

Effects of Exposure to Parental Divorce on the Sibling Relationship in Emerging Adults

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Submitted in partial fulfillment of the  
requirements for the degree of  
Doctor of Philosophy under the Executive Committee  
of the Graduate School of Arts and Sciences

COLUMBIA UNIVERSITY

2012

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## ABSTRACT

### Effects of Exposure to Parental Divorce on the Sibling Relationship in Emerging Adults

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Despite divorce's deleterious effects on child siblings and the importance of sibling support across the lifespan, little is known about how parental divorce affects sibling relationships in emerging adulthood. An Internet study investigated how emerging adults' sibling relationships are impacted by parental divorce exposure (n=1,052; aged 18-29 years) and the timing of divorce (n=296 subsample from divorced families). Parental divorce exposure predicted lower adult sibling warmth, but not increased conflict or rivalry, suggesting adult sibling estrangement. Among offspring of divorce, the timing of parental divorce interacted with current sibling contact to predict adult sibling rivalry, suggesting some siblings may sacrifice relationship quality to accommodate post-divorce family dynamics. How siblings' separation/individuation and identity formation may contribute to divorce effects is discussed.

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## Introduction

The purpose of this study is to explore the impact of parental divorce exposure, as well as the impact of the timing of parental divorce, on adult sibling relationship quality in emerging adulthood (i.e. adults between the ages of 18 and 29 years). In defining the construct of adult sibling relationship quality, this study used the three independent dimensions of adult sibling warmth, conflict, and rivalry, which have been empirically shown to accurately capture the construct of sibling relationship quality in emerging adulthood (Stocker, Lanthier & Furman, 1997). The first aim of this study is to investigate whether parental divorce exposure significantly influences adult sibling relationship quality (i.e. adult sibling warmth, conflict and rivalry), and whether this relationship is significantly moderated by current sibling contact and significantly mediated by subjects' self-efficacy and attachment style. The second aim of this study concerns only the subsample of individuals who have previously been exposed to parental divorce. Specifically, the second aim of this study is to investigate whether subjects' age at the time of the parental divorce significantly influences their adult sibling relationship quality (i.e. adult sibling warmth, conflict and rivalry), and whether this relationship is significantly moderated by current sibling contact and significantly mediated by subjects' self-efficacy and attachment style. In addition, for both the above stated study goals, researchers will investigate whether these effects act over and above the variability present in multiple control variables, including parents' income and siblings' geographical proximity, as well as age, birth order, and gender differences between siblings.

The majority of past research investigating how parental divorce affects the sibling relationship has focused on child and adolescent siblings, with little research attention focused on

emerging adults (Poortman & Voorpostel, 2009). However, extant literature has indicated that the sibling relationship has been found to change when adolescents make the transition into young adulthood and beyond. Specifically, research has found that siblings' proximity, contact, and helping behavior all significantly decreased during their transition from adolescence into young adulthood but then remained stable at this lower level into middle adulthood, only increasing again in old age (White, 2001). This drop in sibling involvement accompanying the increasing independence of emerging adulthood may be intensified by exposure to parental divorce during childhood and adolescence, which in turn decreases adult sibling relationship quality. Specifically, although some studies have found no significant differences between adult siblings from divorced versus non-divorced families (Frank, 2007), other results have indicated that adult siblings from divorced families have significantly fewer positive attitudes about their sibling relationships (Riggio, 2001), increased sibling conflict (Panish and Stricker, 2001; Poortman & Voorpostel, 2009), and significantly lower closeness, communication, and support (Milevsky, 2004) compared to adult siblings from intact families.

This first aim of this study will contribute to the field by replicating past work on the effects of parental divorce on the adult sibling relationship, as well as replicating past work investigating whether parental divorce exposure may interact with sibling contact levels to predict adult sibling relationship quality. Furthermore, no previous study has investigated whether subjects' self-efficacy and attachment style may act as mediators in the relationship between parental divorce exposure and adult sibling relationship quality.

The second aim of this study will also contribute to the field by extending past work investigating how subjects' age at the time of parental divorce influences their adult sibling relationship, as well as whether subjects' age at the time of parental divorce may interact with

sibling contact levels to predict adult sibling relationship quality. In addition, no previous study has investigated whether subjects' self-efficacy and subjects' attachment style may act as mediators in the relationship between subjects' age at the time of parental divorce and adult sibling relationship quality.

The potential moderating effects of sibling contact are important to study because it may reveal how the effects of parental divorce exposure change depending on the level of contact that siblings currently have with one another. That is, siblings with currently low levels of contact may show different patterns regarding how they were affected by parental divorce, compared to siblings with currently high levels of contact. Such results may add new lines of inquiry to future studies, where future subject pools are split into two groups based on their current contact levels.

The impact of subjects' self-efficacy and subjects' attachment style as potential mediators is important to study because it may illuminate the psychological mechanisms underlying the effects of parental divorce on adult sibling relationship quality. Specifically, if parental divorce decreases subjects' sense of self-efficacy, then in turn these subjects may not be psychologically prepared to exert the effort necessary to maintain adult sibling bonds, resulting in lower adult sibling relationship quality. If parental divorce decreases subjects' attachment security, then in turn these subjects may develop more negative and conflictual ways of dealing with relationships in general, including sibling relationships.

Furthermore, emerging adults' increasing independence may strengthen the role that self-efficacy and attachment style play in adult sibling relationship quality. During childhood and adolescence, children live together and thus do not need to exert effort to maintain their sibling relationship. However, once independent from their nuclear family, emerging adults must exert effort to maintain their sibling bonds, which requires that they be advocates on behalf of their



sibling relationship by taking the initiative to maintain contact and intimacy. Such effort to maintain sibling bonds can often require self-efficacy, where siblings believe that they are capable of taking the necessary actions to attain and maintain personal ties as well as believing that they can exercise influence to overcome obstacles that might get in the way of the sibling relationship. Despite this rationale, self-efficacy has not yet been directly investigated in studies on divorce and the adult sibling relationship. However, past research has indicated that exposure to parents' marital problems was significantly associated with a decreased sense that emerging adults can successfully manage and maintain lifelong romantic relationships (Cui, Fincham, & Pasley, 2008). If exposure to parents' marital problems can significantly influence emerging adults' sense of self-efficacy in romantic relationships, then it is possible that parental divorce may also affect emerging adults' sense of self-efficacy in sibling relationships.

In addition, once sibling dyads reach emerging adulthood, sibling relationships may be more susceptible to individual differences in attachment style. Prior to emerging adulthood, siblings are required to live together and thus concerns about becoming overly dependent on a sibling or being abandoned by a sibling may be less salient. However, once outside the home, it is more likely that siblings can act upon their avoidant or anxious/ambivalent tendencies with one another in more meaningful ways, such as denying contact or embroiling each other in conflict from afar. While attachment status has not yet been directly evaluated in studies on divorce and the adult sibling relationship, past research has suggested that emerging adults exposed to parental divorce were more likely to have an insecure attachment status (Lopez, Melendez, & Rice, 2000) and subjects' insecure attachment mediated the link between parents' marital problems and subjects' marital problems in emerging adulthood (Crowell, Treboux, & Brockmeyer, 2009). If exposure to parental divorce can significantly predict emerging adults'

insecure attachment status, which in turn significantly predicts their romantic relationship conflict, then it is possible that parental divorce may also influence attachment status to predict sibling conflict.

### Literature Review

Sibling relationships are one of the most durable personal relationships, with the capacity to provide support from an early age into late adulthood (Riggio, 2001). However, when one's family structure is disrupted through parental divorce, sibling relationships may have the potential to become disrupted as well. Past researchers have questioned whether siblings become closer in the face of parental divorce, or whether they are driven apart in the process of marital dissolution (Poortman & Voorpostel, 2009). The following literature review will summarize the extant literature on siblings' unique contribution to early cognitive development, early emotional attachment patterns, self-efficacy, and psychosocial adjustment through the lifespan. This review will then focus on past literature investigating the impact of exposure to parental divorce on self-efficacy, attachment, and the sibling relationship in childhood as well as lasting effects into adolescence and adulthood.

#### *The childhood sibling relationship's influence on cognitive development and socialization*

Beginning in childhood, siblings take on teaching and nurturing roles with one another, and past research has found that these complementary interactions may have numerous positive benefits for cognitive as well as social development throughout early and middle childhood (Dunn, 1983; Tucker & Updegraff, 2009). Past research has found that siblings are more effective teachers of school-age children than other adults and peers, as children taught by their siblings performed significantly better on tests of math, language (Smith, 1990, 1993), and a

non-verbal intelligence test (i.e., a block construction task) (Azmitia and Hesser, 1993).

Evidence suggests siblings are more engaged in the learning process when working with one another, allowing for better focus, collaboration, and more positive feedback and impromptu aid (Azmitia et al., 1993). Past work also suggests siblings may make especially good teachers because they are familiar with one another's skill level. Findings suggest that older siblings can accurately predict their younger sibling's level of cognitive ability (Klein, Feldman, & Zarur, 2002) and can use this knowledge to better teach their younger siblings (Klein, Zarur, & Feldman, 2003).

However, a younger sibling's ability to gain from an older sibling's teaching is also contingent on the older sibling's motivation to teach, and past evidence also shows that sibling relationship quality influences the willingness of siblings to engage in teaching behaviors. Results have found that children who were engaged in learning from their siblings also had significantly greater cooperation and more positive emotional exchanges during pretend play (Howe & Recchia, 2005), and positive sibling interactions were significantly associated with sibling teaching and learning behaviors four years later (Recchia & Howe, 2010). Together, these findings suggest that sibling relationship quality is connected to siblings' willingness to teach and guide one another, both in the short-term as well as over time.

Childhood sibling interactions are also often characterized by their reciprocity, and siblings' reciprocal interactions can be seen when they engage in pretend play or when siblings have conflicts with one another (Dunn, 1983; Tucker & Updegraff, 2009). As a result, in addition to teaching concrete skills and academic knowledge, siblings also act as important agents of socialization, which can have either a positive or a negative impact for children depending on the behavior of their siblings. Regarding the positive effects of sibling

socialization, past research using false-belief studies has demonstrated that sibling conflict in childhood may aid children's social skills development, as siblings' verbal disputes may help them gain knowledge into the minds of others, take their perspective, and thereby gain sensitivity towards others' thoughts and feelings. One example of a false belief task is a game where children are told stories about characters that have either a correct or an incorrect belief, such as believing that there is a pencil inside an opaque, closed empty box. The children are then asked to predict whether that character would make a mistake, such as looking in the empty box for the pencil. The goal of such trials is to assess whether children will answer using information they possess but the character does not (e.g. the pencil's location) or whether they can put themselves in the mind of a character who does not possess accurate information.

