belsky, 1984; Taraban & Shaw, 2018), in particular, suggests that the developmental history of parents, in this case, infertility distress, precedes and predicts marital relationships and parenting, which may then cascade to the child. To promote better child functioning, positive parenting attuned to the child's needs (Belsky, 1984) and marital relationship of good quality and stability (Cavanagh & Fomby, 2019; Cox & Paley, 1997) are of vital importance. However, when parents are psychologically disturbed by past experiences, they are less likely to provide such a healthy family environment. Figure 1 illustrates my preposition that infertility distress impacts marital instability and overreactive parenting behaviors, which in turn affect child development.

Limited but available empirical research evaluating infertility-related stress appears to support the cascading processes from parents' infertility distress to their marital instability, compromised parenting, and finally to child outcomes. As reviewed earlier, there is some evidence linking infertility distress and undesirable marital relationship quality and stability, including lower marital satisfaction (Gana & Jakubowska, 2016; Van Der Merwe & Greeff, 2015), worse marital functioning

**Figure 1**  
*Hypothesized Mediation Model Depicting the Indirect Relation of Infertility Distress on Child Outcomes via Marital Instability and Overreactive Parenting*



(Andrews et al., 1991), and a contemplation of divorce (Onat & Beji, 2012a). Infertility distress has also been theorized and empirically confirmed to have a negative influence on parenting, leading to diminished maternal confidence, and increased overconcern or castigation in parenting behaviors (Bernstein, 1990; Burns, 1990; Wang et al., 2021). Quantitative evidence comes primarily from comparisons between parents who experienced infertility but conceived with the help of assisted reproductive technologies (ART) and parents whose child was born of natural conception. A review of such comparison suggests that ART parents seem to express more concerns for child well-being and are more protective (Gibson & McMahan, 2004). For instance, ART mothers showed lower sense of parenting competency and self-efficacy, as well as higher parenting stress than naturally conceived mothers (Colpin et al., 1999; Egan, 2019; Reading et al., 1989). Few studies investigated the impact of infertility on parenting among adoptive parents, even though adoption is an important avenue for infertile couples to achieve parenthood (Valentine, 1988). A longitudinal study tracking parenting stress in adoptive parents found that mothers with infertility experiences have a faster increase in parenting hassles before the adopted child reaches around the age of 6 than mothers without infertility challenges (Wang et al., 2021). Finally, research linking infertility to child outcomes has yielded somewhat inconsistent results. Some studies found increased difficult behavior (Hammarberg et al., 2008) and sleep disorders (Raoul-Duval et al., 1994) in children from ART families with prior infertility experiences, compared with those from naturally conceived families. Yet, other studies reveal no difference in children's social and emotional adjustment between ART, adoptive, and

natural conception families, indicating a nil effect of infertility (Gibson & McMahan, 2004; Golombok et al., 2001; Zhu et al., 2011).

While the aforementioned studies contributed to our understanding regarding the effect of infertility on marriage, parenting, and child development, there remain lingering questions. First, most prior studies compare ART families (families with infertility challenges) and families with spontaneously conceived children. This comparison is valuable in understanding child consequences with parents who underwent infertility challenges, by providing a context to examine parenting and child outcomes after infertile couples achieve parenthood. However, pregnancy after infertility treatment is not the only approach for couples with infertility to transition to parenthood. Another important avenue is through adoption, which remains under-investigated. Second, most of these studies are cross-sectional, and few longitudinal studies have been conducted to examine the long-term effect of parents' infertility history on child development. Furthermore, while abundant work compared child outcomes in families with and without parental infertility issues, no research has examined the variability in couples' responses to infertility as a predictor for later child outcomes through marital relationships and parenting. Guided by the framework of *the parenting process model*, the fourth aim of the current dissertation seeks to fill these gaps by investigating the pathways from pre-parenthood infertility distress to perceived marital instability and overreactive parenting behaviors in childhood and by examining whether marital instability and overreactive parenting will, in turn, lead to subsequent internalizing and externalizing problems in adolescents.

## **Overview of the Study**

The overarching aim of the dissertation is to investigate the impact of infertility distress on the trajectories of adoptive parents' marital instability in the 11 years of parenthood and examine how infertility distress affect the child during adolescence through marital instability and overreactive parenting in childhood. This dissertation was ultimately guided by four research questions.

Research Question 1: How does adoptive parents' perceived marital instability change in the 11 years of parenthood?

Research Question 2: How does infertility distress impact adoptive parents' perceived marital instability in the long run?

Research Question 3: Does perceived social support from the partner and others during the infertility journey moderate the relation between infertility distress and marital instability trajectories?

Research Question 4: Does infertility distress influence adolescents' internalizing and externalizing problems through marital instability and overreactive parenting in childhood?

I generated the following hypotheses: (1) marital instability would increase over the course of parenthood for both adoptive mothers and fathers; (2) adoptive parents with greater infertility distress would report higher levels of marital instability over time, and this association will be present in women, not men; (3) parents' perceived social support during infertility experiences would moderate the association between infertility distress and marital instability, such that infertility distress would lead to higher marital instability

for parents who are less satisfied with social support compared with those who are more satisfied with it during their navigation of the infertility journey; and (4) higher infertility distress would predict more subsequent child internalizing and externalizing symptoms via unstable marital relationships and increased overreactive parenting. These hypotheses are evaluated for mothers and fathers separately.

## Method

### Participants

The current investigation is based on seven waves of the Early Growth and Development Study (EGDS; Leve et al., 2019). The EGDS is a prospective, longitudinal adoption study that follows birth and adoptive families linked through nonrelative infant adoption. The EGDS sample consists of 561 families recruited in two cohorts.

Participants were recruited from 45 adoption agencies in the United States at four sites: the Mid-Atlantic, the West/Southwest, the Mid-West, and the Pacific Northwest, between 2003 and 2010 (Leve et al., 2019). This project included data collected from various U.S. adoption agencies, including public, private, secular, and religious, as well as those endorsing open and/or closed adoptions. Eligibility criteria included: (1) domestic adoption placement; (2) placement occurring within three months postpartum; (3) nonrelative placement; (4) no known significant medical conditions, such as extreme prematurity or extensive medical surgeries; and (5) birth and adoptive parents able to understand English at the eighth-grade level. This is a representative sample to provide a systematic description of adoptive parents who choose domestic infant adoption in the U.S (Leve et al., 2019).

The EGDS adopted children (57.2% males) were placed in adoptive homes at a median age of 2.0 days old ( $M = 5.58$ ,  $SD = 11.32$ ; range = 0 – 91 days). Fifty-five percent of the adopted children were Caucasian, 20% were mixed-race, 13% were Black or African American, 11% were Hispanic or Latino, and 1% were other or unknown. The mean ages of adoptive mothers and fathers at the first wave of data collection (i.e., child's

age of 9 months) were 37.4 years ( $SD = 5.6$ ) and 38.3 years ( $SD = 5.8$ ), respectively. More than 90% of adoptive parents were Caucasian, and the majority were college-educated and upper-middle class (see Leve et al., 2019 for study details).

The current investigation is based on seven waves of EGDS when adoptive children were 9 months, 18 months, 27 months, 4.5 years, 6 years, 7 years, and 11 years old. Data were collected through home visit assessments and online questionnaires. The original sample of EGDS consists of 561 adoptive couples and their adopted children. To be included in the analytical sample of the current study, adoptive mothers or fathers had to respond to the questionnaire about fertility-related issues, which resulted in the exclusion of 41 same-sex parents and 10 single parents. Finally, 49 couples who reported no fertility problems or missing all infertility-related questions were excluded, which led to a final sample size of 461 adoptive mother-father dyads and their adopted children.

## **Measures**

**Adoptive Couples' Infertility Distress.** At the first in-person adoptive family interview (i.e., child age at 9 months), mothers and fathers who reported that they had difficulty conceiving or carrying a baby to term were asked to report how emotionally challenging it was for their personal well-being and their relationship with their partner to cope with infertility (1 = *not at all challenging*; 5 = *very challenging*). An average score of both items was created to represent mothers' and fathers' infertility distress ( $\alpha = .76$  and  $.74$  for adoptive mothers and fathers, respectively).

**Marital Instability.** Across all seven waves, adoptive mothers and fathers independently responded to a five-item measure of marital instability (Booth et al., 1983).

Parents reported whether they experienced serious problems in their marriage and had thoughts of ending their marriage on a 4-point scale (1 = *not in the last year*, 2 = *yes; within the last year*, 3 = *yes; within the last 6 months*, 4 = *yes; within the last 3 months*). Items within this measure assess feelings/thoughts (e.g., “even people who get along quite well with their partner sometimes wonder whether their marriage is working out. Have you thought your marriage might be in trouble?”), and behaviors (e.g., “have you discussed divorce or separation from your partner with a close friend?”) related to the possibility that the marriage might end in separation/divorce. The reliability of this scale ranges from .79 to .88 for adoptive mothers and from .78 to .84 for adoptive fathers across waves. A composite score was created averaging marital instability from child age of 18 months to 6 years for hypothesis 4.

**Social Support.** When the child was 9 months old, each adoptive parent was asked to recall how satisfied he or she was with the amount of support received from their partner, family, friends/neighbors, counselor/therapist, support group, physician, and religious community/clergy when coping with infertility. They rated their responses using a 4-point scale (1 = *very dissatisfied*; 4 = *very satisfied*). For this study, two subscales were created: Partner Support, which used the item regarding support received from the partner, and Other Support, which was a composite score of social support provided by other sources ( $\alpha$ s = .67 and .88 for adoptive mothers and fathers, respectively).

**Overreactive Parenting.** When adoptive children were 7 years old, overreactive parenting was measured using the overreactivity subscale of the Parenting Scale (Arnold et al., 1993), which includes the display of anger, meanness, and irritability towards

children. Each parent independently reported how they would deal with children when they misbehave on a 7-point Likert scale anchored at one end by adaptive parenting behavior (e.g., “I speak to my child calmly”) and the other end by ineffective and harsh parenting behavior (e.g., “I raise my voice and yell”). Both mother and father reports indicated good reliability ( $\alpha$ s = .76 and .74 for adoptive mothers and fathers, respectively).

**Child Internalizing and Externalizing Symptoms.** When the adopted child was 11 years old, adoptive mothers and fathers independently responded to the Child Behavior Checklist (6-18 year version; Achenbach et al., 2001). The subscale of Internalizing symptoms includes 32 items describing children’s anxious, depressed, withdrawn behaviors and somatic complaints, such as “feels or complains that no one loves him/her” and “would rather be alone than with others.” The subscale of Externalizing symptoms includes 35 items that describe children’s aggressive and rule-breaking behaviors like “cruelty, bullying, or meanness to others.” Each parent reported how each item described their child currently and within the past 6 months on a 3-point scale (1 = *not true*; 2 = *sometimes true*; 3 = *very true*). Mother and father reports were significantly correlated ( $r$ s = .45 and .61 for internalizing and externalizing problems, respectively, both  $p < .001$ ). Therefore, adopting the logic of other similar investigations (e.g., Brooker et al., 2014), I combined mothers’ and fathers’ reports to create composite raw scores of children’s internalizing and externalizing behaviors ( $\alpha$ s = .91 and .94 for internalizing and externalizing symptoms, respectively).

## **Covariates**

**Socioeconomic Status.** Socioeconomic status was used as a covariate in the multilevel modeling analyses as prior studies indicate that individuals with low socioeconomic status tend to experience less stable marital relationships (Lehrer & Son, 2017). In examining the socioeconomic gradient in marital instability, the key lies in the differences between college graduates and people with less education (Lundberg et al., 2016). At the first data collection (child age at 9 months), adoptive parents reported their education levels by choosing from “less than a high school degree,” “G.E.D. degree,” “high school degree,” “trade school,” “2-year college or university degree,” “4-year college or university degree,” and “graduate program.” I then coded parental education such that 0 = *less education than college graduates* and 1 = *college graduates and above*.

**Couples’ Depressive Symptomatology.** Depressive symptoms in couples were found to increase marital instability (Bulloch et al., 2009) and child internalizing and externalizing problems (Goodman et al., 2011), and were therefore controlled in both the multilevel modeling and path analyses. When children were 9 months old, each parent’s depressive symptoms were measured using the Beck Depression Inventory (Beck & Steer, 1993). The total score of 21 items was used to assess the severity of cognitive, affective, and somatic symptoms of depression. Using a 4-point scale, adoptive mothers and fathers were asked to choose one of four statements that range from positive to depressed emotions about life that best describe how they were feeling in the past week. Sample statements included “I do not feel sad,” “I feel sad,” “I am sad all the time and I

can't snap out of it," and "I am so sad or unhappy that I can't stand it." The reliability estimates were .71 for adoptive mothers and .75 for adoptive fathers.