Past work has indicated that reciprocal sibling interactions are associated with increased social skills and theory of mind development. Younger siblings showed significantly better performance on false belief tasks if they had previously resolved a sibling conflict by taking both parties' interests into account rather than just their own, suggesting that properly resolved sibling conflicts can offer opportunities to practice negotiation skills and foster theory of mind development (Foote & Holmes-Lonergan, 2003). Research also indicates that siblings' frequent fantasy play may foster theory of mind development, as children with siblings in middle-childhood (i.e., ages when fantasy play occurs) performed significantly better than only-children on a false belief task, whereas no significant differences were found for children with infant or teenage siblings (i.e. ages when siblings are unable or unwilling to engage in fantasy play) (Peterson, 2000). In addition, non-twin siblings significantly outperformed twins on false belief tasks, and non-twin, opposite-sex siblings significantly outperformed non-twin, same-sex siblings, suggesting that dissimilarity between siblings' points of view was an important factor in

their theory of mind development (Cassidy, Fineberg, Brown, & Perkins, 2005). Since dissimilarities and disagreements in points of view are also likely to result in arguments and conflict, this result suggests further evidence that sibling conflict may be important for developing knowledge about others' minds and subsequently gaining sensitivity to others' points of view and welfare. Overall, these findings suggest that fantasy play and mild conflict promote theory of mind development through the practice of cooperation and collaboration, as well as competition and negotiation.

However, in contrast to the positive role that mild conflicts play in the development of empathy in early childhood, past studies show that intense, pervasive conflict in sibling relationships has a lasting negative influence on psychosocial adjustment (Stocker, 1994). High-conflict sibling relationships were significantly associated with higher depression, lower self-worth, and poorer conduct, while warm sibling relationships were significantly associated with lower loneliness, higher self-worth and better conduct (Stocker, 1994). In addition, among children with a history of behavior problems, children with cold, high-conflict sibling relationships showed significantly worse social adjustment than children with warm, low conflict sibling relationships (Stormshak, Bellanti, & Bierman, 1996).

*State of the research on how self-efficacy impacts child and adult sibling relationship quality*

For typically-developing child and adult populations, no empirical studies have yet investigated how self-efficacy beliefs directly influence sibling relationship quality. Rather, past work has focused on the self-efficacy of children and adults who have siblings with pervasive developmental disabilities (Stoneman, 2005). The study of this special population is markedly different and most likely not generalizable to the experiences of typically-developing siblings. As a result, there is not yet enough literature to review how self-efficacy affects sibling

relationship quality among typically-developing siblings. Child and adolescent researchers may not have explored this topic area because they viewed such research as inapplicable to children and adolescents. That is, both child and adolescent siblings usually live in the same home and are thus obliged to be siblings to one another. As a result, child siblings do not need self-efficacy in order to maintain their sibling relationships. Rather, researchers exploring children's self-efficacy would likely focus on children's tasks that are not merely an obligatory part of their everyday life, such as getting good grades, making friends, and resisting peer pressure. Indeed, past work has focused on whether self-efficacy beliefs influence academic achievement and peer popularity in both in childhood and adolescence, as well as whether self-efficacy helps adolescents resist peer pressure (Bradley & Corwyn, 2001; Caprara, Barbaranelli, Pastorelli, & Cervone, 2004; Pintrich & De Groot, 1990; Williams & Williams, 2010; Zimmerman, 2000). Moreover, the one exceptional situation where the sibling relationship should not be assumed to be obligatory during childhood and adolescence would be within special samples of children who have siblings with disabilities. Thus, it makes sense that child researchers would focus their efforts on this special sample when exploring the impact of self-efficacy on sibling relationships.

It is important to note that adult siblings have typically left their childhood home and are thus no longer obligated to live together and spend time with one another. Although researchers have had sufficient rationale to hypothesize that self-efficacy beliefs might influence the adult sibling relationship, no previous studies have been conducted in this area largely because the adult sibling relationship has not been a focus of research attention until recently. As previously stated, the present study will contribute to the field by filling in gaps in the existing body of literature on the adult sibling relationship.

*Sibling relationships and the development of early emotional attachment patterns*

Attachment theory was founded by Bowlby (1982), who theorized that early experiences with primary caregivers in infancy color individuals' perceptions and expectations about themselves, others, and the world around them. According to attachment theory, infants' parent-child relationships form a stable "internal working model" of caregivers that is then carried through life and generalized out to other intimate relationships, including sibling relationships (Ainsworth, 1989). Research has documented the link between early parenting experiences and attachment security, as well attachment's power to predict psychopathology and relationship turmoil in childhood and adulthood (Bakermans-Kranenburg & van Ijzendoorn, 2009; Crowell, Treboux, & Brockmeyer, 2009; Van Ijzendoorn, Schuengel, & Bakermans-Kranenburg, 1999). Research has also shown that attachment styles established in infancy remain consistent and stable over time and into adulthood (Benoit & Parker, 1994; Fraley, 2002; Waters, Merrick, Treboux, Crowell, & Albersheim, 2000; Waters, Hamilton, & Weinfield, 2000; Waters, Weinfield, & Hamilton, 2000). But empirical evidence also supports the hypothesis that early parenting experiences affect not only parent-child attachment but also the attachment between siblings. Although siblings are often treated differently by parents (Volling, 1997), data suggests that siblings' attachment styles are similarly influenced by parenting experiences during infancy, which lead siblings to have similar attachment security (i.e., secure or insecure) to one another (O'Connor & Croft, 2001; Teti, Sakin, Kucera, Corns, & Das Eiden, 1996; Touris, Kromelow, & Harding, 1995; van Ijzendoorn, Moran, Belsky, Pederson, Bakermans-Kranenburg, & Kneppers, 2000; Ward, Vaughn, & Robb, 1988). In addition, early parenting experiences influence how siblings relate to one another. Research has found that the attachment status between firstborn infants and their mothers was predictive of sibling conflict five years later, and that this relationship was significantly moderated by differences in mothering between the two siblings

(i.e., the extent to which mothers were controlling with one sibling versus the other) (Volling & Belsky, 1992).

Research suggests that the formation of parent-child attachment is also affected by the transition to siblinghood. The birth of a new sibling can often occur just as parent-child attachments are being formed. These newborn younger siblings often represent a competing demand for the older siblings' maternal attention and care. As a result, sibling jealousy can alter parent-child interactions and thereby impact upon the parent-child attachment bond. Empirical evidence suggests that sibling jealousy may influence the nexus of parent-child attachment. In early childhood, when attachment patterns are still being formed, research has indicated that the attachment security of first-born children significantly decreased following the arrival of a younger sibling (Teti, Sakin, Kucera, Corns, & Das Eiden, 1996; Touris, Kromelow, & Harding, 1995). After the birth of a new baby, firstborn older siblings displayed significantly more behavior problems than prior to the baby's arrival, including anxiety behaviors, dependency behaviors, provocation/aggression towards their younger sibling (e.g., teasing, fighting) and towards their parents (e.g., tantruming), and displays of age-inappropriate behaviors that mimicked their younger sibling (i.e., toileting difficulties, demands for bottles) (Stewart, Mobley, van Tuyl, & Salvador, 1987).

Studies have also indicated that infants as young as 6-months have experiences of jealousy towards new babies, and that these jealousy experiences may impact upon their attachment styles (Hart & Carrington, 2002; Hart, Jones, & Field, 2003). In laboratory studies, infants as early as 6-months-old displayed significantly greater distress when their mother ignored them to look at an infant-sized doll versus an inanimate object (e.g., a book), especially when the mother also held the doll (Hart, Carrington, Tronick, & Carroll, 2004; Hart, Field, Del



Valle, & Letourneau, 1998; Hart, Field, Letourneau, & Del Valle, 1998). A laboratory study was also able to reliably produce jealousy behaviors in preschool-aged children by having their mother ignore them in favor of another child peer (Masciuch & Kienapple, 1993). These distress reactions have been linked to attachment, as securely attached second-born infants displayed significantly less distress than insecurely attached infants when their mothers' attention was diverted to their older sibling (Teti & Ablard, 1989). Furthermore, when intrusive/depressed and withdrawn/depressed mothers ignored their infants in favor of a lifelike infant doll, infants' jealousy behaviors paralleled the patterns seen in insecure/avoidant and insecure/ambivalent attachment disturbances (Hart, Jones, & Field, 2003). Together, these studies suggest that infant jealousy in the wake of the sudden appearance of a new baby can play a role in the development of infants' parent-child attachment style (depending on how well parents are able to manage the competing demands for love, care, and attention between two children). And once such attachment patterns are fully formed, they could continue to affect the sibling relationship across the lifespan.

Older siblings may also perceive their new brother/sister as increasing their responsibility within the family, and as a result, they may take on the role of acting as a supplementary attachment and authority figure when parents are absent. Indeed, siblings' closeness in age may put older siblings more in touch with the everyday challenges their younger siblings face, and allow them to give more practical advice than parents (Tucker & Updegraff, 2009). This sense of responsibility may be especially strong among girls, who are often culturally expected to take care of family members and preserve family connections (Cicirelli, 1989). Three and four year old children showed consistent patterns of attachment-related behavior when exploring their newborn siblings at hospitals (Marecki, Wooldridge, Thompson, & Lechner-Hyman, 1985), and

children showed significantly more care-giving behaviors to younger siblings when their mothers were absent (Teti & Ablard, 1989; Stewart, 1983; Stewart & Marvin, 1984), suggesting that these children may prepare for and then eventually take on the role of a supplementary attachment figure. Empirical evidence also suggests that individuals rely on their siblings throughout adulthood and view them as supplementary but nevertheless significant attachment figures (Doherty & Feeney, 2004; Trinke & Bartholomew, 1997).

In sum, findings show that early attachment patterns are not influenced by parent-child interactions alone, but are affected by interactions between all members of the immediate family system, including siblings. Specifically, research has implicated sibling jealousy and an increased sense of responsibility to younger siblings in the development of attachment status.

*The lasting psychosocial effects of the sibling relationship into adolescence*

Siblings are an important source of support for adolescents (Tucker, McHale, & Crouter, 2001) and past findings also suggest that sibling relationship quality exerts lasting effects on psychosocial outcomes as children transition from childhood into adolescence. Positive adolescent sibling relationships have been significantly associated with positive adolescent peer relationships (Updegraff, McHale, & Crouter, 2002), and increased sibling intimacy in middle childhood has been shown to predict better peer relations, lower depression, and fewer externalizing problems in adolescence (Kim, McHale, Crouter, & Osgood, 2007). Just as sibling support aids social adjustment during adolescence, there is some evidence that sibling conflict has negative effects on psychosocial adjustment. Poor sibling interactions and increased sibling conflict in middle childhood significantly predicted poorer peer relations, higher depression, higher anxiety, and more internalizing problems and delinquent behavior in adolescence (Branje,

van Leishout, van Aken, & Haselager, 2004; Kim et al., 2007; Stocker, Burwell, & Briggs, 2002).

Having a delinquent sibling is another aspect of poor sibling relationships that may exert a negative influence on adolescents, as one sibling may serve as a social model or as a collusive partner for another sibling in the development of substance abuse and antisocial behaviors.

Regarding adolescent substance use, findings have indicated that older siblings' drinking behavior, alongside peer pressure, significantly predicted younger siblings' alcohol use as well as their delinquency behaviors in adolescence (Kuntsche, Gossrau-Breen, & Gmel, 2009).

Furthermore, siblings' deviance was uniquely predictive of changes in children's substance use between middle-school and high-school (Stormshak, Comeau, & Shepard, 2004). Regarding adolescent deviance research, data has evidenced that sibling relationship quality, siblings' aggression levels, and siblings' delinquency behaviors predicted adolescents' interpersonal aggression levels and delinquency behaviors (Slomkowski, Rende, Conger, Simons, & Conger, 2001; Williams, Conger, & Blozis, 2007). Furthermore, deviant older siblings exerted the largest effect on inner-city adolescents' risk for deviant behavior, which was higher than the effect of parental influence, peer influence, and subjects' temperament (Ardelt & Day, 2002). There is also some evidence to suggest that siblings may commit delinquent acts together or influence one another regarding the types of delinquent acts they wish to commit. Sibling collusion significantly predicted early adolescents' deviant behaviors above and beyond the effect of having friendships with deviant peers (Bullock & Dishion, 2002). In addition, researchers have found that adolescent siblings provided significantly similar reports of their delinquent behaviors as one another (Slomkowski et al., 2001).

*The influence of sibling relationships in adulthood*

Research literature points to the importance of sibling relationships as a pillar of support in adulthood (Cicirelli, 1991; Auqilino, 2006). As young adults, Western siblings are moving towards establishing independence from their families and thus have newfound choice as to whether they will remain involved with one another (Shortt & Gottman, 1997). Past evidence has indicated that as siblings transition into young adulthood, their relationship may become increasingly independent from other family relationships, such as their parents. For example, Scharf, Shulman, and Avigad-Spitz (2005) found that compared with adolescent siblings, emerging adults' sibling relationship quality was significantly less connected to parent-child relationship quality. The increasing independence of adolescents may also result in a decrease in sibling contact. White (2001) longitudinally assessed 9,000 adults with siblings over a 7-year period and found that siblings' proximity, their contact, and the frequency of helping behaviors all significantly decreased as siblings transitioned into young adulthood, but then remained stable in middle adulthood and increased again as siblings transitioned into old age. However, despite this drop in sibling contact and helping behaviors in emerging adulthood, evidence suggests that siblings continue to reach out to one another for emotional support, advice, and help in an emergency during this developmental stage. In a large scale study of 7,730 adults with siblings, White and Reidman (1992) found that while sibling contact was low, roughly 30% of the sample reported that in an emergency they would reach out to a sibling first. Furthermore, there is some evidence to suggest that adult siblings may continue to be a source of support and advice regarding life plans and personal problems (Tucker, Barber, & Eccles, 1997). This evidence is congruent with past research on the motivations behind sibling contact, showing that sibling dyads with high contact were those dyads whom were emotionally close, geographically close,

and had expectations about sharing life responsibilities (Lee, Mancini, & Maxwell, 1990).

Indeed, past work indicates that relationship quality improves as adolescents make the transition into young adulthood, and emerging adult siblings have been found to be significantly warmer, more emotionally involved, less conflicted, and less rivalrous than adolescent siblings (Scharf, Shulman, & Avigad-Spitz, 2005).

Past work has evidenced that sibling support is linked with psychosocial adjustment in adulthood. Data from emerging adults has suggested that sibling support may compensate for poor support from parents and peers, and sibling support has been significantly associated with decreased loneliness and depression as well as increased self-esteem and life satisfaction (Milevsky, 2005). There is also research indicating that throughout adulthood, siblings may provide an important source of support during major life events, such as getting divorced, becoming widowed, caring for an ill family member, or mourning the death of a family member (Connidis, 1992; Conger & Little, 2010). In contrast, distant or negative sibling relationships in childhood and adolescence significantly predicted increased depression and illicit drug use in adulthood, above and beyond the effect of family history of depression (Waldinger, Vaillant, & Orav, 2007). Past research has also shown that the effects of having a delinquent sibling continue to last into emerging adulthood. Specifically, older brothers' drug use was significantly related to the brotherly sibling relationship, independent of the parent-child relationship, parental drug use, and subjects' personality (Brook, Brook, & Whiteman, 1999).

#### *The impact of exposure to parental divorce on child and adolescent sibling relationships*

Given the importance of the sibling relationship to cognitive development and psychosocial adjustment, it is likely that the effects of exposure to parental divorce on children are compounded by the divorce's negative impact on children's sibling relationship quality.

Compared to intact families, school-aged siblings from divorced families had more antagonistic or detached sibling relationships with one another, were significantly less compliant with their parents, and these effects were especially strong for young boys (Hetherington, 1989; MacKinnon, 1989). Furthermore, mothers' dissatisfaction with their marriages was significantly related to their children's sibling conflict and rivalry, and mothers' intense emotional displays significantly mediated this association (Stocker, Ahmed, & Stall, 1997). Thus, findings suggest children's sibling relationships may be negatively influenced by parents' emotional expressions of dissatisfaction, including displays of marital dissatisfaction that can accompany the transition into divorce. Only one study stands in contrast to previous studies suggesting lower warmth between siblings from divorced families, and this study used a flawed research design.

Specifically, Jennings and Howe (2001) studied 12 divorced families with school-age sibling pairs and found that children's negative emotional reactions to parental divorce was significantly positively correlated with higher warmth and closeness between siblings as well as concerns about status and power arrangements between siblings. Furthermore, siblings had significantly congruent perceptions about their parents' divorce: sibling conflict was significantly positively correlated with maternal blame, and sibling rivalry was significantly positively correlated with paternal blame. However, it is important to note that the Jennings and Howe (2001) study results are invalid because of their use of mixed evidence, their small sample size, and their lack of advanced statistical tests beyond correlations. In sum, past research on childhood effects of parental divorce on siblings has indicated that siblings from divorced families experience less warmth, more conflict, and more rivalry than siblings from intact families.

Past empirical evidence has also suggested that exposure to divorce continues to disrupt the sibling relationship during the adolescent years, resulting in more hostility, less support, and

poorer psychosocial adjustment. Compared with intact families, adolescents from divorced families had more intensely affective sibling relationships, including significantly higher hostility as well as higher warmth (which adolescents connected to their parents' marital conflict) (Sheehan, Darlington, Noller, & Feeney, 2004). Furthermore, marital conflict was significantly associated with increased negativity in parent-child interactions, which in turn led to increased negativity in the adolescent sibling relationship (Brody, Stoneman, & McCoy, 1994). Kempton, Armistead, Wierson, and Forehand (1991) also found that only-child adolescents from divorced families were rated by teachers as having significantly more externalizing problems compared to adolescents with siblings from divorced families, only-child adolescents from intact families, and adolescents with siblings from intact families. There is also some evidence that siblings exposed to divorce engage in less sibling support during their adolescent years. Adolescents exposed to divorce were found to ask siblings for advice significantly less often than adolescents from intact families (Tucker, Barber, & Eccles, 2001).

As parents transition into divorce, they may also engage in differential treatment of their children, which can exacerbate the negative effects of divorce exposure on the sibling relationship. Differential treatment may include differences in the extent to which siblings are given care and attention, as well as the extent to which siblings are exposed to and entangled in parental conflicts (Daniels, Dunn, Furstenberg, & Plomin, 1985). By treating sibling children differently, divorcing parents may purposely or inadvertently undermine sibling support and promote sibling conflict and sibling rivalry. Even when sibling support is not intentionally undermined by parents, siblings may subjectively perceive parents' differential treatment as reflective of their siblings' lower support. In these ways, differential parental treatment may reduce the extent to which siblings are able to support one another through their parents' divorce.

There is some empirical evidence to support the notion that parents' differential treatment negatively affects their offspring's perceptions of sibling support through parental divorce. Differential parental treatment has been significantly associated with children's sibling relationship quality, where differences in mother-child warmth were significantly associated with sibling warmth and differences in parent-child conflict were significantly associated with sibling conflict (Shanahan, McHale, Crouter, & Osgood, 2008). Furthermore, treating siblings equally during problem solving discussions has been significantly associated with lower sibling conflict, while unequal treatment by parents was significantly associated with higher sibling conflict (i.e., either conflict behaviors or viewing the sibling relationship as conflicted) (Brody, Stoneman, McCoy, & Forehand, 1992). Overall, past findings suggest that divorce may exacerbate parents' differential treatment of their offspring, and that differential parental treatment of sibling offspring during childhood and adolescence has negative effects on the sibling relationship as well as psychosocial adjustment.

*The impact of exposure to parental divorce on child and adolescent self-efficacy beliefs:*

Some researchers have suggested that parental divorce may give children the sense that important events in the world are outside their control (Weiser & Riggio, 2010), while others have posited that children are egocentric and thus they may maladaptively keep their sense of self-efficacy intact by blaming themselves for their parents' divorce (Wallerstein & Kelly, 1974, 1975). Indeed, past literature on how parental divorce affects children's self-efficacy has found both increases and decreases in self-efficacy in the aftermath of divorce. Specifically, some past work has found that children and adolescents exposed to parental divorce showed higher self-efficacy compared to those from intact families, but these results led some researchers to hypothesize that children may blame themselves for the divorce and subsequently grow up faster



than their peers from intact families (Guidubaldi and Perry, 1985; Kalter, Alpern, Spence, & Plunkett, 1984; Wallerstein, 1974; Weiss, 1979). Meanwhile, a meta-analysis of early divorce studies from the 1950s to the 1980s found weak effects for self-efficacy in relation to parental divorce, suggesting that children's self-efficacy was not negatively impacted by divorce (Amato & Keith, 1991). The results from this meta-analysis were contrasted by studies conducted during the 1990's which suggested that parental divorce significantly decreased children's self-efficacy levels (Kurtz & Derevensky, 1993; Smith, 1990). Indeed, Amato (2001) later updated his meta-analysis to include another 67 studies conducted during the 1990's and found that children of divorce had significantly lower self-efficacy compared to children from intact families, suggesting that parental divorce damages children's sense of personal control in the world. Furthermore, studies on children of divorce have shown self-efficacy to significantly mediate the relationship between the children's efforts to cope with stress (e.g. stress associated with their parents' divorce) and their psychological problems (Fogas, Wolchik, Braver, Freedom, & Bay, 1992; Kim, Sandler, & Tein, 1997; Sandler, Tein, Mehta, Wolchik, & Ayers, 2000). Divorce's negative impact on children's self-efficacy may be especially detrimental because having naturally high self-efficacy is the very psychological mechanism shown to buffer children against the negative effects of divorce (Kurdek, 1981; Sandler, Kim-Bae, & MacKinnon, 2000).