**Child Sex.** Child sex (0 = *boys*; 1 = *girls*) was also included as a covariate in both the multilevel modeling and path analyses. Prior work has identified an association between child sex and marital instability, where parents with boys have a lower propensity to divorce than parents with girls (Katzew et al., 1994). Sex differences were also established in the prevalence of internalizing and externalizing problems, such that girls have a significantly higher prevalence rate in internalizing problems (McLean et al., 2011) while boys are more likely to develop externalizing problems (Ara, 2016).

### **Data Analysis Plan**

**Missing Data Analyses.** Data were analyzed with SPSS version 27 (IBM Corp., 2020), SAS 9.4 (SAS Institute, 2013), and R (R core team, 2020). The percentage of missingness on any study variable ranges from 3.5% to 45.1%, with adoptive mothers' marital instability at child age 7 years having the highest percentage of missingness. Little's Missing Completely at Random (MCAR) was used to assess the overall pattern of missingness in both multilevel modeling and path analyses (Little, 1988). Results indicated that the data were not missing completely at random,  $\chi^2_{(4180)} = 5091.03, p < .001$ . To further understand the patterns of missingness among variables, a series of correlation tests were then conducted to examine the relation between variables measured at the inception of the study (child age 9 months) and the missingness of marital instability, overreactive parenting, and child outcomes at other waves. For adoptive mothers, those who reported higher satisfaction with partner support were more likely to

be missing on marital instability at child age 6 years ( $r = .11, p = .02$ ) while those who were less satisfied with other support were more likely to be missing at child age 27 months ( $r = -.10, p = .04$ ). Additionally, adoptive mothers who had lower infertility distress ( $r = -.11, p = .03$ ) or lower marital instability at 9 months ( $r = -.15, p = .002$ ) were more likely to have missing data on marital instability at child age 4.5 years. For adoptive fathers, those who were more satisfied with partner support were more likely to have missing data on marital instability at child age 4.5 ( $r = .14, p = .006$ ) and 6 years ( $r = .14, p = .007$ ), and those with lower marital instability at 9 months were more likely to be missing on marital instability at child age 27 months ( $r = -.16, p = .001$ ) and 6 years ( $r = -.10, p = .04$ ). These results showed that the missingness patterns seemed to be explained by infertility distress, social support, and couples' initial marital instability and in a relatively random manner. Therefore, Full Information Maximum Likelihood (FIML) was used to handle missingness in the subsequent analyses to generate parameter estimates making full use of available data (Newman, 2014; Peng et al., 2006).

**Analytic Plan for Hypotheses 1, 2, and 3.** Descriptive analyses examined the means, variability, and normality (i.e., skewness and kurtosis) of study variables. Correlation analyses evaluated associations between the covariates (i.e., parent education, couples' depressive symptoms, and child sex), infertility distress, partner support, other support, and marital instability at each wave.

A series of growth curve analyses (Singer et al., 2003) were then conducted to examine the first three hypotheses using SAS PROC MIXED (SAS Institute, 2013). In these models, I tested the trajectories of marital instability over time (level-1) and

explored the role of infertility distress and social support in the between-person change in these trajectories (level-2). Models were separately examined in adoptive mothers and fathers. Age was centered at child age 4.5 years to avoid multicollinearity between the intercept and the slope for the polynomial models (McElreath, 2020).

First, I conducted an unconditional means model (Model 0), which used marital instability as the outcome and estimated the intercept. This unconditional means model separated the variance in marital instability into the estimated within- and between-person variance and provided a baseline for evaluating the shape of marital instability trajectories from the child's age of 9 months to 11 years. Second, to identify the shape of marital instability trajectories (*Hypothesis 1*), I fitted an unconditional linear growth model (Model 1a), which added a linear age term to the unconditional means model, and a quadratic growth model (Model 1b), which included both linear age and quadratic age terms. The quadratic model was tested to capture the potential changing rate of growth over time in marital instability. The log likelihood-ratio, Akaike information criteria (AIC; Akaike, 1974), and Bayesian information criteria (BIC; Schwarz, 1978) were used as fit indicators to assist in the choice between Model 1a and Model 1b and to determine the shape of marital instability trajectories.

Once the shape of marital instability was established, I then conducted Model 2 to examine *Hypothesis 2* (i.e., the impact of infertility distress on marital instability trajectories) by running the chosen model with additional terms involving infertility distress, including the main effect of infertility distress and its interactions with age. Accordingly, the infertility distress terms examined the main effect of infertility distress

on marital instability at child age 4.5 years, and the infertility distress x age (or age<sup>2</sup>) interaction terms estimated the effect of infertility distress on marital instability across time.

To explore *Hypothesis 3* regarding the moderating role of social support from the partner and others in the association between infertility distress and marital instability trajectories, Model 3a and 3b then added terms of social support to the chosen model, with partner support in Model 3a and other support in Model 3b, respectively. The social support term examined the main effect of social support on marital instability at child age 4.5 years, and social support x age (or age<sup>2</sup>) assessed the impact of social support on the changes in marital instability. The social support x infertility distress term tested how social support and infertility distress interacted to predict marital instability at child age 4.5 years. Finally, the social support x infertility distress x age (or age<sup>2</sup>) term investigated whether social support interacted with infertility distress to impact marital instability across time. All the predictors in the multilevel models were centered at their own means.

**Analytic Plan for Hypothesis 4.** Descriptive analyses examined the means, variability, and normality (i.e., skewness and kurtosis) for all study variables in *Hypothesis 4*. Correlation analyses evaluated associations between infertility distress, average marital instability from child age 18 months to 6 years, overreactive parenting at child age 7 years, and child internalizing and externalizing problems at age 11. To investigate the indirect effect of infertility distress on child internalizing and externalizing symptoms through marital instability and overreactive parenting, path analyses were conducted in lavaan (Rosseel, 2012) using R (R Core Team, 2020), using maximum

likelihood estimation with 95% confidence intervals constructed with bootstrapping (5000 samples). Two models examined adoptive mothers' influence on child internalizing (Model A) and externalizing (Model B) outcomes separately, and another two models tested adoptive fathers' influence on child internalizing (Model C) and externalizing (Model D) outcomes. Good model fit was based on values of comparative fit index ( $CFI > .95$ ), root mean square error of approximation ( $RMSEA < .05$ ), standardized root mean square residual ( $SRMR < .05$ ), and a nonsignificant chi-square statistic (Marsh et al., 2004; McDonald & Ho, 2002).

## Results

### Preliminary Analyses for Infertility Distress, Social Support, and Marital Instability

**Descriptives.** Table 1 illustrates the means and standard deviations of parent education, parent depressive symptoms, infertility distress, partner support, other support, and marital instability across waves from child age 9 months to 11 years, respectively, for adoptive mothers and fathers. Coping with the experience of infertility was somewhat challenging for both mothers ( $M = 3.06$ ,  $SD = 1.13$ ) and fathers ( $M = 2.84$ ,  $SD = 1.13$ ). Both mothers and fathers reported that they were pretty satisfied with partner support ( $M = 3.64$ ,  $SD = 0.63$  for mothers;  $M = 3.75$ ,  $SD = 0.54$  for fathers) and support from other sources ( $M = 3.24$ ,  $SD = 0.45$  for mothers;  $M = 3.24$ ,  $SD = 0.47$  for fathers) during the infertility experience. The means of marital instability across waves revealed that both mothers and fathers appear to take a slight upward trend over time. Figure 2 provides a visualization of this trend. To evaluate the differences between mothers and fathers, I ran paired-wise t-tests on study variables (Table 1). Results indicated that compared to fathers, mothers reported higher levels of depressive symptoms ( $t(444) = 3.89$ ,  $p < .001$ ), more infertility distress ( $t(410) = 4.02$ ,  $p < .001$ ), and higher marital instability at child age 27 months ( $t(405) = 2.30$ ,  $p = .02$ ).

**Correlations.** The bivariate correlation matrix of the study variables for hypotheses 1, 2, and 3 is presented in Table 2. Adoptive parents' infertility distress was negatively associated with both partner support ( $r_s = -.32$ ,  $-.29$ ,  $p_s < .001$  for mothers and fathers, respectively) and other support ( $r_s = -.24$ ,  $-.22$ ,  $p_s < .001$  for mothers and fathers, respectively). For adoptive mothers, infertility distress was positively related to higher

**Table 1**  
*Means and standard deviations of study variables*

	AM		AF		<i>t</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	
Parent education (% college or higher)	84%	–	74%	–	–
Parent depressive symptoms	3.69	3.31	2.94	3.04	3.90**
Infertility distress	3.06	1.13	2.84	1.13	4.02**
Partner support	3.65	.63	3.75	.56	-2.63
Other support	3.24	.45	3.24	.47	-.36
MI 9 mo <sup>a</sup>	5.66	2.00	5.55	1.54	.81
MI 18 mo <sup>a</sup>	5.86	2.21	5.75	1.98	1.00
MI 27 mo <sup>a</sup>	6.08	2.56	5.84	2.13	2.30*
MI 4.5 y <sup>a</sup>	6.27	2.68	6.04	2.35	1.60
MI 6 y <sup>a</sup>	6.15	2.44	6.08	2.43	.09
MI 7 y <sup>a</sup>	6.12	2.53	5.87	2.17	1.11
MI 11 y <sup>a</sup>	6.46	3.07	6.17	2.73	1.27

*Notes.* AM = adoptive mothers; AF = adoptive fathers; MI = marital instability.

<sup>a</sup>Age refers to the child's age at the measurement time.

\*\* $p < .01$ . \* $p < .05$ .

**Table 2**  
*Correlations of Study Variables*

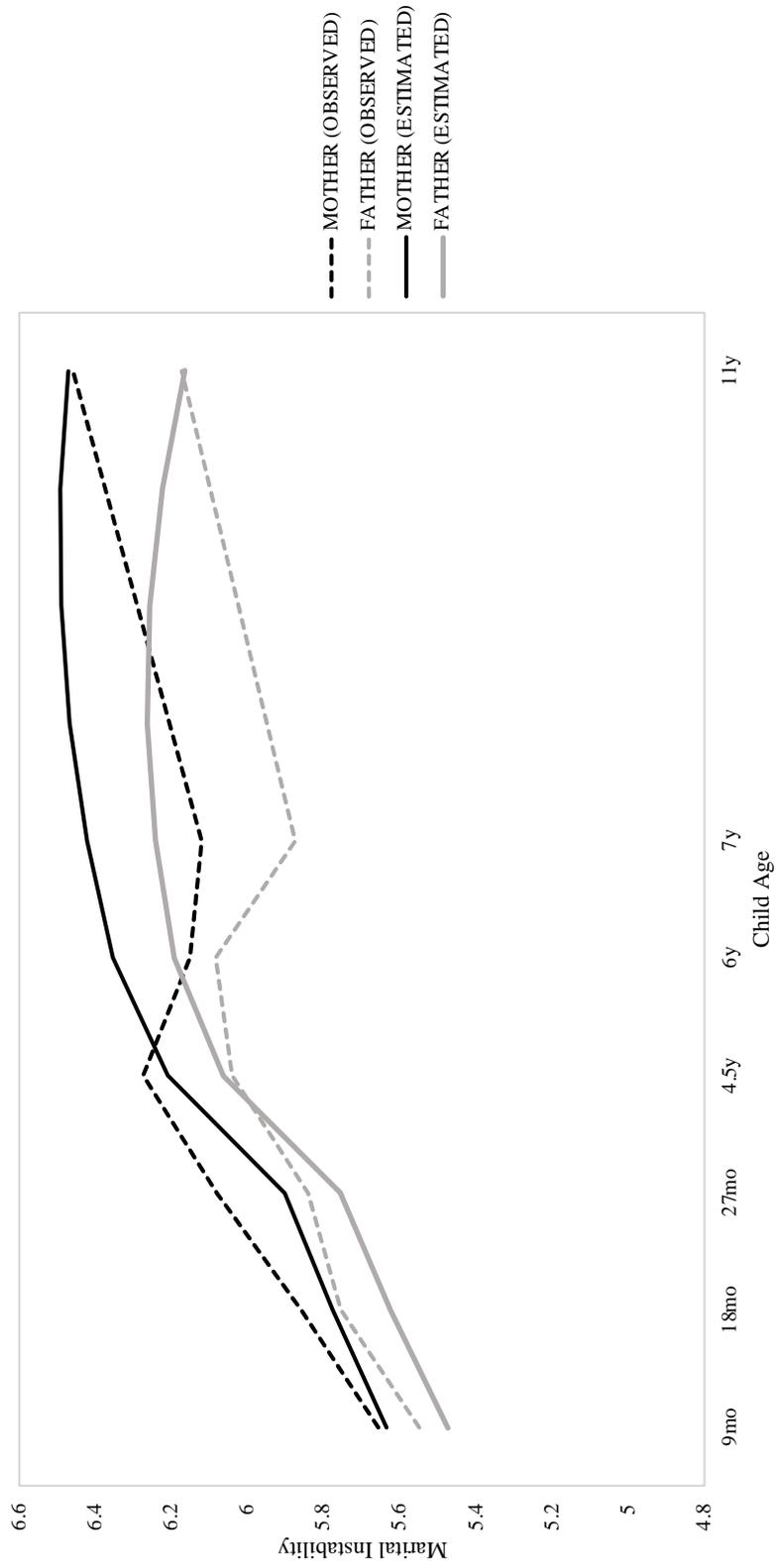
	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Parent education	–	.01	-.06	-.01	.05	-.09	.00	.00	.05	-.05	.05	.06	-.01
2. Parent depressive symptoms	-.01	–	-.04	.14**	-.11*	-.16**	.21**	.10*	.09	.16**	.06	.08	.15*
3. Child sex	.02	-.04	–	.06	.00	-.00	-.02	.01	-.04	-.08	-.03	-.06	.00
4. Infertility distress	.05	.16**	.03	–	-.29**	-.22**	-.01	.02	.04	.04	.04	-.07	.04
5. Partner support	-.01	-.20**	-.08	-.32**	–	.32**	-.23**	-.14	-.15**	-.05	-.07	-.15*	-.07
6. Other support	-.06	-.21**	-.03	-.24**	.33**	–	-.11*	-.05	-.07	-.03	-.05	-.09	.03
7. MI 9 mo <sup>a</sup>	-.00	.20**	-.03	.07	-.14**	-.11*	–	.45**	-.50**	.25**	.28**	.42**	.22**
8. MI 18 mo <sup>a</sup>	.01	.22**	-.06	.01	-.16**	-.05	.65**	–	.43**	.36**	.35**	.43**	.24**
9. MI 27 mo <sup>a</sup>	-.02	.17**	.03	.08	-.25**	-.13*	.45**	.57**	–	.45**	.35**	.44**	.12
10. MI 4.5 y <sup>a</sup>	-.02	.22**	-.14	.13*	-.16**	-.08	.36**	.39**	.40**	–	.62**	.38**	.29**
11. MI 6 y <sup>a</sup>	.09	.10	-.04	.11*	-.09	-.04	.23**	.21**	.21**	.48**	–	.54**	.22*
12. MI 7 y <sup>a</sup>	.09	.14**	-.09	.11	-.11	-.07	.24**	.28**	.29**	.40**	.57**	–	.30*
13. MI 11 y <sup>a</sup>	.10	.21**	-.03	.16**	-.20**	-.10	.22**	.38**	.33**	.44**	.39**	.31**	–