However, researchers have also noted that it may be offspring's perceptions about their parents' divorce, rather than the divorce itself, that impacts offspring's self-efficacy. For both school-age and college-age students, offspring's self-efficacy has been found to be significantly related to those offspring's perceptions of their parents' divorce, with higher self-efficacy associated with positive appraisals and lower self-efficacy associated with negative appraisals (Kurdek & Siesky, 1980; Ross and Miller, 2009). Thus, variation in children's cognitive

appraisals may explain why children have been found to have both increased and decreased self-efficacy after parental divorce. That is, children's sense of control over events in their lives may depend on their appraisal of their parent's marriage before divorce, and thus whether they considered the divorce to be a positive or a negative event. Thus, although children's cognitive appraisals may alter which direction their self-efficacy beliefs change after divorce, past literature has indicated that parental divorce exposure has a significant impact on children's self-efficacy levels.

*The impact of exposure to parental conflict on early patterns of attachment security*

Although divorce is often intended to end marital conflict, research has shown parents do not become significantly less conflictual after divorce (Ahrons & Rodgers, 1987; Maccoby, Depner, & Mnookin, 1990; Whiteside, 1998). Because interparental conflict has been shown not to significantly change following divorce, the following literature review will include research on how both predivorce and postdivorce interparental conflict affect early attachment patterns.

Literature has suggested that the persistent interparental conflict often associated with parental divorce damages a child's sense of emotional security, thereby decreasing parent-child relationship quality and predicting insecure attachment status in early infancy, middle childhood, and beyond (Davies & Cummings, 1994; Frosch, Mangelsdorf, & McHale, 2000; Howes & Markman, 1989; Isabella & Belsky, 1985). When faced with parental conflict, children seek to ensure their own safety (i.e. establish emotional security) and their attachment systems activate, leading them to respond to the conflict using specific emotion and behavior patterns (e.g., by displaying fear/distress, seeking comfort/closeness, hyper-vigilantly watching parents, hiding emotion/avoiding parents, or by attempting to placate parents) (Davies & Woitach, 2008; Gilbert, 2001). Some researchers have called these processes attachment security, while others

have referred to them as emotional security, but the two concepts are conceptually equivalent. For example, emotional security researchers have identified patterns consistent with anxious/ambivalent and avoidant attachment patterns, where children have been found to respond to parental conflict by either experiencing high subjective distress and internalizing symptoms, or by displaying blunted affect and externalizing problems (Davies & Forman, 2002). Children's emotional insecurity was found to mediate the relationship between parents' marital conflict and children's internalizing and externalizing behavior problems in middle childhood, latency, and adolescence (Cummings, Schermerhorn, Davies, Goeke-Morey, & Cummings, 2006; Davies & Cummings, 1998; Harold, Shelton, Goeke-Morey, & Cummings, 2004). This mediating effect increased in strength as children got older (Cummings, et al., 2006) and data suggested that children increasingly internalized fear, self-blame, and the view that adults are incompetent or hostile, after being exposed to multiple instances of parental conflict over time (Buehler, Lange, & Franck, 2007; Davies, Sturge-Apple, Winter, Cummings, & Farrell, 2006; Gerard, Buehler, Franck, & Anderson, 2005; Grych, Harold, & Miles, 2003). Intensity of conflict has also been shown to play a role, as children who were exposed to more intense, physically violent parent conflict were more likely to display behaviors consistent with insecure attachment patterns, such as avoidance or distress (i.e., anger, fear, or sadness), compared to low conflict or non-violent conflict (O'Hearn, Margolin, & John, 1997).

Parental conflict has also predicted poorer parent-child relationships (Camara & Resnick, 1989; Forehand, Wierson, Thomas, Fauber, Armstead, Kempton, & Neighbors, 1991; Kline, Johnston, & Tschann, 1991; Peterson & Zill, 1986), which can indirectly affect children's attachment by negatively impacting parenting style. Parents in conflict were found to be negatively involved in their children's lives, such as mothers being more overprotective and

intrusive with their preschool-aged children (Engfer, 1988), or mothers and fathers being more likely to engage in parentification/role reversals with their adolescent children (Peris, Goeke-Morey, Cummings, & Emery, 2008). Furthermore, parental divorce was found to adversely affect mothers' parenting styles, which in turn, influenced attachment security among preschool-aged children (Nair & Murray, 2005).

*The lasting effects of parental divorce on psychosocial and marital outcomes for emerging adults*

Literature has evidenced that the detrimental effects of parental divorce on psychosocial outcomes last well into offspring's young adulthood. Adult offspring from divorced families have been shown to score significantly lower on measures of well-being than those from intact families (Booth & Amato, 1991; Amato, Loomis, & Booth, 1995). In particular, studies have shown especially strong negative effects on female offspring's well-being, with females from divorced families evidencing poorer well-being, higher depression, and greater difficulty adjusting to their first year of college, compared to females from intact families (Ängarne-Lindberg, 2009; Huure, Junkkari, & Aro, 2006; Wintre, Ames, Pancer, Pratt, Polivy, Birnie-Lefcovitch, & Adams, 2011). In addition, young adults of both genders from divorced families showed significantly poorer relationships with parents, greater behavior problems, more risky health behaviors, and a greater likelihood of dropping out of high school or otherwise having a shorter education than subjects from intact families (Aquilino, 1994; Huure et. al., 2006; Sobolewski & Amato, 2007; Mack, 2001; Zill, Morrison, & Coiro, 1993). Young adults of both genders from divorced families also showed significantly poorer mental health than those from intact families, and divorce exposure was linked with a 39% increase in subjects exceeding clinical cutoff scores for psychopathology (Afifi, Bonman, Fleisher, & Sareen, 2009; Chase-Lansdale, Cherlin, & Kiernan, 1995). In addition, parental divorce exposure significantly

predicted offspring's risk for alcohol dependence in adulthood, regardless of their family's history of alcoholism (Thompson, Lizardi, Keyes, & Hasin, 2008). Furthermore, divorce has been shown to reach across generations, linking divorce in the grandparents' generation to lower educational attainment, poorer parent-child relationships, and more marital discord among grandchildren (Amato & Cheadle, 2005).

Indeed, literature has shown that one of the largest effects of parental divorce is the intergenerational transmission of divorce (Amato, 1996; Amato & DeBoer, 2001). That is, parental divorce has been shown to significantly increase the odds of offspring divorce. Specifically, studies show that adults exposed to parental divorce were more wary of marriage, were 30% less likely to be involved in an intimate romantic relationship, were engaged in more frequent dating while also being less likely to have had past or present long-term romantic relationships, and were more likely to have endorsed premarital cohabitation and premarital sex, compared to those from intact families (Axinn & Thornton, 1996; Booth, Brinkerhoff, & White, 1984; Burns & Dunlop, 1998, 2002; Sergin, Taylor, & Altman, 2005). Such wariness may either reflect an attempt to increase marriage quality by engaging in a trial period living together prior to making a larger marital commitment (Thornton, 1991) or it may reflect the choice to cohabitate in lieu of getting married (Axinn & Thornton, 1992). Adults exposed to parental divorce may also choose partners who are equally wary about marriage, as they are more likely to marry a previously-divorced partner (Sergin et al., 2005). However, such choices in partners and living arrangements may inadvertently confer additional risk for divorce, as a history of parental divorce has been shown to increase the odds of offspring divorcing (Amato & DeBoer, 2001), and offspring from divorced homes were significantly more likely to divorce if they cohabitated before marrying (Bumpass, Martin, & Sweet, 1991). Alternatively, offspring's

wariness about marriage may be due to witnessing the premature dissolution of a supposedly life-long covenant, which may lead them to be more suspicious of all intimacy, including the romantic intimacy necessary in marriage (Burns & Dunlop, 2002; Lauer & Lauer, 1991).

Compared with intact families, women from divorced families had less idealistic beliefs about love while men had greater eroticism, suggesting that parental divorce may make women more cynical regarding relationships and men more likely to seek superficial sexual conquests over monogamous commitment (Sprecher, Cate, & Levin, 1998).

*Adult offspring's self-efficacy and attachment and the intergenerational transmission of divorce*

The association between parental divorce exposure and offspring's wariness about marriage has led researchers to study whether the intergeneration transmission of divorce is linked to offspring's self-efficacy beliefs (i.e. efficacy beliefs about being able to successfully manage a lifelong marital commitment). Indeed, such self-efficacy beliefs have been found to be an important factor mediating the intergenerational transmission of divorce (Sergin, et. al., 2005; Cui & Fincham, 2010; Cui, Fincham, & Pasley, 2008). Evidence has found that parental divorce exposure significantly predicted offspring's relationship commitment, suggesting that by getting divorced, parents are teaching offspring that marriages are not lifelong commitments and that divorce offers a viable alternative to remaining with an unsatisfying partner (Amato & DeBoer, 2001; Cui & Fincham, 2010; Glenn & Kramer, 1987; Greenberg & Nay, 1982; Jacquet & Surra, 2001; Kapinus, 2005; Segrin et al., 2005; Trent & South, 1992; Webster, Orbuch, & House, 1995).

Similarly, attachment status, and its effects on young adults' capacity for intimacy, has also been implicated as a mediating factor in the intergenerational transmission of divorce (Amato, 1996; Crowell, Treboux, & Brockmeyer, 2009; Bakermans-Kranenburg & van

IJzendoorn, 1997). Emerging adults' secure attachment status has been linked to their capacity for intimacy, including greater self-disclosure, responsiveness, and greater capacity to feel understood, validated, and supported (Grabill & Kerns, 2000; Hannum & Dvorak, 2004; Mayseless & Scharf, 2007; Scharf, Mayseless, & Kivenson-Baron, 2004; Wei, Russell, & Zakalik, 2005). In contrast, exposure to parental divorce has been significantly related to young adults being insecurely attached as well as having romantic relationships with greater insecurity, less trust, less marital satisfaction, poorer conflict resolution, and greater likelihood of divorce within their first six years of marriage (Crowell et al., 2009; McLeod, 1991; Schaick & Stolberg, 2001; Shi, 2003; Sprecher, et. al., 1998).

In sum, poor self-efficacy and attachment have been shown to add to the risk that the offspring of divorced parents will experience their own divorce. Specifically, studies have found that the intergenerational transmission of divorce is significantly mediated by offspring's sense of efficacy, as parental divorce exposure negatively impacts offspring's sense that they can put their interpersonal skills to good use in maintaining a marriage, their schema about viewing marriage as a lifelong commitment, and their level of idealism/optimism about the quality of their romantic partners as suitable life-mates. Furthermore, the intergenerational transmission of divorce has been linked to the transmission of attachment patterns, as parental divorce fosters young adults' attachment insecurity, which weakens their trust and optimism in their own romantic relationships as well as hindering the development of the intimacy necessary for a successful marriage.

#### *The impact of childhood exposure to divorce on adult sibling relationships*

There is a dearth of research on the effects of parental divorce on the adult sibling relationship, and past evidence is inconsistent regarding whether exposure to parental divorce

during childhood and adolescence continues to have effects on sibling relationship quality that last into adulthood. On the one hand, past work has found that offspring exposed to parental divorce in childhood had significantly fewer positive attitudes (both past and present) about their sibling relationships (Riggio, 2001), more sibling conflict (Panish & Stricker, 2001), and lower sibling closeness, communication, and support (Milevsky, 2004) in adulthood, compared with siblings from intact families. Parental marital satisfaction also significantly predicted sibling communication and mediated the relationship between parental divorce and sibling closeness, as well as the relationship between parental divorce and sibling support (Milevsky, 2004).

On the other hand, in contrast to studies showing lasting negative effects of parental divorce on the sibling relationship, Frank (2007) used the same sibling relationship scale as the Riggio (2001) study and found that adult sibling relationships were not significantly affected by divorce, marital conflict, or the age at which parents divorced. However, in a secondary analysis of the same data set, Frank (2008) broke down both parent-child and sibling relationships along gender lines and found that within the divorced sample, father-son relationships were positively correlated with male sibling relationships, and mother-daughter relationships were positively correlated with female sibling relationships, but that these correlations did not maintain their significance when applied to intact families. It is important to note that the Frank (2008) study was methodologically limited by its use of two separate sets of correlations rather than direct comparisons of subjects grouped along gender-lines. Thus, conclusions cannot be drawn from this study about the direct influence of marital status on sibling relationships. Furthermore, in a large-scale study of mostly middle-aged adult sibling dyads, Poortman and Voorpostel (2009) found no significant differences in sibling contact or relationship quality between siblings from divorced versus intact families. However, the study did find that adult siblings exposed to



parental divorce during their childhoods were significantly more likely to experience sibling conflict in adulthood, and parental conflict fully accounted for the effect of sibling conflict in this sample. It is important to note that this study was limited by a skewed age range (i.e., the mean age was 44 years), and as a result, middle-aged adults were overrepresented in the sample, thus indicating that the above findings may be more generalizable to middle-aged individuals than to other age groups.

### Literature Review Conclusions

Past research on the sibling relationship has primarily addressed the question of whether living through the experience of parental divorce brings siblings closer together or pulls them apart. There is substantial evidence in the literature linking exposure to parental divorce to decreases in sibling relationship quality and concurrent decreases in psychosocial adjustment. Specifically, the majority of past research has suggested that the experience of parental divorce is significantly associated with decreased warmth alongside increased conflict and rivalry throughout childhood and adolescence. However, the effects of parental divorce on the adult sibling relationship have received less research attention, and past results are inconsistent. While some evidence suggests that emerging adults exposed to parental divorce have a more tumultuous but involved adult sibling relationships (Panish & Stricker, 2001; Poortman & Voorpostel, 2009) other evidence indicates degrees of estrangement (Riggio, 2001; White, 2001; Milevsky, 2004). Studies of child and adolescent samples did not need to consider sibling estrangement as a possible outcome since both siblings were typically forced to live together. However, in adult samples where sibling communication is optional, studies need to consider three possible outcomes for siblings exposed to divorce: that siblings continue to have a warm

relationship, that siblings have a more negative, tumultuous sibling relationship, or that siblings have an indifferent, uninvolved, and potentially estranged relationship.

### Study goals and hypotheses

Study hypotheses were divided into two sets: one set of primary hypotheses and one set of secondary hypotheses. The primary hypotheses focus on the effects of parental divorce exposure (i.e. whether or not parental divorce occurred) on the adult sibling relationship. The secondary hypotheses concern the effects of the timing of parental divorce on the adult sibling relationship among the smaller subsample of those subjects who had previously been exposed to parental divorce.

#### *Primary hypotheses:*

Hypothesis 1: Parental divorce exposure will significantly predict adult sibling relationship quality (ASRQ; Stocker, Lanthier, & Furman, 1997).

Hypothesis 2: Parental divorce exposure will be significantly moderated by current sibling contact (Sibling Contact Scale; Stocker et al., 1997) to significantly predict adult sibling relationship quality (ASRQ; Stocker et al., 1997).

Hypothesis 3: The relationship between parental divorce exposure and adult sibling relationship quality (ASRQ; Stocker et al., 1997) will be significantly mediated by subjects' attachment style (ECR-R; Fraley, Waller, & Brennan, 2000).

Hypothesis 4: The relationship between parental divorce exposure and adult sibling relationship quality (ASRQ; Stocker et al., 1997) will be significantly mediated by subjects' self-efficacy (Measure of Belief in Personal Efficacy; Pearlin & Schooler, 1978).

#### *Secondary hypotheses:*

Hypothesis 5: Subjects' age at the time of their parents' divorce will significantly predict their adult sibling relationship quality (ASRQ; Stocker et al., 1997).

Hypothesis 6: Subjects' age at the time of their parents' divorce will be significantly moderated by their current sibling contact (Sibling Contact Scale; Stocker et al., 1997) to significantly predict their adult sibling relationship quality (ASRQ; Stocker et al., 1997).

Hypothesis 7: The relationship between subjects' age at the time of their parents' divorce and their current adult sibling relationship quality (ASRQ; Stocker et al., 1997) will be significantly mediated by subjects' attachment style (ECR-R; Fraley et al., 2000).

Hypothesis 8: The relationship between subjects' age at the time of their parents' divorce and adult sibling relationship quality (ASRQ; Stocker et al., 1997) will be significantly mediated by subjects' self-efficacy (Measure of Belief in Personal Efficacy; Pearlin & Schooler, 1978).

## Method

### *Participants and procedure:*

This study used data previously collected by three investigators: George Nitzburg, Erel Shvil, and Elizabeth Midlarsky, Ph.D. This data set was originally collected to evaluate the effects in adulthood of having a sibling with a mental illness or developmental disability in comparison to a control group. The current study focuses on the control group subjects only and analyzes the effects of exposure to parental divorce within this group. Data collection for the original study was conducted in two stages using an Internet survey. The first stage collected data on the control group sample only, which was identified as anyone over age 18 in the general public who could use the Internet to take an online survey, and where no mention was made regarding any interest in siblings with mental illnesses or developmental disabilities. The second

stage of data collection was originally hoped to add respondents who were specifically identified as being part of support groups or organizations that catered to siblings of individuals with disabilities. However, this second stage of data collection never occurred, as the administrators of these organizations denied access to their support group populations. However, this worked in favor of the current study, as the lack of these additional respondents provided the current study with clean data to conduct a separate investigation into divorce effects. This first phase of data collection obtained a total sample of 2,227 participants, which was then filtered down to 1,052 participants for use in the present study. Specifically, because the hypotheses under study focused on emerging adults, 866 participants were excluded from this sample because they did not meet the age criteria (i.e. being emerging adults between the ages of 18-29 years). Next, because subjects' mental illness is an alternate reason why siblings might have poorer sibling relationship quality, another 194 participants were excluded because they self-reported having been previously diagnosed with a psychiatric illness. And lastly, because the hypotheses under study relied upon the subjects answering divorce-related questions about their parents, 115 subjects were excluded because they did not list the marital status of their parents. Thus, for the purposes of this study, only the control group sample of 1,052 emerging adults without psychiatric diagnoses was analyzed. Furthermore, 296 of these 1,052 subjects were previously exposed to parental divorce, and we also conducted a separate analysis using this 296-subject subsample. Study participant demographics for both the 1,052-subject sample, as well as the 296-subject subsample, are presented in Table 1. After approval by the Institutional Review Board, the survey research instrument was placed on the Columbia University website. The informed consent procedure notified participants that the study was being conducted by a team of researchers at Columbia University and provided contact information. The purpose of the study

was explained as an "exploration of how sibling relationships change across the lifespan and influence wellbeing." It was also noted that the survey was intended for people 18 years and older and that only data from participants 18 years and older would be kept in our database. There were no other inclusion or exclusion criteria used in this study. To obtain respondents, researchers posted classified ads using online message boards, forums and public Web sites such as craigslist.org and facebook.com (see Appendix for the full text of the classified advertisement used in the first phase of data collection). Using these online recruiting methods, the investigators were able to advertise the study across the United States.

Although the present study was quasi-experimental and used a convenience sample obtained via the Internet, we had an adequate rationale to believe that such sampling methods would be reasonably representative of the general population of offspring of divorce, and would be approximately as representative as other sampling methods regarding other demographic characteristics. Specifically, rates of parental divorce (i.e., the primary independent variable under study) have remained stable since 1980 to 2003 at approximately half of all marriages in America (Raley & Bumpass, 2003). This means that for all respondents aged 18-29 years (i.e. respondents born between 1980 and 1991) the likelihood of any given respondent being from a divorced family was approximately 50%. Moreover, the present study was a secondary analysis of a data set on sibling relationships and thus study participants were not told that we were studying divorce. Furthermore, literature has shown that Internet surveys are comparable to traditional paper-and-pencil surveys in terms of demographic diversity (i.e. age, gender, socioeconomic status, and geographical region), response rates, and how serious the respondents are about filling out surveys (Gosling, Vazire, Srivastava, & John, 2004; Kaplowitz, Hadlock, & Levine, 2004; Ritter, Lorig, Laurent, & Matthews, 2004). As a result, we could reasonably

assume that any given young adult respondent in the present Internet study had an approximately 50% chance of being from a divorced home, and that their demographic characteristics would not significantly differ from other samples obtained via traditional, paper-and-pencil survey methods.

## Measures

### Dependent Variables

*Adult sibling relationship quality:* Adult sibling relationship quality was measured by the Adult Sibling Relationship Questionnaire (ASRQ), an 81-item scale designed to measure three dimensions (i.e., warmth, conflict, and rivalry) within the adult sibling relationship (Stocker, Lanthier, & Furman, 1997). For the sibling warmth and sibling conflict subscale items, participant rated how much they engage in warm interactions or conflictual interactions with their sibling using a Likert-type scale from 1 (Hardly At All) to 5 (Extremely Much). Examples of sibling warmth subscale items included, “How much does this sibling try to cheer you up when you are feeling down?” and “How much does this sibling accept your lifestyle?” among others. Examples of sibling conflict subscale items included, “How much do you and this sibling argue with each other?” and “How much does this sibling irritate you?” among others. For items on the rivalry subscale, participants rated the extent to which they and their sibling differed in terms of maternal and paternal attention using a 5-point Likert-type scale (1 = I am usually favored, 2 = I am sometimes favored, 3 = Neither of us is favored, 4 = This sibling is sometimes favored, & 5 = This sibling is usually favored). Examples of sibling rivalry subscale items included, “Do you think your father favors you or this sibling more?” and “Do you think your

mother favors you or this sibling more?" The resulting variables were coded so that higher numbers indicate higher sibling warmth, higher sibling conflict and higher sibling rivalry.