*Notes.* Adoptive fathers' correlations are above the diagonal and adoptive mother's correlations are below the diagonal. MI = marital instability.

<sup>a</sup>Age refers to the child's age at the measurement time.

\*\* $p < .01$ . \* $p < .05$ .

**Figure 2**  
*Trajectories of Marital Instability for Adoptive Mothers and Fathers (Model 1b)*  
 Growth Curves of Marital Instability for Adoptive Parents



marital instability at child age 4.5, 6, and 11 years ( $r_s = .13, .11, .16, p_s = .02, .05, .01$ , respectively), but for fathers, it was unrelated to their marital instability at any wave. These results further justified the need to analyze the outcomes of mothers and fathers separately in the subsequent analyses. Additionally, parental education and child sex were not related to marital instability at any wave for both adoptive mothers and fathers and were therefore excluded from the following multilevel modeling analyses. In contrast, couples' depressive symptoms were found to be positively associated with marital instability at some waves. Adoptive mothers with higher depressive scores reported higher levels of marital instability at child age 9 months ( $r = .20, p < .001$ ), 18 months ( $r = .22, p < .001$ ), 27 months ( $r = .17, p < .001$ ), 4.5 years ( $r = .22, p < .001$ ), 7 years ( $r = .20, p = .02$ ), and 11 years ( $r = .21, p < .001$ ), and adoptive fathers with more depressive symptoms had higher marital instability at child age 9 months ( $r = .21, p < .001$ ), 18 months ( $r = .10, p = .04$ ), 4.5 years ( $r = .16, p = .003$ ), and 11 years ( $r = .15, p < .02$ ). Thus, adoptive couples' depressive symptoms were retained as a covariate in the multilevel modeling analyses.

### **Longitudinal Trajectories of Marital Instability as a Function of Age, Infertility Distress, and Social Support From the Partner and Others**

I conducted a series of multilevel models to estimate the trajectories of marital instability for adoptive mothers and fathers separately. Tables 3 and 4 present the parameter estimates of all the models described in the data analytic plan. The estimated parameters are parallel to unstandardized coefficients in multiple regression analyses, which indicate the increase or decrease in marital instability with a unit increase in the

independent variable. Obtained coefficients represent coefficient estimates using the maximum likelihood (ML) estimation procedure with unstructured covariance matrix. Because I centered child age at 4.5 years, the intercept was interpreted as the mean levels of marital instability when the adopted child was 4.5 years old.

**Age Trajectories of Marital Instability.** An unconditional means model (Model 0) was first fitted as a baseline model to describe the variation in marital instability at all waves. As shown in Table 3, both the estimated within- and between-person variances in the unconditional means model were significant for both adoptive mothers ( $\sigma_{\varepsilon}^2 = 3.91$ ,  $\sigma_0^2 = 2.41$ ,  $ps < .001$ ) and fathers ( $\sigma_{\varepsilon}^2 = 3.12$ ,  $\sigma_0^2 = 1.68$ ,  $ps < .001$ ). Model fit indices were listed in Table 3 and will be used as a comparison to later growth curve models.

A subsequent linear growth curve model (Model 1a; Table 3) was then fitted to assess the trajectories of marital instability over time (*Research Question 1*). The linear age terms were positive and significant for both adoptive mothers and fathers ( $\gamma = .08$ ,  $.07$ ,  $ps < .001$  for mothers and fathers, respectively), indicating that marital instability increased slightly over time. Both the estimated between- and within-person variances were significant among mothers ( $\sigma_{\varepsilon}^2 = 3.27$ ,  $\sigma_0^2 = 2.62$ ,  $\sigma_1^2 = 0.05$ ,  $ps < .001$ ) and fathers ( $\sigma_{\varepsilon}^2 = 2.68$ ,  $\sigma_0^2 = 1.98$ ,  $\sigma_1^2 = 0.04$ ,  $ps < .001$ ). The chi-square difference test on -2 Residual log likelihood suggested a better fit of Model 1a compared with Model 0 for both adoptive mothers ( $\chi^2_{(2)} = 131.3$ ) and fathers ( $\chi^2_{(2)} = 115.3$ ). AIC (11402.4 and 10259.2 for adoptive mothers and fathers, respectively) and BIC (11427.2 and 10284.0 for adoptive mothers and fathers, respectively) indices both decreased compared with these indices of Model 0.

Next, in Model 1b, I included both a linear age and a quadratic age term to capture the different rate of change in marital instability over time, which was observed in the descriptive statistics stated earlier (Table 1). For adoptive mothers, both the positive coefficient of the linear age term ( $\gamma = 0.10, p < .001$ ) and the negative coefficient of the quadratic age term ( $\gamma = -0.01, p = .02$ ) were significant. This result indicated an inverse U-shaped curve for marital instability, peaking at child age 9.6 years (Table 3; Figure 2). The marital instability trajectory of fathers mirrored this result ( $\gamma = 0.09, p < .001$  for the linear coefficient;  $\gamma = -0.01, p = .01$  for the quadratic coefficient), with an estimated peak at child's age of 8.3 years (Table 3; Figure 2). Both the estimated between- and within-person variances were significant among mothers ( $\sigma_{\epsilon}^2 = 2.87, \sigma_0^2 = 3.46, \sigma_1^2 = 0.07, \sigma_2^2 = 0.003, ps < .001$ ) and fathers ( $\sigma_{\epsilon}^2 = 2.22, \sigma_0^2 = 3.53, \sigma_1^2 = 0.04, \sigma_2^2 = 0.004, ps < .001$ ).

To assist my choice between Model 1a and Model 1b, I compared the -2 residual log likelihood of the two models. The chi-square difference test indicated that Model 1b displayed significantly lower indexes of -2 residual log likelihood for both adoptive mothers ( $\chi^2_{(2)} = 46.9$ ) and fathers ( $\chi^2_{(2)} = 126.4$ ), indicating that Model 1b had a better fit than Model 1a. The comparisons between AIC and BIC indices supported the superiority of Model 1b (AICs = 11363.5, 10140.8, BICs = 11404.8, 10182.1 for mothers and fathers, respectively) over Model 1a (AICs = 11402.4, 10259.2, BICs = 11427.2, 10284.0 for mothers and fathers, respectively) for both adoptive mothers and fathers (Table 3). Given the better fit of the curvilinear age trend, Model 1b was applied as the baseline unconditional growth model in the subsequent analyses.

**Table 3**  
*Fixed and Random Coefficients for Trajectories of Marital Instability in Unconditional Models among Adoptive Parents*

	Model 0			Model 1a			Model 1b					
	Mothers		Fathers	Mothers		Fathers	Mothers		Fathers			
	Beta	SE	Beta	SE	Beta	SE	Beta	SE	Beta	SE		
Intercept	6.09**	0.08	5.90**	0.07	6.13**	0.09	5.95**	0.08	6.25**	0.10	6.09**	0.10
Age	-	-	-	-	0.08**	0.02	0.07**	0.01	0.10**	0.02	0.09**	0.02
Age <sup>2</sup>	-	-	-	-	-	-	-	-	-0.01*	0.004	-0.01**	0.005
Variance Components												
Level 1												
Within-person	3.91**	0.12	3.12**	0.10	3.27**	0.11	2.68**	0.10	2.87**	0.11	2.22**	0.09
Level 2												
In intercept	2.41**	0.21	1.68**	0.16	2.62**	0.23	1.98**	0.18	3.46**	0.34	3.53**	0.34
In linear slope	-	-	-	-	0.05**	0.01	0.04**	0.01	0.07**	0.01	0.04**	0.01
In quadratic slope	-	-	-	-	-	-	-	-	0.003**	0.001	0.004**	0.001
Goodness-of-fit												
-2 Residual log likelihood	11521.7		10362.5		11390.4		10247.2		11343.5		10120.8	
AIC	11527.7		10368.5		11402.4		10259.2		11363.5		10140.8	
BIC	11540.1		10380.9		11427.2		10284.0		11404.8		10182.1	

*Note.* Age is centered at the child's age of 4.5 years; parental depressive symptoms are used as a covariate but not included in the table.  
 \*\* $p < .01$ . \* $p < .05$ .

**Effect of Infertility Distress on the Trajectories of Marital Instability.** To examine *Research Question 2* about the effect of infertility distress on adoptive parents' marital instability over the course of parenthood, Model 2 was employed to include infertility distress as a predictor of marital instability trajectories for adoptive mothers and fathers, with their depressive symptoms as a covariate (Table 4). Regarding the covariates, both adoptive mothers' and fathers' marital instability was significantly higher at child age 4.5 years when they reported higher levels of depressive symptoms ( $\gamma = 0.14, 0.11, p < .001$  for mothers and fathers, respectively).

For adoptive mothers, the main effect of infertility distress was significant ( $\gamma = 0.19, p = .04$ ), as shown in Table 4, indicating that adoptive mothers who reported higher infertility distress at child age 9 months also had higher perceived marital instability when the child was 4.5 years old. Although there was no significant interaction between infertility distress and the quadratic age term, the interaction between infertility distress and the linear age term was positive and statistically significant ( $\gamma = 0.04, p = .02$ ), suggesting that the pace of increase in marital instability was higher for mothers who felt more emotionally challenged due to infertility. Figure 3 depicts the different trajectories of marital instability for mothers by the levels of infertility distress. It seems that the

**Table 4**  
*Fixed and Random Coefficients for Trajectories of Marital Instability in Conditional Models among Adoptive Parents*

	Model 2				Model 3a				Model 3b			
	Mothers		Fathers		Mothers		Fathers		Mothers		Fathers	
	Beta	SE	Beta	SE	Beta	SE	Beta	SE	Beta	SE	Beta	SE
Intercept	6.27**	0.11	6.11**	0.11	6.12**	0.11	6.05**	0.11	6.26**	0.11	6.12**	0.11
Infertility distress	0.19*	0.09	0.01	0.09	0.16*	0.08	-0.06	0.07	0.14	0.08	-0.02	0.07
Social support <sup>a</sup>	-	-	-	-	-0.30 <sup>†</sup>	0.16	-0.45*	0.19	-0.20	0.20	-0.13	0.16
Infertility distress × Social support <sup>a</sup>	-	-	-	-	-0.33**	0.12	-0.001	0.15	-0.11	0.16	0.07	0.14
Rate of Change												
Age	0.10**	0.02	0.09**	0.02	0.09**	0.02	0.09**	0.02	0.11**	0.02	0.09**	0.02
Age × Infertility distress	0.04*	0.02	0.004	0.01	0.03*	0.02	-0.005	0.01	0.04	0.01	0.003	0.01
Age × Social support <sup>a</sup>	-	-	-	-	0.004	0.03	-0.002	0.04	-0.008	0.04	0.02	0.03
Age × Infertility distress × Social support <sup>a</sup>	-	-	-	-	-0.04	0.02	-0.0001	0.03	0.04	0.03	-0.02	0.03
Age <sup>2</sup>	-0.01**	0.004	-0.01**	0.004	-0.01*	0.005	-0.02**	0.005	-0.01*	0.005	-0.01**	0.004

Age <sup>2</sup> × Infertility distress	-0.002	0.004	-0.002	0.004	-	-	-	-	-	-	-	-
Variance Components												
Level 1												
Within- person	2.89**	0.11	2.22**	0.09	2.80**	0.11	2.02**	0.09	2.89**	0.11	2.22**	0.09
Level 2												
In intercept	3.42**	0.35	3.56**	0.35	2.94**	0.32	3.07**	0.33	3.41**	0.35	3.57**	0.36
In linear slope	0.07**	0.01	0.04**	0.01	0.06**	0.01	0.03**	0.01	0.07**	0.01	0.04**	0.01
In quadratic slope	0.003**	0.001	0.003**	0.001	0.003**	0.001	0.004**	0.001	0.003**	0.001	0.003**	0.001
Goodness-of-fit												
-2 Residual log likelihood	10745.8		9537.1		10261.9		8170.0		10726.2		9519.9	
AIC	10773.8		9565.1		10295.9		8204.0		10760.2		9553.9	
BIC	10830.9		9621.9		10364.7		8270.9		10829.5		9622.9	

*Note.* Age is centered at the child's age of 4.5 years; parental depressive symptoms are used as a covariate but not included in the table.