Cronbach's alpha for the ASRQ in the present data set was 0.95, and previous research has also demonstrated the satisfactory psychometric properties of this measure (Stewart, Kozak, Tingley, Goddard, Blake, & Cassel, 2001; Stocker, Lanthier, & Furman, 1997). In particular, for the Warmth, Conflict and Rivalry subscales, Stocker et al. (1997) reported internal consistency coefficients of 0.97, 0.93, and 0.88 (respectively) as well as two-week test-retest reliability coefficients of 0.95, 0.89, and 0.87 (respectively). Furthermore, the Warmth and Rivalry subscales were not significantly correlated with a measure of social desirability, the Impression Management Scale (Paulhus & Reid, 1991), while a weak but nevertheless significant correlation ( $r = -0.16$ ) was observed between Sibling Conflict and Social Desirability (Stocker et al., 1997). Stocker et al. (1997) also demonstrated ASRQ's convergent validity by correlating their subjects' ASRQ responses with reports by their siblings, and found significant agreement between siblings on the warmth ( $r = .60, p < .01$ ), conflict ( $r = .54, p < .01$ ), and rivalry subscales ( $r = .33, p < .01$ ).

*Age of subject at time when parent divorce occurred:* Participants were asked, "If your parents divorced, what age were you when your parents first divorced?" in order to account for variability in the age of the subject at the time when parental divorce occurred. This variable was used for analyses into the effects of time of parental divorce on adult sibling relationship quality among those participants from divorced families.

Moderators:

*Sibling contact:* Contact between siblings was measured by a 4-item scale designed to measure the frequency with which siblings see each other in person, meet for holidays and special occasions, and speak over the telephone (Stocker et al., 1997). Participants rated responses using a Likert-type scale in which response choices ranged from 1 (Hardly At All) to 5 (Extremely Much). The four items listed are: “How much do you and your sibling see each other?” “How much do you and this sibling see each other for holidays and family gatherings?” “How much do you phone this sibling?” and “How much does this sibling phone you?” Cronbach’s alpha for this scale in the present data set was 0.72, and previous research has also demonstrated the satisfactory psychometric properties of this measure, where Stocker et al. (1997) reported an internal consistency coefficient of 0.78 for this scale, and a test-retest reliability coefficient of 0.85 over a two-week time interval.

#### Mediators

*Adult attachment status:* Adult attachment status was measured by the Experiences in Close Relationships Scale, Revised (ECR-R), a 36-item scale designed to measure participant’s fears about romantic relationships (i.e., insecure attachment anxiety), as well as their ambivalence about becoming involved in dependent romantic relationships (i.e., insecure attachment avoidance) (Fraley, Waller, & Brennan, 2000). This measure yields two continuous variables: one variable measuring subjects’ degree of insecure attachment anxiety and another variable measuring subjects’ degree of insecure attachment avoidance. Participants rated responses using a Likert-type scale in which response choices ranged from 1 (Strongly Disagree) to 7 (Strongly Agree). Examples of items include “I find it difficult to allow myself to depend on romantic partners,” “I’m afraid that I will lose my partner's love,” and “I prefer not to be too



close to romantic partners,” among others. Cronbach’s alpha for this scale in the present data set was 0.94, and previous research has also demonstrated the satisfactory psychometric properties of this measure (Fraley, Waller, & Brennan, 2000; Sibley, Fischer, & Liu, 2005). In particular, for the Anxiety and Avoidance scales, Sibley et al. (2005) reported three-week test-retest reliability coefficients of 0.90 and 0.92, respectively. Fraley et al. (2000) estimated test-retest correlations of 0.93 and 0.95 (respectively) under simulated conditions. Sibley et al. (2005) also reported coefficients of 0.60 and 0.62 (respectively) when test scores were correlated with another measure of attachment, the Relationship Questionnaire (Bartholomew & Horowitz, 1991).

Notably, this attachment scale captures the underlying construct of attachment status by measuring subjects’ thoughts, feelings and behaviors in romantic relationships, and not sibling relationships. In addition, the scale measures attachment status formed in infancy for an investigation into the sibling relationships of emerging adults aged 18-29 years. However, literature has evidenced that attachment status remains stable across time from infancy to adulthood, and can even be transmitted across generations (Benoit & Parker, 1994; Fraley, 2002; Waters, Merrick, Treboux, Crowell, & Albersheim, 2000; Waters, Weinfeld, & Hamilton, 2000). Furthermore, past work has found attachment status generalizes across multiple types of relationships: Young adults’ attachment to their parents was found to be significantly associated with their attachment to siblings (Keren, Roisman, Haydon, Groh, & Holland, 2011), as well as their peers (Bartholomew & Horowitz, 1991) and their romantic partners (Shaver, Belsky, & Brennan, 2000; Simpson, Winterheld, Rholes, & Orina, 2007). Thus, although the attachment scale used in the present study measures romantic attachment, the scale is actually assessing the

core underlying construct of attachment security, which is stable across time and different relationship types, including sibling relationships in emerging adulthood.

*Self-efficacy:*

Self-efficacy was measured by the Measure of Belief in Personal Efficacy, a 7-item scale designed to measure the extent to which participants believe they can effectively solve their problems and exert control over their own lives (Pearlin & Schooler, 1978). Participants rated responses using a Likert-type scale in which response choices ranged from 1 (Strongly Agree) to 4 (Strongly Disagree). Examples of items include “There is really no way I can solve some of the problems I have,” “I have little control over the things that happen to me,” and “I can do just about anything I really set my mind to,” among others. Cronbach’s alpha for this scale in the present data set was 0.79, and previous research has also demonstrated the satisfactory psychometric properties of this measure (Nolen-Hoeksema, Larson, & Grayson, 1999; Pearlin, Menaghan, Lieberman, & Mullan, 1981; Pearlin & Schooler, 1978; Schieman & Turner, 1988; Turner & Noh, 1988). In particular, Nolen-Hoeksma et al. (1999) reported an internal consistency coefficient of 0.78, and a test-retest reliability coefficient of 0.66 over a one year time interval. Marshall and Lang (1990) also reported a coefficient of 0.71 when test scores were highly correlated with the Life Orientation Test, measuring optimism (Scheier & Carver, 1985), while a chi-square found the two to be distinct ( $\chi = 30.2, p < 0.001$ ).

Notably, the Measure of Belief in Personal Efficacy scale is considered a general self-efficacy scale and not a self-efficacy scale that is specific to sibling relationships. However, past empirical literature has demonstrated that general scales of self-efficacy (i.e. scales measuring self-efficacy across multiple domains of achievement) have equivalent or greater validity than task-specific self-efficacy scales that treat self-efficacy as a state-like construct (Luszczynska,

Gutierrez-Dona, & Schwarzer, 2005; Luszczynska, Scholz, & Schwarzer, 2005). Because self-efficacy measures are easily modified to make them task-specific, many researchers have chosen to use state-like measures in their research designs. However, such choices may reflect researchers' risk-aversion rather than the true nature of self-efficacy as a construct. For example, there are such overly narrow state-like self-efficacy scales as attendance self-efficacy (Frayne & Latham, 1987), job-seeking self-efficacy (Caplan, Vinokur, Price, & van Ryn, 1989), and software self-efficacy (Gist, Schwoerer, & Rosen, 1989). In addition, some of these overly narrow state-like self-efficacy scales are unlikely to capture vastly different concepts, including smoking cessation self-efficacy (Colletti, Supnick, & Payne, 1985), dietary self-efficacy (Saksvig, Gittelsohn, Harris, Hanley, Valente, & Zinman, 2005), and exercise self-efficacy (Fletcher & Banasik, 2001), which all measure beliefs about health. In contrast, general self-efficacy researchers have posited that self-efficacy beliefs are developed via the buildup of experiences of success or failure over time and across multiple domains of achievement, and as a result, self-efficacy beliefs from one domain are likely to spill over into other domains of achievement (Bandura, 1994; Chen, Gully, & Eden, 2001; Shelton, 1990). Indeed, recent large scale studies across multiple countries evidenced that general self-efficacy met criteria for a universal construct, as it was significantly and stably linked across languages and cultures with respect to subjects' personality traits, perceived wellbeing, perceived stress, sense of achievement, and social relationship quality (Luszczynska, Gutierrez-Dona, & Schwarzer, 2005; Luszczynska, Scholz, & Schwarzer, 2005). Furthermore, Scherbaum, Cohen-Charash, and Kern (2006) conducted an item response theory analysis of three general self-efficacy measures and found evidence supporting the reliability and validity of general self-efficacy measures for use in understanding the latent construct of self-efficacy across domains of functioning. Thus, general

or trait-like self-efficacy scales like the Measure of Belief in Personal Efficacy scale have been empirically validated for use in assessing efficacy beliefs across all domains of achievement, including the domain of efficacy in maintaining sibling relationships.

### Control Variables

*Parents' income during subjects' childhood:* In order to measure the socioeconomic status differences between subjects' families, subjects were asked, "What was the approximate total income of your family/household when you were growing up?" Participants rated responses using a Likert-type scale in which response choices ranged from 1 (Under \$29,000 a year) to 10 (Over \$250,000 a year). Other examples of answer choices include, "\$30,000 to \$44,999 a year" "\$45,000 to 59,999 a year" and "\$100,000 to \$149,999 a year." The resulting continuous variable was included to control for variability in socioeconomic status that might have been due to Internet sampling methods, as subjects with access to the Internet-capable computers could possibly skew towards these subjects having higher socioeconomic status.

*Gender discrepancy between siblings:* Participants were asked to provide the gender of both themselves and their siblings, and this information was used to produce a variable measuring the gender composition of the sibling dyad. The resulting nominal variable classified sibling pairs as either, "male-male," "female-female," or "female-male." This nominal variable was then recoded into two dichotomous, contrast-coded variables. The first contrast variable measured whether siblings were the same gender or different genders, while the second contrast variable measured whether same gender sibling pairs were male-male or female-female. These contrasts were included in the regression analyses order to control for the potential effects of gender differences between siblings on adult sibling relationship quality.

*Birth order differences between siblings:* Using subjects' provided age for both themselves and their siblings, a categorical variable was computed that measured the birth order discrepancy between the members of the sibling dyad. The resulting dichotomous variable measured whether subjects were younger or older than their sibling, and this variable was included in order to control for the potential effects of age differences between siblings on adult sibling relationship quality.

*Age gap between siblings:* Subjects were also asked to provide the age of both themselves and their siblings, and this information was used to compute a continuous variable measuring the age gap between the members of the sibling dyad. This age gap information initially included either a positive or a negative sign depending on if the subject was older or younger than their sibling. To avoid overlap with a birth order variable, we first took the absolute value of the age gap variable. In addition, the age gap variable had an overly high kurtosis, and we corrected for this by taking the square root of all values in this variable (DeCarlo, 1997). The resulting continuous variable was included in order to control for the potential effects of age differences between siblings on adult sibling relationship quality.