<sup>a</sup>Social support = partner support in Model 3a; Social support = other support in Model 3b.

\*\* $p < .01$ . \* $p < .05$ . †  $p < .10$ .

negative impact of infertility distress on marital instability started to emerge at the preschool age and persisted until early adolescence<sup>1</sup>.

Interestingly, however, no significant effect of infertility distress on marital instability was observed for adoptive fathers (Figure 4). Infertility distress was not predictive of the fathers' trajectories of marital instability, as neither the main effect of infertility distress ( $\gamma = 0.01, p = .88$ ), the interaction between infertility distress and the linear age term ( $\gamma = 0.004, p = .75$ ), nor the interaction between infertility distress and the quadratic age term ( $\gamma = -0.002, p = .66$ ) was statistically significant (Table 4).

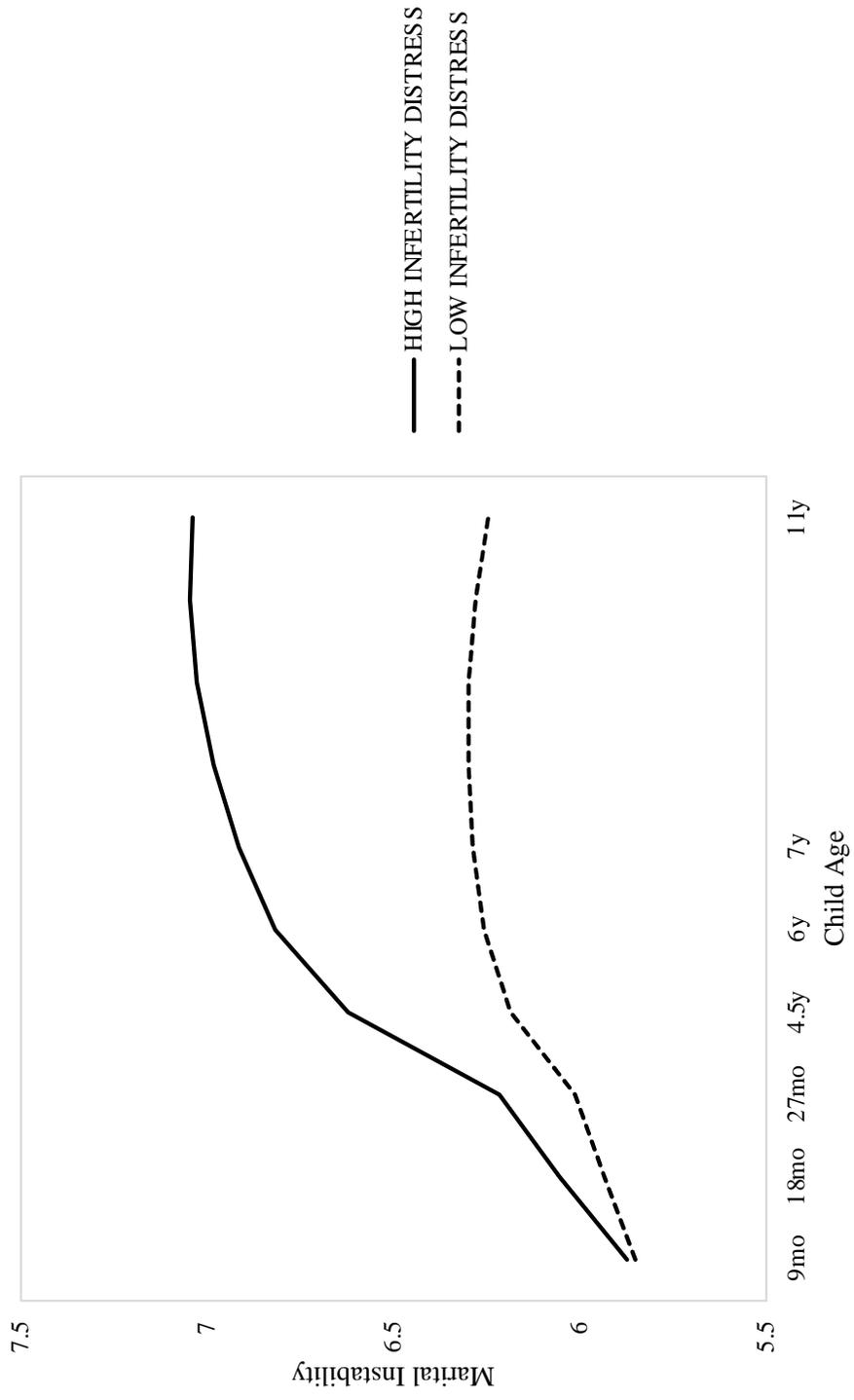
**Effect of Infertility Distress and Social Support on the Trajectories of Marital Instability.** To examine *Research Question 3* and explore the moderating effect of social support from the partner and others on the association between infertility distress and marital instability trajectories, I added partner support and other support as additional predictors in Model 3a (using partner support) and Model 3b (using other support), respectively, together with interaction terms including social support variable x infertility distress, social support variable x age, as well as social support variable x infertility distress x age.

In Model 3a (Table 4), the main effect of partner support was only marginally significant ( $\gamma = -0.30, p = .052$ ) and the interaction between partner support, infertility

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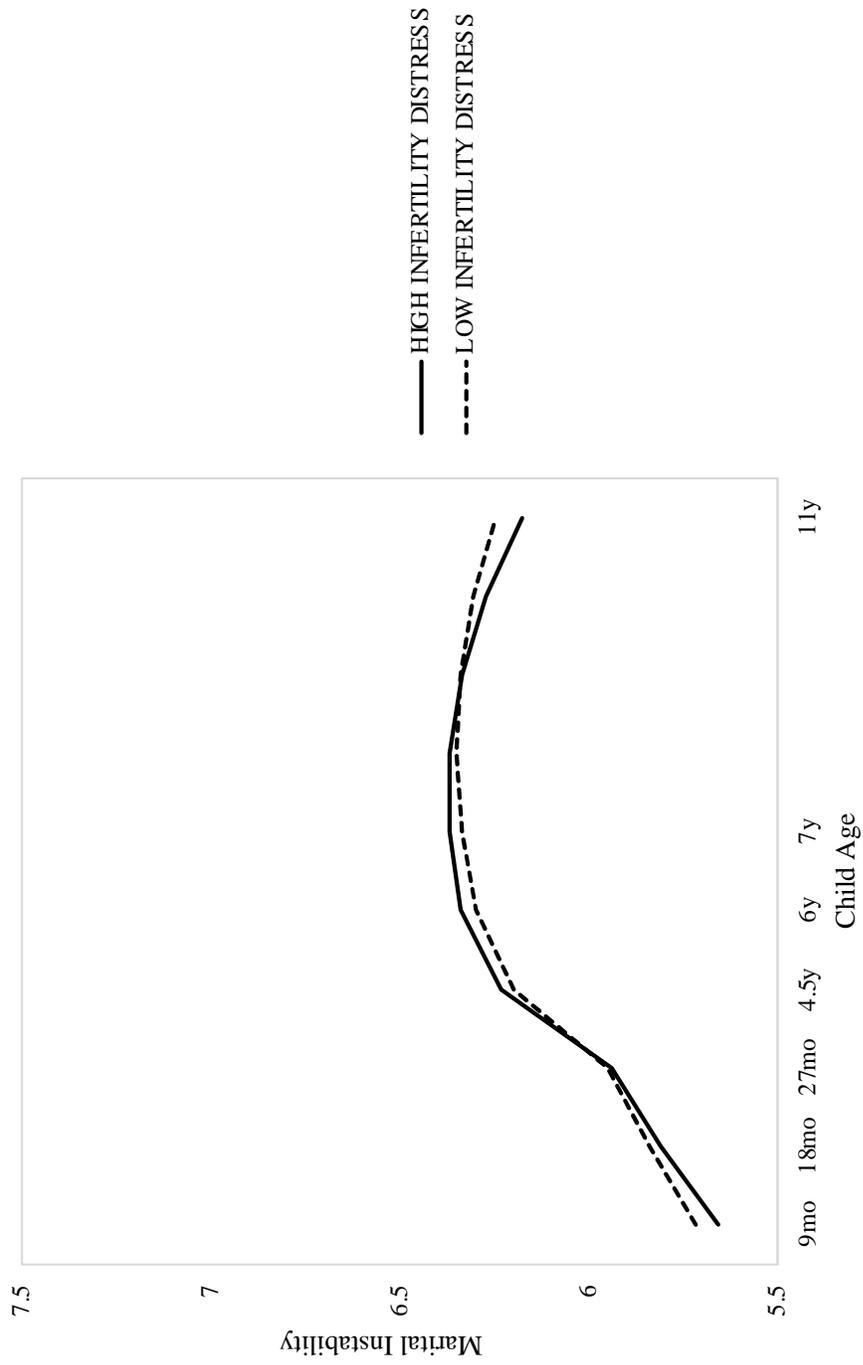
<sup>1</sup> To further examine the effect of infertility distress on marital instability at other ages, I re-centered the intercept at every wave from when children were 9 months to 11 years old. Results indicated significant main effects of infertility distress at child ages 4.5, 6, 7, and 11 years old ( $\gamma$ s = .19, .25, .28, .35,  $ps$  = .04, .02, .01, .02, respectively) and significant interactions between infertility distress and the linear age term when the child was 4.5 and 6 years old ( $\gamma$ s = .04, .03,  $ps$  = .02, .03, respectively). These findings suggested that infertility distress predicted higher levels of marital instability for mothers not in infancy but after the child was 4.5 years old.

**Figure 3**  
*Marital Instability by Infertility Distress among Adoptive Mothers (Model 2)*  
 Trajectories of Marital Instability for Adoptive Mothers



*Note.* High group is at one standard deviation above the mean, and low group is at one standard deviation below the mean.

**Figure 4**  
*Marital Instability by Infertility Distress among Adoptive Fathers (Model 2)*  
 Trajectories of Marital Instability for Adoptive Fathers



*Note.* High group is at one standard deviation above the mean, and low group is at one standard deviation below the mean.

distress, and age ( $\gamma = -0.04, p = .07$ ) was not significant for adoptive mothers. However, there was a significant interaction between partner support and infertility distress ( $\gamma = -0.33, p = .01$ ), indicating that partner support during the struggle with infertility experience mitigated the effect of infertility distress on marital instability at child age 4.5 years for adoptive mothers. This suggests that when the child was 4.5 years old, the marital instability of mothers who were more satisfied with partner support was less influenced by their infertility distress compared with mothers who were less satisfied with partner support during their infertility journey. Figure 5 depicts the differing marital instability trajectories by different levels of infertility distress and partner support among adoptive mothers<sup>2</sup>.

On the other hand, for adoptive fathers, while partner support was negatively associated with marital instability ( $\gamma = -0.45, p = .02$ ), neither the interaction between partner support and infertility distress ( $\gamma = -0.001, p = 1.00$ ) nor the interaction between partner support, infertility distress, and the linear age term ( $\gamma = -0.0001, p = 1.00$ ) was statistically significant (Table 4)<sup>3</sup>.