*The interaction between age gap and birth order differences between siblings:*

In order to explain how birth order and age gap may individually contribute to the model under study, we broke apart a variable measuring age gap and birth order at the same time (i.e. a relative age gap variable measuring age gap in both a positive and negative direction). Although breaking apart this more robust variable into separate elements added nuance and subtlety to the model, the model no longer captured the interaction between age gap and birth order.

Researchers have long noted that when studying the effects of time on individuals, cohort effects (e.g. birth order rank) and age spacing can only rarely be considered as fully distinct from one

another statistically (Glenn, 1976; Palmore, 1978). Such literature stresses the importance of including interactions alongside time-related control variables, as these variables will not properly act as controls if they are not in the presence of other variables that capture the interaction between them. Thus, in order for the model to properly control for age gap and birth order, we included the interaction variable of age gap by birth order in the regression model alongside the two separate control variables of age gap and birth order.

*Geographical proximity between siblings:* In order to assess the geographical proximity between siblings, participants were asked, “How far does this sibling live from you?” (Stocker et al., 1997). Participants rated responses using a Likert-type scale in which response choices ranged from 1 (Same house) to 10 (More than 1000 miles (1600km)). The resulting continuous variable was reverse-coded so that higher numbers indicated closer proximity, and the variable was included to control for the potential effects of geographical proximity between siblings on adult sibling relationship quality, which are likely to obscure accurate measurement of sibling contact. That is, siblings who are in close proximity likely have more contact than siblings who live far away from one another, but there are many reasons why siblings may be geographically separated that are beyond their control and unrelated to their adult sibling relationship quality (e.g. changing locations in order to find affordable housing, obtain employment that requires geographic resettling, or move nearby to the family of one’s spouse). Furthermore, some siblings may maintain high contact considering that they are geographically separated by a large distance, while other siblings may maintain low contact considering that they live in the same neighborhood. Thus, measuring geographical proximity allowed us to control for the variability in siblings’ proximity due to logistical constraints, and thereby obtain a more accurate measurement of sibling contact.

## Results

### *Primary analyses:*

All analyses were conducted twice for two separate samples: a full sample of 1,052 emerging adults, and a subsample with only the subset of those 296 individuals who had all previously been exposed to parental divorce. For both of the full sample and subsample, ranges, means, and standard deviations for each of the study variables were calculated (see Table 2), as well as bivariate correlations among all study variables (see Tables 3 & 4).

The strongest correlations between study variables were largely similar for both the full sample of 1,052 emerging adults and the subsample of 296 subjects previously exposed to parental divorce. Within the full sample of 1,052 subjects, the strongest correlations with the dependent variables were between current sibling contact and adult sibling warmth ( $r = .64, p < .01$ ), between subjects' self-efficacy and adult sibling warmth ( $r = .23, p < .01$ ), and between attachment anxiety and sibling conflict ( $r = .22, p < .01$ ). In other words, subjects who believed they were in control of their lives and who had greater contact with their siblings tended to have warmer sibling relationships, whereas subjects who were more anxious about intimate relationships tended to have more conflict-laden sibling relationships. The strongest correlations between the independent variables under study were as follows: Current sibling contact was significantly correlated with siblings' geographical proximity ( $r = .23, p < .01$ ) as well as the gender of same-sex sibling pairs ( $r = .25, p < .01$ ). That is, siblings who lived close to one another also tended to have more contact with one another, and sibling's contact with one another tended to be related to whether siblings were brother-brother pairs or sister-sister pairs. Siblings' gender match was also significantly correlated with the gender of same-sex sibling

pairs ( $r = .45, p < .01$ ), meaning that whether siblings were brother-brother or sister-sister pairs was related to whether sibling dyads were different sexes (i.e., male-female pairs) or the same sex (i.e., male-male pairs and female-female pairs). In addition, attachment anxiety was significantly correlated with attachment avoidance ( $r = .43, p < .01$ ), and subjects' self-efficacy was significantly correlated with their attachment anxiety ( $r = -.43, p < .01$ ) as well as their attachment avoidance ( $r = -.34, p < .01$ ). This means that those who had more anxiety about intimate relationships also tended to have more ambivalence about intimate relationships, whereas those who believed that they had control over their lives tended to have less anxiety and less ambivalence about intimate relationships.

Within the subsample of 296 subjects previously exposed to parental divorce, the strongest correlations with the dependent variables were between current sibling contact and adult sibling warmth ( $r = .67, p < .01$ ), between subjects' self-efficacy and adult sibling warmth ( $r = .33, p < .01$ ), between parents' income during subjects' childhood and adult sibling warmth ( $r = .27, p < .01$ ), and between siblings' geographical proximity and sibling conflict ( $r = .23, p < .01$ ). This means that subjects with greater family wealth, subjects who believed they were in control of their lives, and subjects who had more contact with their siblings all tended to have warmer sibling relationships, whereas those who lived closer to their siblings tended to have more conflict-laden sibling relationships. The strongest correlations between the independent variables under study were as follows: Current sibling contact was significantly correlated with sibling geographical proximity ( $r = .20, p < .01$ ) and the gender of same-sex sibling pairs ( $r = .21, p < .01$ ), again showing that siblings who lived close to one another also tended to have more contact with one another, and sibling's contact with one another tended to be related to whether siblings were brother-brother pairs or sister-sister pairs. Current sibling contact was also



significantly correlated with parents' income during subjects' childhood, meaning that those siblings who have more contact as adults tended to have more family wealth while growing up. Current sibling contact was significantly correlated with subjects' age at the time of their parents' divorce ( $r = .26, p < .01$ ), which means that the older the subjects were when their parents divorced, the more contact they currently have with their siblings as adults. Siblings' gender match was significantly correlated with the gender of same-sex sibling pairs ( $r = .53, p < .01$ ), again showing that whether siblings were brother-brother or sister-sister pairs was related to whether sibling dyads were different sexes (i.e., male-female pairs) or the same sex (i.e., male-male pairs and female-female pairs). Lastly, attachment anxiety was significantly correlated with attachment avoidance ( $r = .42, p < .01$ ) and subjects' self-efficacy was significantly correlated with their attachment anxiety ( $r = -.48, p < .01$ ) as well as their attachment avoidance ( $r = -.43, p < .01$ ). This again showed that subjects with more anxiety about intimate relationships also tended to have more ambivalence about intimate relationships, but that those who believed that they had control over their lives tended to have less anxiety and less ambivalence about intimate relationships.

For both the full sample of 1,052 emerging adults and the subsample of 296 emerging adults previously exposed to parental divorce, we tested three regression models, with one regression model for each of the sibling relationship quality outcomes: adult sibling warmth, conflict and rivalry (i.e., six regressions total). Results from the three multiple regressions tested on the full sample of 1,052 emerging adults are presented in Tables 5, 6, & 7, while results from the three multiple regressions that were run on the subsample of 296 emerging adults previously exposed to parental divorce are presented in Tables 8, 9, & 10.

The same model of predictor variables was tested for all three regressions using the full sample of 1,052 emerging adults. This model consisted of two steps: The first step consisted of parental divorce exposure and current sibling contact alongside a series of control variables: siblings' parents' income, siblings' geographical proximity, siblings' age gap, birth order, the interaction between siblings' age gap and birth order, siblings' gender match (i.e. whether sibling pairs were the same gender or different genders), and the gender makeup of same-sex sibling pairs (i.e., whether same-gender siblings were male-male or female-female). The second step added an interaction variable between two of the other variables under study: the interaction between parental divorce exposure and current sibling contact.

Regarding sibling warmth in the full sample of 1,052 emerging adults, the whole model reliably predicted adult sibling warmth ( $F = 53.17, p < .001$ ). This model accounted for 46.3% of the variance in ASRQ warmth subscale scores at step 1 and 46.5% of the variance at step 2 (see Table 5). This means that there was only a change of 0.2% between the variance account for by the first and second steps of the model (i.e. without versus with the interaction between parental divorce exposure and current sibling contact). Results from the second step of the regression showed that parental divorce exposure ( $F = 4.06, p < .05$ ) and current sibling contact ( $F = 308.39, p < 0.001$ ) were significant predictors of adult sibling warmth, over and above the control variables. However, parental divorce exposure was not significantly moderated by current sibling contact to predict adult sibling warmth ( $F = 2.22, p > .05$ ). Among the control variables, parents' income ( $F = 4.18, p < .05$ ), siblings' birth order ( $F = 5.29, p < .05$ ) and siblings' geographical proximity ( $F = 31.14, p < .001$ ) also significantly predicted adult sibling warmth.

Regarding sibling conflict in the full sample of 1,052 emerging adults, the whole model reliably predicted adult sibling conflict ( $F = 4.72, p < .001$ ). This model accounted for 6.6% of the variance in ASRQ conflict subscale scores at step 1 and 7.0% of the variance at step 2 (see Table 6), and thus there was a change of only 0.4% between the first and second steps. However, results from the second step of the regression showed that neither parental divorce exposure ( $F = 2.13, p > .05$ ), nor current sibling contact ( $F = 1.75, p > .05$ ) significantly predicted adult sibling conflict. Furthermore, parental divorce exposure was not significantly moderated by current sibling contact to predict adult sibling conflict ( $F = 2.71, p > .05$ ). Among the control variables, siblings' gender match ( $F = 4.35, p < .05$ ), their birth order ( $F = 6.53, p < .05$ ) and their geographical proximity ( $F = 9.22, p < .01$ ) all significantly predicted adult sibling conflict.

Regarding sibling rivalry in the full sample of 1,052 emerging adults, the whole model reliably predicted adult sibling rivalry ( $F = 3.39, p < .001$ ). This model accounted for 4.8% of the variance in ASRQ rivalry subscale scores at step 1 and 4.9% of the variance at step 2 (see Table 7), and thus there was a change of only 0.1% between the first and second steps. However, results from the second step of the regression showed that neither parental divorce exposure ( $F = 1.01, p > .05$ ), nor current sibling contact ( $F = 3.79, p > .05$ ) significantly predicted adult sibling rivalry. Furthermore, parental divorce exposure was not significantly moderated by current sibling contact to predict adult sibling rivalry ( $F = 0.90, p > .05$ ). Among the control variables, only siblings' age gap ( $F = 11.72, p \leq .001$ ) significantly predicted adult sibling rivalry.

In order to illuminate how the adult sibling relationship may be affected by the subjects' age at the time of parental divorce, a second set of three regressions were also run using the subsample of the 296 individuals who had previously been exposed to parental divorce (i.e., one regression for each outcome: adult sibling warmth, conflict, rivalry). This second set of

regressions all utilized a similar model to the first set of regressions, where the only difference was to replace the variable measuring parental divorce exposure with a variable measuring the subjects' age at the time when their parents divorced.