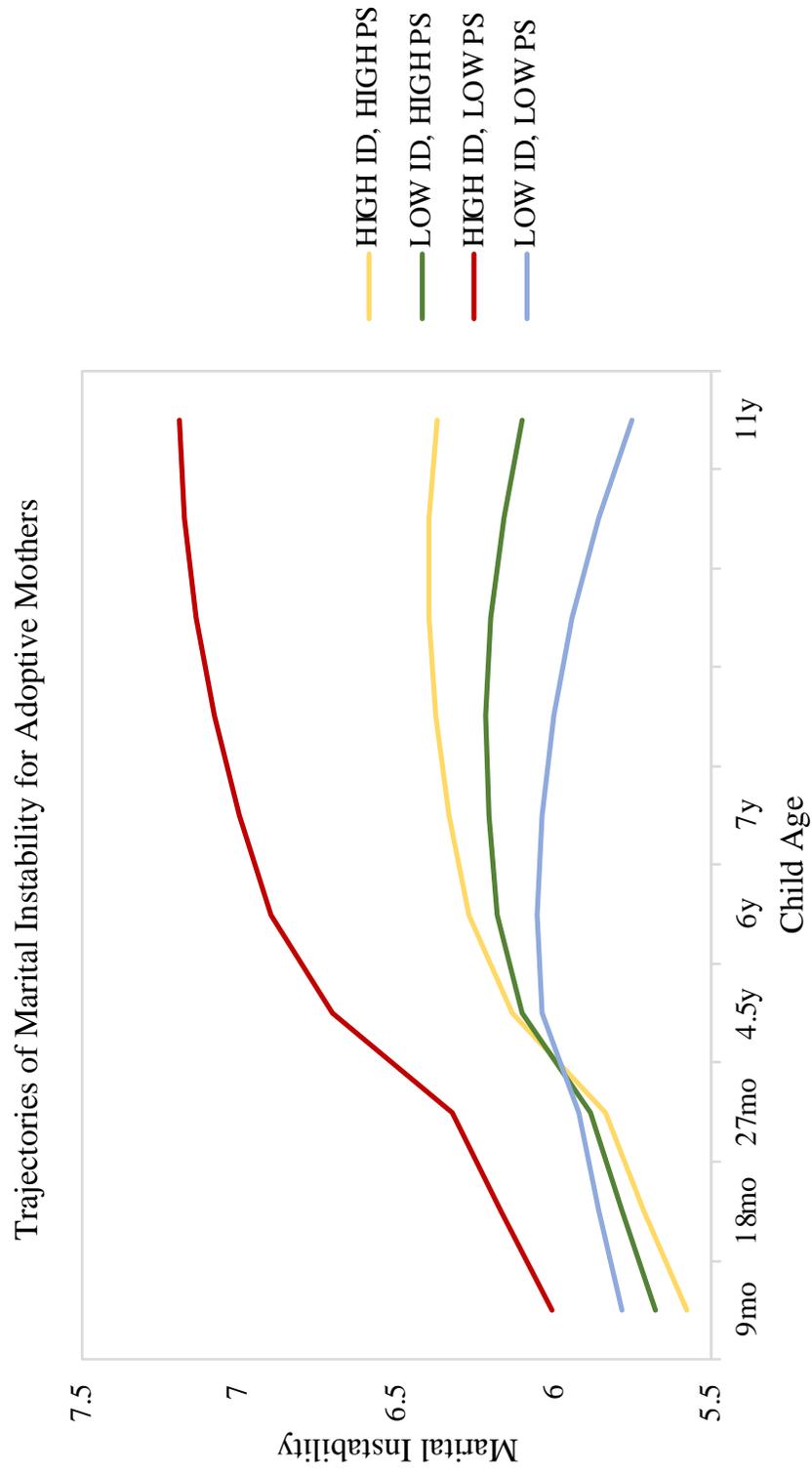
In Model 3b, other support showed no impact on marital instability or on the association between infertility distress and marital instability for both adoptive mothers

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<sup>2</sup> To further examine the moderating effect of partner support on the association between infertility distress and marital instability at other ages, I re-centered age at every wave from when children were 9 months to 11 years old. Results indicated a significant interaction between partner support and infertility distress only when the child was 4.5, 6, 7, and 11 years old ( $\gamma$ s =  $-.33, -.40, -.44, -.61, ps = .007, .004, .003, .005$ , respectively). This suggests that partner support mitigated the impact of infertility distress on marital instability for mothers not in the beginning but after the child was 4.5 years old.

<sup>3</sup> Analogous to Model 3a for adoptive mothers, I re-centered age at every wave to examine the effect of partner support on the association between infertility distress and marital instability at other ages for adoptive fathers. Results indicated no impact of partner support at any time (all  $p > .05$ ).

**Figure 5**  
*Marital Instability by Infertility Distress (ID) and Partner Support (PS) among Adoptive Mothers (Model 3a)*



*Note.* High ID and PS groups are at one standard deviation above the mean, and low ID and PS groups are at one standard deviation below the mean. ID = infertility distress; PS = partner support.

and fathers. None of the effects of other support ( $\gamma = -0.20, p = .31$  for mothers;  $\gamma = -0.13, p = .44$  for fathers), the interactions between other support and infertility distress ( $\gamma = -0.11, p = .52$  for adoptive mothers;  $\gamma = 0.07, p = .62$  for adoptive fathers), nor the interactions between other support, infertility distress, and the linear age terms ( $\gamma = 0.04, p = .16$  for adoptive mothers;  $\gamma = -0.02, p = .54$  for adoptive fathers) was statistically significant (Table 4).

**Sensitivity Analyses for Multilevel Models.** Although the current study intended to measure marital instability, not divorce, during parenthood, some adoptive parents ( $N = 24$ ) ended their marriage by the adopted child reached the age of 11. Prior studies indicated that marital conflict trajectories differed depending on whether couples got a divorce in the end (James, 2015a, 2015b). Therefore, to exclude the possibility that marital instability trajectories are dependent on whether couples had divorced, I conducted sensitivity analyses by re-conducting all multilevel models for adoptive mothers and fathers whose marriage stayed intact until child age 11 years ( $N = 437$ ). Results revealed similar patterns as those from the multilevel modeling analyses using the full sample. Specifically, Model 1 of the sensitivity analyses revealed better fit of the quadratic trajectories of marital instability in both mothers ( $\gamma = 0.10, p < .001$  for the linear coefficient;  $\gamma = -0.01, p = .02$  for the quadratic coefficient) and fathers ( $\gamma = 0.09, p < .001$  for the linear coefficient;  $\gamma = -0.01, p = .01$  for the quadratic coefficient), with mothers' marital instability peaking at child age 9.4 years, and fathers' marital instability peaking at child age 8.2 years. Model 2 indicated a significant main effect of infertility distress ( $\gamma = 0.19, p = .04$ ) and a significant interaction between infertility distress and the

linear age term ( $\gamma = 0.04, p = .02$ ) for mothers. No effect of infertility distress was found for fathers. Finally, Model 3 revealed a significant interaction between partner support and infertility distress ( $\gamma = -0.33, p = .007$ ) for mothers, indicating that mothers' perceived partner support mitigated the impact of infertility distress on marital instability at child age 4.5 years. No moderating effect of social support was found in fathers. Because all results from multilevel modeling analyses held after excluding divorced couples, I was more confident that in the current sample, marital instability trajectories and their associations with the risk and protective factors (i.e., infertility distress and social support) were not dependent on whether couples got a divorce in the end.

### **Effect of Infertility Distress on Child Internalizing and Externalizing Symptoms in Early Adolescence Through Marital Instability and Overreactive Parenting in Childhood**

**Descriptives.** Table 5 provides the means, standard deviations, and the bivariate correlation matrix of infertility distress, average marital instability from child age 18 months to 6 years, overreactive parenting at child age 7 years, child internalizing and externalizing symptoms at age 11, as well as potential covariates (i.e., parents' depressive symptoms and child sex), for both adoptive mothers and fathers. Regarding covariates, parents' depressive symptoms were positively correlated with infertility distress ( $r = .16, p = .001$  for mothers,  $r = .14, p = .003$  for fathers), average marital instability ( $r = .22, p < .001$  for mothers,  $r = .12, p = .01$  for fathers), and overreactive parenting ( $r = .22, p$

**Table 5**  
*Correlations of Study Variables with Means and Standard Deviations*

	1	2	3	4	5	6	7	<i>M</i>	<i>SD</i>
1. Parent depressive symptoms	–	-.04	.14**	.12**	.25**	.04	.07	3.69 (2.94)	3.31 (3.04)
2. Child sex	-.04	–	.06	-.05	-.12	-.02	-.12**	–	–
3. Infertility distress	.16**	.03	–	.02	.14*	.03	.01	3.06 (2.84)	1.13 (1.13)
4. MI (average from 18 mo to 6 y) <sup>a</sup>	.22**	-.04	.01	–	-.03	.05	-.01	5.86 (5.75)	2.21 (1.98)
5. Harsh parenting 7 y <sup>a</sup>	.22**	.12	.17**	.12*	–	.18	.28*	2.39 (2.38)	0.70 (0.69)
6. Child internalizing symptoms 11y <sup>a</sup>	.004	-.02	.03	.06	.16	–	.66**	6.76	5.96
7. Child externalizing symptoms 11y <sup>a</sup>	-.02	-.12**	.07	.01	.29**	.66**	–	7.72	6.78

*Notes.* Adoptive fathers' correlations are above the diagonal and adoptive mothers' correlations are below the diagonal; adoptive fathers' means and standard deviations are in the parentheses and adoptive mothers' means and standard deviations are outside the parentheses. MI = marital instability.

<sup>a</sup>Age refers to the child's age at the measurement time.

\*\* $p < .01$ . \* $p < .05$ .

= .001 for mothers,  $r = .25, p < .001$  for fathers), and thus were included as a covariate in path models A, B, C, and D. Child sex was associated with externalizing problems ( $r = .12, p = .03$ ) and therefore was included as a covariate in path models B and D. For the variables of my main interest, adoptive mothers' infertility distress was positively associated with both average marital instability from child age 18 months to 6 years ( $r = .11, p = .03$ ) and overreactive parenting at child age 7 years ( $r = .24, p < .001$ ). Mothers' overreactive parenting at child age 7 years was also positively related to their average marital instability ( $r = .15, p = .02$ ) and child externalizing problems at age 11 ( $r = .28, p < .001$ ). Fathers' overreactive parenting at child age 7 years was positively associated with child externalizing problems at age 11 ( $r = .26, p < .001$ ). Finally, child internalizing and externalizing problems were highly correlated ( $r = .66, p < .001$ ).

**Path Analyses.** Path analyses were then conducted to investigate *Research Question 4* about the cascading effect of pre-parenthood infertility on child outcomes at age 11 via average marital instability from child age 18 months to 6 years and overreactive parenting at child age 7 years. I conducted four models to examine child internalizing and externalizing symptoms and for mothers and fathers separately: Model A and Model B tested child internalizing and externalizing symptoms, respectively, for mothers (Figure 6), and Model C and Model D analyzed internalizing and externalizing symptoms separately for fathers (Figure 7). As described earlier, parents' depressive symptoms were used as a covariate in models A, B, C, and D, while child sex is kept as a covariate in models B and D. All models showed good fit to data (Table 6; all CFI > .95;

**Table 6**  
*Summary of Fit Statistics of Path Analysis*

Model	Chi-square	df	RMSEA	SRMR	CFI
Model A	0.179	2	0.000	0.005	1.000
Model B	7.157	6	0.020	0.027	0.985
Model C	0.059	2	0.000	0.003	1.000
Model D	6.972	6	0.019	0.029	0.976

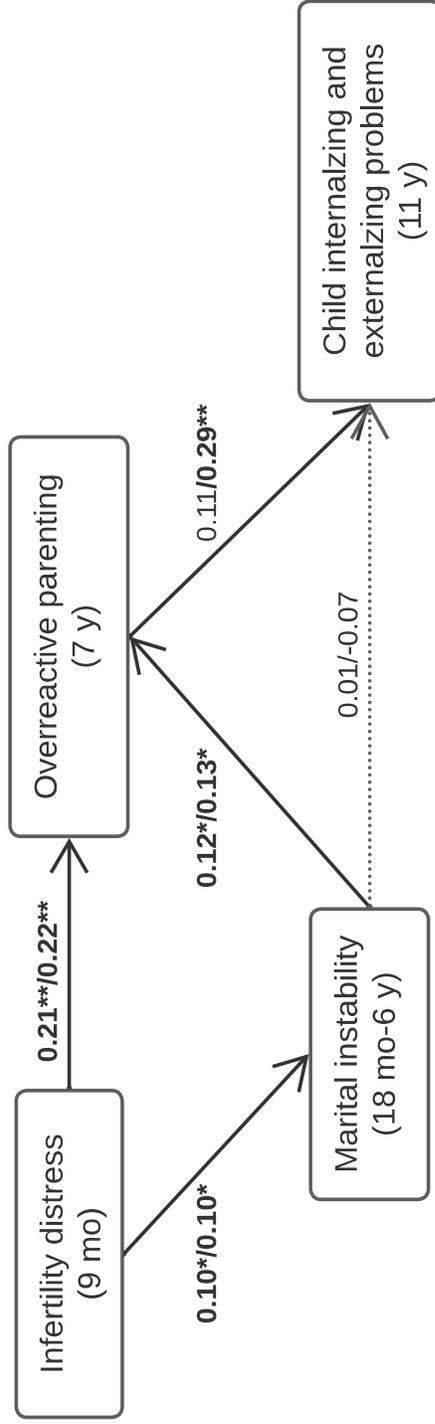
*Notes.* df = degrees of freedom; RMSEA = Root Mean Square Error of Approximation; SRMR = standardized root mean square residual; CFI = comparative fit index.

all RMSEA and SRMR < .05;  $\chi^2_{(2)} = .023, .077, ps = .88, .78$  for models A and C, respectively,  $\chi^2_{(6)} = .004, .064, ps = .95, .80$  for models B and D, respectively).

In Model A (internalizing symptoms; Figure 6), adoptive mothers' infertility distress was associated with both higher levels of average marital instability from child age 18 months to 6 years ( $\beta = .10, p = .03, 95\% \text{ CI } [.01, .20]$ ) and overreactive parenting at child age 7 years ( $\beta = .21, p < .001, 95\% \text{ CI } [.09, .33]$ ). Average marital instability was positively related to later overreactive parenting ( $\beta = .12, p = .05, 95\% \text{ CI } [.002, .239]$ ). However, no association was found between overreactive parenting at child age 7 years and child internalizing symptoms at age 11 ( $\beta = .11, p = .12, 95\% \text{ CI } [-.03, .24]$ ) or between average marital instability from child age 18 months to 6 years and internalizing outcomes in children of 11 years old ( $\beta = .01, p = .84, 95\% \text{ CI } [-.10, .12]$ ). Collectively, while infertility distress predicted more unstable marital relationship and more overreactive parenting in childhood, it did not cascade to child internalizing outcomes in early adolescence.

In Model B (externalizing symptoms; Figure 6), adoptive mothers' infertility distress was associated with both higher average marital instability from child age 18 months to 6 years ( $\beta = .10, p = .03, 95\% \text{ CI } [.01, .20]$ ) and overreactive parenting at child age 7 years ( $\beta = .22, p < .001, 95\% \text{ CI } [.10, .33]$ ). Average marital instability was positively related to subsequent overreactive parenting ( $\beta = .13, p = .04, 95\% \text{ CI } [.01, .24]$ ), and finally, overreactive parenting at child age 7 years was associated with more child externalizing problems at age 11 ( $\beta = .29, p < .001, 95\% \text{ CI } [.17, .41]$ ). However, average marital instability in early childhood was not related to externalizing

**Figure 6**  
*Results of the Path Analysis for Adoptive Mothers (Models A and B)*

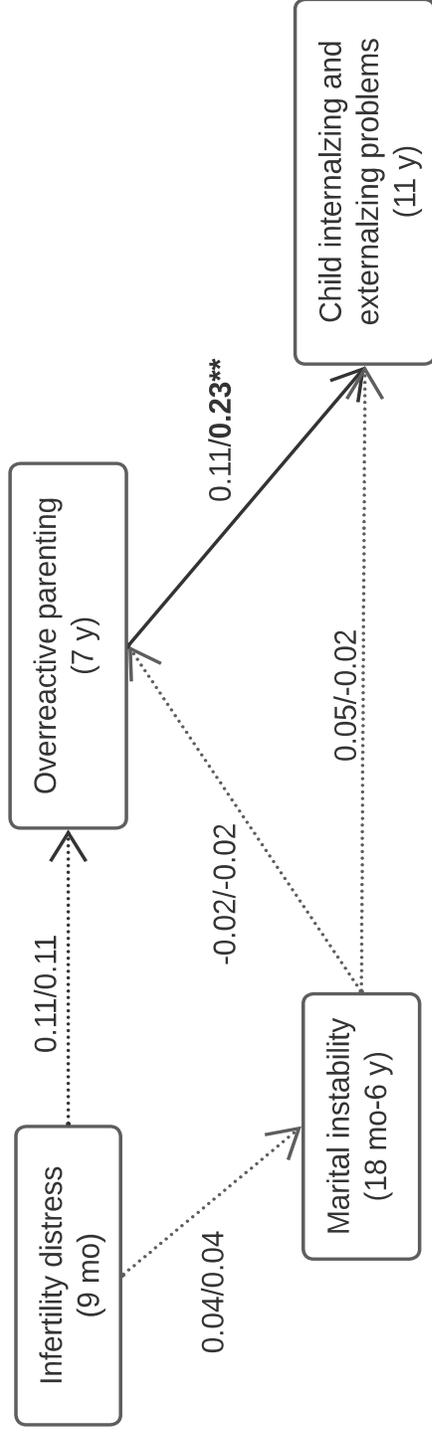


*Note.* Results of child internalizing problems are on the left of the slash (Model A) and results of child externalizing problems are on the right of the slash (Model B). Standardized coefficients are presented. Covariates (parental depressive symptoms and child sex) are omitted for visual clarity.  
 \*\* $p < .01$ . \* $p < .05$ .

symptoms in children at age 11 ( $\beta = -.07, p = .17, 95\% \text{ CI } [-.18, .03]$ ). Finally, I tested the total indirect effects of two possible paths — one with overreactive parenting as a single mediator and the other with both average marital instability and overreactive parenting as sequential mediators. Results indicated that the indirect effect of infertility distress on child externalizing problems at age 11 through overreactive parenting at child age 7 years was significant ( $\beta = .06, p = .004, 95\% \text{ CI } [.02, .10]$ ). However, the indirect effect of infertility distress on child outcomes at age 11 via average marital instability from child age 18 months to 6 years and subsequent overreactive parenting at child age 7 years was not ( $\beta = .004, p = .15, 95\% \text{ CI } [-.001, .009]$ ) even though each path involved in this sequential mediation was statistically significant.

No significant associations were found in Model C regarding child internalizing symptoms for adoptive fathers. Model D (externalizing symptoms; Figure 7) revealed that higher levels of overreactive parenting at child age 7 years were associated with more externalizing problems in children at age 11 ( $\beta = .23, p < .001, 95\% \text{ CI } [.10, .36]$ ).

**Figure 7**  
*Results of the Path Analysis for Adoptive Fathers (Models C and D)*



*Note.* Results of child internalizing problems are on the left of the slash (Model C) and results of child externalizing problems are on the right of the slash (Model D). Standardized coefficients are presented. Covariates (parental depressive symptoms and child sex) are omitted for visual clarity.

\*\* $p < .01$ . \* $p < .05$ .

## General Discussion

While abundant research has established the association between problematic marital relationships and child outcomes (e.g., Cherlin et al., 1991; Cavanagh & Fomby, 2019; Cummings et al., 2006; Davis et al., 2002; Emery, 1982; Grych et al., 2001; Harold & Conger, 1997), limited work has considered this association in the context of pre-parenthood experiences, such as infertility. Widely recognized as a life and family crisis and stressor, infertility distress has been found to negatively impact both the personal and relational well-being of individuals (Covington & Burns, 2006). Guided by the broader theoretical frameworks of the family systems theory (Bowen, 1993; Cox & Paley, 1997) and the parenting process model (Belsky, 1984; Taraban & Shaw, 2018), the present dissertation fills existing research gaps by examining how parents' experiences of fertility challenges influence the trajectories of marital instability over the course of parenthood and investigating the cascading effect of pre-parenthood infertility distress on child internalizing and externalizing outcomes in early adolescence through marital instability and overreactive parenting during childhood. To pursue these aims, I used longitudinal data from adoptive families and tracked them for 11 years during parenthood. The benefits of using the adoption sample include 1) this population has exceptionally high infertility rates, but few empirical investigations have been conducted to examine the impact of their infertility distress; 2) adoptive parents represent an important group of infertile couples who achieved parenthood, and provide a context to examine the long-term effect of infertility on marital relationships, parenting, as well as the child; and 3)

the inclusion of this sample increases the diversity of family structures represented in developmental science.

The current dissertation was based on a prospective longitudinal study of 461 adoptive parents with prior infertility experience and their adopted children. The following four research questions guided the scope of the current investigation: 1) How does adoptive parents' perceived marital instability change in the 11 years of parenthood?; 2) How does infertility distress impact adoptive parents' perceived marital instability in the long term?; 3) Does perceived social support from the partner and others during the infertility journey moderate the relationship between infertility distress and marital instability trajectories? 4) Does parents' history of infertility distress influence adolescents' internalizing and externalizing problems through marital instability and overreactive parenting in childhood? Based on previous work that revealed gender differences in couples' responses to the infertility experience (e.g., Drosdzol & Skrzypulec, 2009; Greil et al., 2010, 2018; Monga et al., 2004), I explored these questions separately for mothers and fathers. In what follows, I synthesize my interpretation of findings for each research question, discuss the strengths and limitations of the current dissertation, and provide recommendations for future research and intervention.

### **Trajectories of Marital Instability for Adoptive Mothers and Fathers**

The first research question concerns the changes in adoptive parents' marital instability in the 11 years of parenthood. I hypothesized that marital instability would increase over time, and this hypothesis was partially supported. Results revealed inverse

U-shaped marital instability trajectories for both adoptive mothers and fathers, with perceived marital instability increasing from 9 months to child age of 8.3 and 9.6 years and declining thereafter, though the decline of marital instability toward early adolescence was very subtle. The current finding is somewhat consistent with available work on the changes in marital satisfaction and conflict over the course of the marriage, which indicates a continuous decline in the quality of couples' relationships with the possibility of a flat trend in later years (Umberson et al., 2005; VanLaningham et al., 2001). The trend of deteriorating marital relationship over the course of marriage is especially salient during child-rearing years (VanLaningham et al., 2001), as children may impose additional child-care duties on the couples, which influence the quantity and/or quality of couples' time spent together (Helms-Erikson, 2001; Kurdek, 1999). Some available longitudinal studies examining couples' marital relationship changes over the course of parenthood found declines in marital intimacy in the first 3 child-rearing years (O'Brien & Peyton, 2002), and decreases in marital satisfaction over the first 15 years of children's life (Hirschberger et al., 2009), as well as declines in love and increases in conflict from the 10<sup>th</sup> month to 60<sup>th</sup> month of parenthood (Belsky & Hsieh, 1998). This trend is likely to result from a combination of time, which erodes marital relationships (MacDermid et al., 1990), and the child, which introduces additional stress and tension into couples' relationships (Belsky, 1986). The increasing trend in marital instability with the aging of children is also consistent with the divorce literature, which indicates that the bonding effect of having a child(ren) on interparental relationship quality peaks in infancy and then diminishes as the child grows up (Svarer, 2005; Wu &

Penning, 1997). It has been suggested that after the ‘honeymoon’ period right after the birth of a child, rates of family dissolution continue to increase for at least seven years (Heaton, 1990). Perhaps, children’s growing independence from parents reduces the need for the parents to collaborate and pursue common goals in daily parenting duties (Heaton, 1990). Additionally, as the child grows up, parents also reach their midlife period, where midlife identity crisis and concerns, partially resulting from a greater parent-child distance, bring out marital disenchantment (Steinberg & Silverberg, 1987).

Surprisingly, there was a declining trend of adoptive parents’ marital instability after the peak at age 8 – 9 years. This result contradicts previous research that demonstrated declines in marital satisfaction over the first 15 years of children’s life (Hirschberger et al., 2009). The seeming inconsistency may reflect the conceptual distinction between marital quality and instability. Prior work shows that the transition to parenthood is a time of declining marital satisfaction but fairly high marriage stability (Cowan & Cowan, 1992; Karney & Bradbury, 1995), and many couples stick together even when they are unhappy about their relationship (Rands et al., 1981). Although subtle, this decreasing trend of marital instability may reflect a combination of various factors at this stage of the family cycle, including age-related decrease in opportunities to find an alternative life partner (Orbuch et al., 1996) and more financial assets that are hard to divide if marriage is disrupted (Booth et al., 1986). However, this tendency may change after children enter adolescence, as previous studies indicate that children’s entering teenage years increases the risk of family dissolution due to difficult adjustment to the demands of child rearing (Gottman & Levenson, 2000; Heaton, 1990). Future

researchers are encouraged to expand the time range in tracking marital instability trajectories as children enter adolescence.

### **The Effect of Infertility Distress on Marital Instability Trajectories During Parenthood**

Another important aim of the current work is to investigate the impact of infertility distress on adoptive parents' marital instability trajectories during parenthood. My results indicated that infertility distress affected adoptive mothers and fathers differentially. Specifically, mothers' infertility distress predicted higher levels of marital instability at child age of 4.5 years (the intercept) and a faster increase at this time. Mothers' elevated distress from the infertility experience before parenthood forecasted more unstable marital relationships from 4.5 years to 11 years into parenthood. This effect remained even after controlling for adoptive mothers' depressive symptoms. Such a pattern echoes previous work demonstrating a higher possibility of divorce or separation in infertile couples than in fertile couples (Che & Cleland, 2002; Rutstein & Shah, 2004). My findings also coincide with previous cross-sectional studies showing that infertility distress is associated with marital problems such as compromised marital communication, intimacy, satisfaction, and overall marital functioning and adjustment (Gana & Jakubowska, 2016; Lee & Sun, 2000; Newton et al., 1999; Van Der Merwe & Greeff, 2015) because couples with infertility experiences may develop dysfunctional patterns of interaction, such as conflict avoidance or habituation, that perpetuates into parenthood (Burns, 1990).

An important contribution of the current investigation is the persistent effect of infertility distress. Adoptive mothers' struggles with infertility continue to destabilize their marriage even after the adoptees join the family. This finding aligns with previous research suggesting that fertility problems have a long-lasting emotional sequela that may reappear over time in forms of depression, low self-esteem, feelings of inferiority, and a loss of control over their lives (Cousineau & Domar, 2007; Wallach & Mahlstedt, 1985; Wirtberg et al., 2007). Specifically for adoptive parents, infertility experiences are known to generate feelings of loss and anger from being deprived of the chance of becoming a biological parent (Daly, 1988) and heightened parenting stress in early childhood of adoptive children (Wang et al., 2021). Indeed, resolving difficult feelings about infertility can be a lengthy task for adoptive parents as they undertake years of child-rearing, which typically includes mourning the losses of the imagined biological child, gaining a healthy perspective of the associated emotional struggles, and dealing with the uncertainty about their emotional ties with the adopted child (Covington & Burns, 2006). As such, infertility distress may act as a chronic stressor that takes a greater toll on individual wellbeing and marital relationships as time passes (Berg & Wilson, 1990; Hirsch & Hirsch, 1989). This finding has important implications for family and couple interventions by suggesting that fertility issues, if any, should be proactively incorporated into the intervention strategy.

Interestingly, the effect of infertility distress on marital instability discussed above is only observed for adoptive mothers, not fathers. Notwithstanding that infertility is a shared experience of the couple, infertility-related distress seems to have a differential

impact on women and men (Greil & Johnson, 2014). Generally, men are more resistant to family-related stress, including infertility problems, than women (Gerstein et al., 2009; Wang et al., 2021). Regarding marital relationships, copious studies found that infertility threatens marital quality (Drosdzol & Skrzypulec, 2009), satisfaction (Greil et al., 2018), adjustment (Monga et al., 2004), and stability (Tao et al., 2012) for women but not men.

Why would women be more vulnerable in response to infertility compared with men? First, a series of studies, including the current dissertation, consistently found that women feel more emotionally challenged by the news of infertility, reporting higher levels of distress, anxiety, depression, and cognitive disturbances than men (Anderson et al., 2003; Lee & Sun, 2000; Monga et al., 2004; Slade et al., 2007; Ulbrich et al., 1990; Wright et al., 1991; for a review, see Greil et al., 2010). Such a pattern may be attributable to women's heightened values in parenthood as a central life goal (Greil et al., 1988; McCormick, 1980). Prior work found that representations of the importance of parenthood are associated with the impact of infertility on various life domains (Galhardo et al., 2020; Greil et al., 2011). As such, encountering obstacles in conceiving may be especially difficult and generate more subsequent marital problems for women than men (Greil et al., 2018). Second, compared with fathers, mothers who experience infertility may be forced to deal with more social stigma (Slade et al., 2007). While the existence of stigma in infertile couples is well-known (Whiteford & Gonzalez, 1995), women tend to have higher levels of stigma and stigma consciousness than men, which are associated with more negative consequences from infertility (Justo et al., 2010; Slade et al., 2007; Ying et al., 2015). Such a heightened experience of stigma in women may be rooted in

the internalized social norms that are expressed in dominant gender roles, which emphasize virility and the role of economic provider for men and motherhood and the role of homemaker for women (Endendijk et al., 2018; Wallach & Mahlstedt, 1985; Wood & Eagly, 2002). Because women have more restricted alternatives to achieving these goals other than having and taking care of children, such as work and sports for men (Inhorn, 2003), the social identity of motherhood is more important for women compared with fatherhood for men (Mumtaz et al., 2013). As a result, compared with men, childless women are more likely to consider infertility a threat to their identity (Bell, 2019; Clarke et al., 2006; Greil & Johnson, 2014), see themselves as defective and powerless (Nahar & Richters, 2011), and inexorably tie themselves to grief and guilt (Whiteford & Gonzalez, 1995), and such emotional sufferings are likely to generate more perceived marital relationship problems (Andrews et al., 1992; Greil et al., 2018; Van Der Merwe & Greeff, 2015).

### **The Moderating Role of Social Support on the Association Between Infertility Distress and Marital Instability Trajectories**

A third goal of the current dissertation was to examine the moderating role of social support on the association between infertility distress and marital instability trajectories. Partially supporting the original hypothesis, results indicated that for adoptive mothers, but not fathers, partner support mitigated the impact of infertility distress on marital instability. Specifically, mothers who had reacted strongly and negatively to infertility reported lower levels of marital instability if they were more

satisfied with the support from the partner (i.e., fathers) during the difficult time of fertility struggles.

This result is consistent with the theories of social support, which state that in the event of stressful situations, individuals with more social support suffer less from the potentially harmful effects of the stressor, thereby facilitating adaptation (Cobb, 1976; Cohen & Wills, 1985). While the sources of support vary, family support is particularly helpful when the origin of stress is family-related (McCubbin et al., 1980). For couples with infertility issues, spousal support has been found to be the best way to cope with infertility-related distress and bolster marital adjustment (Peterson et al., 2006; for a review, see Gourounti et al., 2010). It appears that perceptions of receiving more support from the partner inspire feelings of encouragement, confidence, security, and peace (Jafarzadeh-Kenarsari et al., 2015), and inhibit infertile individuals' use of avoidance coping strategies (Casu et al., 2019), which promote communication within the couple and contribute to more stable marital relationships.

The marital relationship literature also recognizes spousal support as a critical element of marital functioning where high levels of support from the partner predict better concurrent (Pasch & Bradbury, 1998; Rostami et al., 2013; Yedirir & Hamarta, 2015) and longitudinal marital outcomes (Conger et al., 1999; Stapleton et al., 2012), whereas low partner support is often cited as a predictor of low marital satisfaction (Baxter, 1986). Combining both lines of work on infertility and marital relationships, the current dissertation demonstrates that partner support works as a long-term buffer in the impact of infertility distress on the perceived marital relationship for women, perhaps, by

providing the needed psychological and instrumental resources (Cohen, 2004; Rostami et al., 2013).

This dissertation also represents a direct response to a recent call to consider perceived support specific to infertility problems (Martins et al., 2014) when studying the psychosocial effects of infertility. Research on infertility-specific support revealed similar results in its associations to lower infertility distress (Casu et al., 2019; Sexton & Byrd, 2015; Ying et al., 2015). Indeed, compatible couples are able to overcome the distress of infertility by supporting each other (Onat & Beji, 2012a). A husband's support during their infertility journey may protect his partner against negative emotions, thereby saving their marriage (Albayrak & Günay, 2007; Lee & Sun, 2000).

Interestingly, however, the protective effect of partner support was only observed in mothers, not fathers. This mother-father difference is consistent with prior research on gender differences regarding the moderating effect of social support. For instance, women's depressive symptoms are more strongly influenced by social support than men's (Brugha et al., 1990; Landman-Peeters et al., 2005; Matthews et al., 1999; Slavin & Rainer, 1990). Women may be more likely not only to seek out social support (Kowalcek et al., 2001) but also sensitively translate cues of social support into perceived ability to control their lives, thereby benefiting more from it (Avison & McAlpine, 1992). However, note that the differing results between women and men may be meaningful only when we study self-perceived social support, which I did in this investigation. Some studies adopting both self-report and observational methods indicate that only self-report

methods yielded significant gender differences in support behavior, while observational measures revealed little or no difference (Neff & Karney, 2005; Verhofstadt et al., 2007).

Contrary to the findings on partner support, support from other people, including family members outside of the nuclear family, friends/neighbors, counselors/therapists, support groups, physicians, and religious community, did not moderate the association between infertility distress and marital instability trajectories for mothers and fathers. This result is unexpected, as previous work demonstrates the beneficial role of social support from family (Martins et al., 2011), friends (Mahajan et al., 2009), and support groups (Boivin & Gameiro, 2015), in reducing infertility-related distress for individuals. However, prior research delving into infertility-specific social support suggests that some infertile couples consider the support from parents as an additional stressor because they feel guilty for bringing such a burn to them (Ying et al., 2015). Some also consider the support from friends and colleagues as potentially negative because of unfavorable comments that are unintentionally brought up during supposedly supportive conversations (Casu et al., 2019). It is also likely that compared with partner support, support from other sources is less influential for the marital relationship, as prior work has suggested that friendship does not buffer low quality intercouple relationships (Birditt & Antonucci, 2007), and spousal support is more important in explaining marital satisfaction than support from other sources (Rostami et al., 2013).

While support from the wider network did not buffer the effect of infertility distress on marital relationships – both of which are very private intercouple matters – it is likely to play an important role in the individual’s general social functioning and

psychological well-being. Previous work has shown that infertility may lead to social isolation (Bhatti et al., 1999; Drosdzol & Skrzypulec, 2009). Support from others, accordingly, is likely to play a role in promoting better social relationships for infertile individuals (Jafarzadeh-Kenarsari et al., 2015). Additionally, the correlations between infertility distress and support from other sources were significant in a negative direction ( $r_s = -.29, -.22$  for mothers and fathers, respectively), which suggests that although support from sources outside the couple unit may not be a potent protective factor for couples' relationships, it may be beneficial for promoting personal well-being. Therefore, the current finding does not undermine the importance of social support from various sources outside the core family but evidences its lesser extent in protecting the marriage of couples severely affected by fertility struggles.

### **Indirect Effect of Infertility Distress on Child Internalizing and Externalizing Symptoms in Adolescence**

My final aim was to determine the indirect effect of pre-parenthood infertility distress on child outcomes in adolescence. I identified two processes that link these distant constructs, but only in adoptive mothers. First, mothers' experiences of infertility distress were associated with heightened overreactive parenting at age 7 years, resulting in more subsequent child externalizing symptoms at age 11. Second, mothers' infertility distress predicted higher marital instability in childhood, which led to more overreactive parenting at age 7 that, in turn, exacerbated child externalizing problems at age 11. However, no such effect was found in child internalizing problems. Additionally, fathers' infertility distress did not play a significant role in predicting adolescent internalizing or

externalizing symptoms via marital instability and compromised parenting. The following discussion is streamlined by interpreting the two paths explaining the cascading effects seen in mothers, accompanied by a discussion on the lack of effect in child internalizing outcomes and the absence of fathers' cascading effects.

Process 1: Via overreactive parenting. Results indicated that mothers' pre-parenthood infertility distress predicted child externalizing problems in early adolescence through overreactive parenting in childhood. Previous work has documented segments of this mediation, but the current investigation is the first in my knowledge that has tested the full cascading effect from couples' preparenthood experiences (i.e., infertility distress) to parenting behaviors to child maladjustment.

Prior research investigating the first segment from infertility to parenting has alluded that infertility may compromise some aspects of parenting. For instance, mothers with infertility experiences (including both ART and adoptive mothers) showed less sensitive parenting and less use of reasoning during conflicts with the child compared with mothers of natural conception (Golombok et al., 2001). ART parents also displayed more concerns over the well-being of the child and reported lower self-efficacy and self-confidence in parenting (Egan, 2019; Gibson & McMahon, 2004; Hammarberg et al., 2008). Similarly, a longitudinal study of adoptive parents (using the same data as the current investigation) found a faster increase in parenting stress from infancy to early childhood in those with infertility experiences compared to those without (Wang et al., 2021). It seems that some infertile couples who desperately want child(ren) may idealize the experience of parenthood, and they may not be well-prepared for the unrelenting and

taxing nature of the parenting journey (McGrath et al., 2010). Additionally, adoptive parents with prior infertility experiences may construct an imagined idealized biological child that their child could not live up to, which induces abusive or overprotective parenting behaviors (Burns, 1987, 1990).

The second segment of the mediation (i.e., overreactivity in parenting to child externalizing problems) has received robust evidence (Gershoff, 2002; Prinzie et al., 2003; Reid et al., 2002; Taraban et al., 2019). From a social learning perspective, children who are exposed to parental aggression may learn aggressive problem-solving scripts that foster a hostile style of interpersonal interactions, which potentially result in child maladaptation, such as externalizing problems (Bandura, 1977; Prinzie et al., 2003). Similar evidence has been reported from the literature on coercive family environment, which includes parents' escalating reactive parenting (Dishion & Patterson, 1997; Patterson, 1997). Aggressive parent-child interactions may also sensitize children to social cues of potential conflicts, such that benign or harmless disagreements could be interpreted as threatening, which in turn, trigger behavioral problems in children (Cummings & Davies, 1994).

Process 2: Via marital instability. Another sequential cascading effect involves parents' marital instability. In this path, mothers' infertility distress exacerbated child externalizing problems in adolescence through marital instability in childhood (the average MI from child age at 18 months to 6 years) and then subsequent overreactive parenting at child age of 7 years. This result indicated that for adoptive mothers, heightened pre-parenthood infertility distress preceded an unstable marital relationship

during childhood, which was observed in the investigation of my second research question. Higher marital instability then, in turn, set the stage for more overreactive parenting practices, which were associated with more externalizing symptoms in children. This is consistent with previous findings indicating that harsh or overreactive parenting is a mediator between marital issues and child behavioral problems (O’Leary & Vidair, 2005; Rhoades et al., 2011). Known as the spillover effect of marital conflicts (Katz & Gottman, 1996), parents who are embroiled in a hostile marital relationship also tend to treat their children in a more harsh and critical manner (Sherrill et al., 2017), which affects child behavioral outcomes (Harold et al., 2012). Similarly, a shaky and distressed marital relationship that includes thoughts and actions towards ending the marriage may consume parents’ energy in parenting, which leads to child problems (Minuchin, 1974). Putting this mediation process in the infertility context, mothers’ preparenthood infertility distress is a precursor that drives the spillover effect of undesirable marital relationships in the family system.

However, this finding needs to be interpreted with some discretion. The overall indirect effect of this sequential mediation did not reach statistical significance despite the findings that all paths involved were statistically significant. According to Yzerbyt and colleagues (2018), the interpretation of mediation should rest on the presence (as evidenced in the form of statistical significance at .05 level) of all individual paths involved rather than the significance of a single mediation index, but caution should be exercised when interpreting this result.

Interestingly, no cascading effect was found concerning child internalizing outcomes. Somewhat surprisingly, the current study did not find an association between overreactive parenting and child internalizing outcomes. However, this coheres with previous research indicating that overreactive parenting contributed to externalizing but not internalizing problems in children aged 8 to 9 years (van den Akker et al., 2010). Similarly, two meta-analyses indicated that harsh parenting, which includes overreactive parenting, explained more variance in externalizing than internalizing problems (McLeod et al., 2007; Rothbaum & Weisz, 1994) because, in adolescence, children are more likely to act out than to withdraw in reaction to parental harsh discipline (van den Akker et al., 2010).

Finally, no mediating effect of marital instability or overreactive parenting was found in fathers. For the father model, the only significant finding was that their overreactive parenting at child age 7 years predicted child externalizing outcomes at age 11, which is consistent with prior work on fathers' harsh parenting (Kuppens et al., 2013; Pinquart, 2017). However, unlike mothers', fathers' parenting is relatively resistant to the influence of interparental stress, such as unstable marital relationships and infertility distress. The lack of cascading effect from infertility distress in fathers is not surprising; previous work demonstrated that fathers are not as influenced by infertility as mothers and are especially adaptive once they achieve the role of becoming a parent via different means of a family formation such as adoption and ART (Drosdzol & Skrzypulec, 2009; Fisher et al., 2010; Greil et al., 2018; Hjelmstedt et al., 1999). While infertility can be stressful and result in psychological distress in men, it is likely that this effect is rather

temporary and does not affect their parenting behaviors or trickle down to child outcomes.

### **Strengths, Limitations, and Future Directions**

The current investigation contributes to the existing literature through several strengths. First, this is the first study to use a multi-wave longitudinal design that spanned 11 years to estimate the trajectories of marital instability independently for adoptive mothers and fathers. Marital instability, as conceptualized and measured in the current dissertation, allows us to track the state of a perceived “shaky marriage” over time instead of a single focus on divorce. As mentioned previously, marriage can be unstable for years before they finally dissolve, and it is meaningful to measure how it changes before it comes to the point of dissolution (Booth & Edwards, 1985). Second, the use of a community sample of women and men that includes a variety of infertility experiences (from undiagnosed to clinically diagnosed) contributes to the diversity of the infertility literature, which primarily includes clinical samples, such as couples undergoing infertility treatment. This point is important because, in the United States, only less than half of infertile women seek treatment (Chandra et al., 2013; Greil & McQuillan, 2004). Research based on infertile patients may limit the generalizability of findings (Greil, 1997; Stewart & Robinson, 1989). Relatedly, women are overrepresented in the infertility literature, and our knowledge is severely limited by insufficient responses from men (Tao et al., 2012). It has been argued that women whose partners refused to attend the study reported higher levels of distress than those whose partners were willing to be studied (Link & Darling, 1986). Therefore, including couples rather than only infertile

individuals provides a more comprehensive understanding of the impact of infertility. Finally, the current research represents a step toward investigating the long-term impact of infertility distress on the marital relationship and child outcomes, which is rarely examined in prior work. Infertility is a chronic stressor that may reappear to influence individual and relationship wellbeing (Covington & Burns, 2006). Therefore, it is meaningful to adopt a longitudinal approach and test the impact of infertility distress on marital functioning and child outcomes in the long run.

However, findings in the current dissertation should be interpreted with the following caveats. First, the current sample is selected from a pool of adoptive parents. Infertility is a prevalent issue among adoptive parent samples, and yet, it is largely neglected in adoption research. A prior study identified that around 80 percent of adoptive parents who chose infant domestic adoption cited “not able to have a biological child” as a primary reason to adopt (Wang et al., 2021). However, the use of an adoptive parent sample limits the generalizability to all individuals with fertility challenges, particularly those who decided not to or were not able to become parents. In addition, adoptive parents are generally intentional and motivated to become parents. Moreover, the current dissertation only included heterosexual couples with infertility challenges because same-sex parents were asked to skip infertility-related questions in data collection. However, homosexual couples consider parenthood just as important and can have a stronger desire to have children than heterosexual couples (Bos et al., 2003), and therefore, their infertility experience and pathway to parenthood need more attention (Jennings et al., 2014). Future work should include more diverse samples from the

population who experienced infertility. Second, the measures of infertility and the associated distress are solely reliant on self-reports. Given the highly personal and sensitive nature of the infertility question, fertility problems are typically measured via self-report in nonclinical research (e.g., McQuillan et al., 2003; Steuber & Solomon, 2008). Prior research suggested that it is the self-identification of infertility problems that lead to stress rather than the medical diagnosis (Greil et al., 2011). Furthermore, there is a wide variation in people's experiences of fertility problems, from receiving formal diagnoses to failure in conception after years of trying to conceive without seeking any medical treatment, and this variety in infertility was not accounted for in this study. This investigation also did not account for the heterogeneity in the causes of infertility (e.g., low sperm count, hypogonadism, ovulation problems, scarring from surgery, side effects of medicines and drugs). Evaluating the variability in couples' fertility experiences is important because, for instance, primary infertility (i.e., couples never conceived) may result in higher levels of distress than secondary infertility (i.e., inability to achieve additional birth; Epstein & Rosenberg, 2005; Verhaak et al., 2007). Future research should examine how these different experiences impact family functioning and child outcomes over time. Relatedly, pre-parenthood infertility distress was retrospectively measured at child age of 9 months, which may have introduced inevitable recall bias. In addition to general memory decay, particularly relevant is the possibility of parents' recollections of infertility distress being shaped by post-adoption child-rearing experiences. Research suggests that, for example, children with difficult temperament and characteristics evoke negative reactions from rearing parents (Ge et al., 1996), which

color memory bias further. While prior work indicates that the recall of potentially stressful and traumatic events, such as infertility, is more accurate than other experiences (Lalande & Bonanno, 2011), future work is needed to measure infertility distress prospectively and examine its effect on subsequent marital relationships, parenting behaviors, and child outcomes. Third, marital instability, overreactive parenting, and child outcomes were also assessed through parents' self-reports. Therefore, reporter bias needs to be considered. For instance, parents who report more personal distress may over-report internalizing and externalizing problems in children, which has been suggested in many previous studies (e.g., Boyle & Pickles, 1997; Fitzmaurice et al., 1995). While self-report is valuable as it provides a unique and independent perspective, adopting multiple informants in future research will allow researchers to paint a fuller picture and reduce the possibility of over- or under-estimating child problems as well as the impact of risk factors, which ultimately benefits intervention and prevention treatments (Collishaw et al., 2009; De Los Reyes et al., 2015; Kraemer et al., 2003; Pavlova & Uher, 2020). Fourth, the different results for adoptive mothers and fathers that were revealed in the current dissertation need to be interpreted with caution, as previous work suggests that compared to women, men with infertility issues may be more inclined to hide their distress and provide a more positive picture of themselves to researchers (Berg & Wilson, 1990; Greil, 1997).

Fifth, the current study did not attend to the heterogeneity of marital instability trajectories. It has been indicated in prior research that there is great variation in the trajectories of various marital relationship dimensions (Proulx et al., 2017). For instance,

longitudinal studies adopting a person-centered approach identified groups of stable, declining, and curvilinear trajectories in marital happiness (Anderson et al., 2010), adjustment (Gosselin et al., 2015), and conflict (James, 2015b; Kamp Dush & Taylor, 2012). Clarifying and distinguishing among these subgroups in future research will have important implications for theories of marital change and provide more sensitive detection of the impact of risk and/or protective factors on differing marital trajectories.

A final remark is that this study focused on infertility distress among couples with fertility challenges and did not compare infertile couples with fertile couples. Thus, the current work by no means indicates a negative impact of infertility (as compared to fertility) itself. In fact, previous work that compared infertile versus fertile couples has demonstrated comparable or even better marital functioning and child outcomes in infertile couples. For instance, infertile and fertile parents report similar or higher levels of marital satisfaction, parenting quality, attachment to the fetus, parent-child relationship, and child socioemotional outcomes (Golombok et al., 2001; Hahn, 2001; Hammarberg et al., 2008). Barnes and colleagues (2014) found that ART parents seem to have less hostility/aggressive feelings toward the child and more commitment to parenting compared with the natural conception group. It appears that it is not infertility itself that is problematic but what seems to matter more is the heightened distress experienced during the navigation of the infertility journey. Those who experienced greater distress in reaction to infertility may find it more challenging to maintain stable marital relationships and display more anger and irritability in parenting practices.

## **Implications Toward Broader Family Research**

Despite the aforementioned limitations, the current dissertation has important implications for developmental approaches in family studies. This work aligns with the call made by Cummings and colleagues (2020) that a new generation of process-oriented research on the prediction of normal development and the development of psychopathology needs to explicate a wider causal net such as multiple processes and both risk and protective factors, and identify risk factors as dynamic organizations of social, emotional, and/or other processes. This view mirrors a long history in developmental and family research to examine the interactive systems in the family over time (Masten & Cicchetti, 2010). Theories, such as the parenting process theory (Belsky, 1984; Taraban & Shaw, 2018) and the family systems theory (Bowen, 1993; Cox & Paley, 1997), allow for a longitudinal understanding of the interrelationships between different levels within the family system, including the individual family member, family relationships, and the institution of family as a whole (Belsky, 1984; Rodgers & White, 1993). Importantly, this dissertation underscores the significance of expanding the timeline to understand family functioning. Most studies in this line of work start their investigation after the family system is formed, aiming to describe or explain the changes in roles or relationships of family members (Bengtson & Allen, 1993). However, people come to form a family with unique individual histories, such as infertility, and by various methods, such as adoption and ART. In studying families as an evolving system that changes over time, this dissertation speaks to the importance of including the history of

individuals before parenthood in the network of risk and protective factors that ungird processes affecting child development and family lives.

## **Conclusion**

This dissertation examined the impact of pre-parenthood infertility distress on marital instability for adoptive mothers and fathers during parenthood, and evaluated the cascading effect of infertility distress on child internalizing and externalizing symptoms in adolescence through marital instability and overreactive parenting during childhood. Findings suggested that more pre-parenthood infertility distress predicted higher marital instability and a faster increase in marital instability at child age 4.5 years for adoptive mothers, not fathers. Mothers' perceived partner support mitigated the impact of infertility distress on marital relationships. Regarding child outcomes, two cascading processes were identified for adoptive mothers. Specifically, mothers' infertility distress predicted child externalizing symptoms in early adolescence, either through overreactive parenting alone or via both marital instability and overreactive parenting during childhood. No spillover effect was found regarding child internalizing symptoms for adoptive mothers or from adoptive fathers' infertility distress to child outcomes. This study underscores the importance of longitudinal work in understanding the long-term influence of infertility distress, especially for women during parenthood. The challenges and distress that many women experience during their navigation of the infertility journey may persist even after they transition to parenthood, increasing their perceived marital instability and compromising their ability to effectively parent the child, which in turn result in child maladjustment over time. Researchers and interventionists are encouraged

to consider and evaluate the persistence of infertility distress and its impact on marriage, parenting, and children during child-rearing years, especially for mothers. Future work should continue to take advantage of longitudinal designs to examine the persisting effect of infertility distress and adopt advancing methodological and analytical tools to test the heterogeneity in the impact of pre-parenthood infertility distress on subsequent family functioning and child outcomes.

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