Regarding sibling warmth in the subsample of 296 adults previously exposed to parental divorce, the whole model reliably predicted adult sibling warmth ( $F = 14.73, p < .001$ ). This model accounted for 52.5% of the variance in ASRQ warmth subscale scores at step 1 and 52.7% of the variance at step 2 (see Table 8), and thus there was a change of only 0.2% between the first and second steps. But although second step regression results showed that current sibling contact significantly predicted adult sibling warmth ( $F = 36.42, p < .001$ ), subjects' age at the time of their parents' divorce ( $F = 1.07, p > .05$ ) did not. Furthermore, subjects' age at the time of their parents' divorce was not significantly moderated by sibling contact to predict adult sibling warmth ( $F = 0.72, p > .05$ ). Among the control variables, only siblings' geographical proximity ( $F = 8.08, p < .05$ ) significantly predicted adult sibling warmth.

Regarding sibling conflict in the subsample of 296 adults previously exposed to parental divorce, the whole model reliably predicted adult sibling conflict ( $F = 2.77, p < .01$ ). This model accounted for 16.2% of the variance in ASRQ conflict subscale scores at step 1 and 16.8% of the variance at step 2 (see Table 9), and thus there was a change of only 0.6% between the first and second steps. However, results from the second step of the regression showed that neither subjects' age at the time of their parents' divorce ( $F = 0.47, p > .05$ ) nor current sibling contact ( $F = 0.55, p > .05$ ) significantly predicted adult sibling conflict. Furthermore, subjects' age at the time of their parents' divorce was not significantly moderated by current sibling contact to predict adult sibling conflict ( $F = 1.09, p > .05$ ). And among the control variables, only siblings' geographical proximity ( $F = 8.51, p < .01$ ) significantly predicted adult sibling conflict.

Regarding sibling rivalry in the subsample of 296 adults previously exposed to parental divorce, the whole model reliably predicted adult sibling rivalry ( $F = 2.32, p < .05$ ). This model accounted for 10.7% of the variance in ASRQ rivalry subscale scores at step 1 and 13.6% of the variance at step 2 (see Table 10), and thus there was a change of 2.9% between the first and second steps. Results from the second step of the regression showed that both subjects' age at the time of their parents' divorce ( $F = 7.95, p > .01$ ) and their current sibling contact ( $F = 4.68, p > .05$ ) significantly predicted their adult sibling rivalry. Subjects' age at the time of their parents' divorce was also significantly moderated by current sibling contact to predict adult sibling rivalry ( $F = 4.92, p > .05$ ), and a plot of this significant interaction is presented in Figure 1. Among the control variables, siblings' age gap ( $F = 7.88, p < .01$ ), their birth order ( $F = 8.57, p < .01$ ), and the interaction between the two ( $F = 11.12, p \leq .001$ ) all significantly predicted adult sibling rivalry.

### *Secondary Analyses*

In order to explore possible mechanisms underlying the relationship between parental divorce and emerging adults' sibling relationship quality, we ran a secondary analyses to test for mediation using the Baron and Kenny (1986) method. We first tested whether subjects' self-efficacy or their attachment style significantly mediated the relationship between parental divorce exposure and their adult sibling relationship quality. In addition, we tested whether the association between subjects' age at the time of their parents' divorce and their adult sibling relationship quality was mediated by subjects' self-efficacy or their attachment style (i.e. either their attachment anxiety or attachment avoidance) However, the present data did not support the mediation hypotheses. That is, neither attachment anxiety, nor attachment avoidance, nor self-efficacy significantly mediated adult sibling warmth, conflict, or rivalry in either the full sample

of 1,052 emerging adults or the smaller subsample of 296 subjects previously exposed to parental divorce. Specifically, in the full sample of 1,052 participants, parental divorce exposure did not significantly predict attachment anxiety ( $F = 0.67, p > .05$ ), attachment avoidance ( $F = 2.87, p > .05$ ), or subjects' self-efficacy ( $F = 0.46, p > .05$ ). In addition, in the subsample of 296 participants from divorced families, subjects' age at the time of their parents' divorce also did not significantly predict attachment anxiety ( $F = 0.01, p > .05$ ), attachment avoidance ( $F = 0.12, p > .05$ ), or subjects' self-efficacy ( $F = 1.92, p > .05$ ). Thus, the Baron and Kenny (1986) method could not be successfully completed, and consequently all mediation tests were non-significant.

### Discussion

In support of hypothesis 1, a major finding for this study concerns the importance of parental divorce exposure on sibling warmth in emerging adulthood. Although there were no significant links between parental divorce exposure and sibling conflict or rivalry, findings found that parental divorce exposure exerted a significant and unique effect on adult sibling warmth, above and beyond the effects of numerous control variables, including parents' income, siblings' geographical proximity, age gap, birth order, and gender differences. However, findings did not support hypotheses 2, as parental divorce exposure was not significantly moderated by current sibling contact to predict adult sibling relationship quality in the full sample of 1,052 emerging adults. In addition, data did not support hypotheses 3 or 4, as neither subjects' self-efficacy nor their attachment style significantly mediated the relationship between parental divorce exposure and emerging adults' sibling relationship quality.

Parental divorce exposure's significant link to adult sibling warmth, but not adult sibling conflict or rivalry, may point to possible sibling estrangement in the aftermath of parental

divorce. Although conflict and rivalry are two negative ways of being engaged with one's sibling, they are nevertheless signs of siblings' continued engagement with one another. On the other hand, decreased sibling warmth potentially signals that the sibling relationship is growing cold or may even indicate the lack of an ongoing relationship altogether. One possible explanation for these findings is that through the act of divorce, parents are sending their offspring the message that the family is dissolving, but these messages do not manifest as part of the sibling relationship until offspring move out of their childhood home and no longer consider their sibling relationships as obligatory.

It is important to note that if maintaining healthy sibling relationships did not require much initiative or effort, then it is unlikely that an obstacle such as parental divorce would get in the way of healthy adult sibling relationships. However, congruent with the sibling estrangement hypothesis, findings from both the full sample of 1,052 emerging adults as well as the subsample of 296 adults exposed to parental divorce showed that higher self-efficacy significantly predicted higher adult sibling warmth. In parallel, results from the full sample found that lower self-efficacy resulted in higher adult sibling conflict. Furthermore, being geographically close to one's sibling was not sufficient for maintaining positive sibling relationships, as findings from both samples showed that closer geographical proximity was significantly associated with lower adult sibling warmth and higher adult sibling conflict. Together, these findings suggest that being geographically close is not enough to maintain a positive adult sibling relationship and that keeping a warm adult sibling relationship requires considerable self-advocacy and initiative. These results may also explain why neither subjects' self-efficacy nor attachment style were significant mediators of the relationship between parental divorce exposure and the adult sibling relationship. That is, parental divorce exposure may not act on the adult sibling relationship

through the mechanisms of attachment or self-efficacy, but rather parental divorce exposure may lead to sibling estrangement by exacerbating the general developmental tendency for siblings to individuate once they reach emerging adulthood and leave their childhood home.

The present evidence of sibling estrangement may affect siblings differently based on their gender makeup. Specifically, since females are often socialized to take on the role of maintaining bonds between kin (Hagestad, 1986; Silverstein & Bengtson, 1997), sibling estrangement may lead females to experience greater emotional distress than their male counterparts. In contrast, male-male siblings and male-female sibling dyads have been found to have significantly less contact than female-female siblings (Lee, Mancini, & Maxwell, 1990) and researchers have noted that past work shows male-male siblings to have poorer sibling relationships (Matthews, Delaney, & Adamek, 1989). Thus, it is possible that sibling estrangement may be least distressing and most exacerbated amongst male-male sibling dyads. On the other hand, male-female sibling dyads may have both the highest levels of estrangement and distress, because such siblings could potentially become stuck in a maladaptive pattern where the sister wishes to engage in conflict to reach resolution while the brother wishes to avoid conflict by shunning contact. That is, after the brother and sister pull away from one another, the sister may become distressed and attempt to reach out to her brother. During such contact, the sister may then attempt to process her distress through sibling conflict, which inadvertently pushes the brother even further away and escalates the sibling estrangement. This interpretation (i.e., that brothers respond to sisters' attempts at conflict with increased estrangement) is congruent with the present findings, where parental divorce exposure predicted a pattern of increased sibling estrangement but not a pattern of increased sibling conflict. This interpretation could also explain why siblings' gender match (i.e., whether siblings were male-female or the



same sex: male-male or female-female) was a significant predictor of adult sibling conflict in the full sample of 1,052 emerging adults.

Unfortunately, the present data set does not allow for an empirical investigation into the above theory that different sibling gender makeups have different perceived distress levels over sibling estrangement, which in turn may influence their motivation to contact one another as well as their contact patterns. Specifically, the present data set did not measure subjects' perceived distress related to sibling estrangement or how perceived distress may alter siblings' contact motivations and/or contact patterns. Future studies are needed that directly measure these issues related to sibling estrangement, as such studies could expand on the present results by exploring how gender differences in perceived distress over sibling estrangement may mediate the relationship between parental divorce exposure and sibling estrangement in young adulthood.

In support of hypothesis 5, a second major finding for this study concerns how the timing of parental divorce influences sibling rivalry in young adulthood. Among participants from divorced families, results found that how old the subjects were when their parents divorced significantly predicted adult sibling rivalry, above and beyond the effects of numerous control variables, including parents' income during subjects' childhoods as well as siblings' geographical proximity, age gap, birth order, and gender differences. Furthermore, subjects' age at the time of their parents' divorce significantly predicted adult sibling rivalry, but not adult sibling warmth or conflict. In addition, results supported hypothesis 6, as subjects' age at the time of their parents' divorce significantly interacted with current sibling contact to predict adult sibling rivalry. But data did not support hypotheses 7 or 8, as neither subjects' self-efficacy nor their attachment style significantly mediated the relationship between subjects' age at the time of their parents' divorce and their adult sibling relationship quality.

These findings have implications for parents who are questioning whether it would be better for their child's psychological health to divorce when their child is young or to delay their divorce until their child is older (e.g. in their teenage years). Unfortunately, the present results suggest that there is no good time for parents to get divorced between their children's preschool and teenage years, as evidence found no offspring age group that resulted in high sibling contact and low sibling rivalry in young adulthood. That is, offspring who were able to keep close contact with their siblings in young adulthood were largely unaffected by the time at which their parents divorced, showing high but stable adult sibling rivalry regardless of when their parents divorced. In contrast, those siblings with currently low levels of contact evidenced a sharp increase in adult sibling rivalry depending on the time at which their parents divorced. And although the lowest level of adult sibling rivalry occurred among those young adults who had low contact with their siblings and whose parents divorced when they were young children, this is not necessarily indicative of a healthy adult sibling relationship. Rather, a pattern of low adult sibling contact and low adult sibling rivalry may suggest that these siblings have a distant or estranged relationship in young adulthood.

Findings may also illuminate divorce's lasting impact on family dynamics, as well as how developmental age affects offspring's reaction to parental divorce. The group most suggestive of sibling estrangement was among low-contact adult siblings who were preschoolers on average when their parents divorced (i.e., the low age group mean was approximately 4 years old). One possible explanation for this finding is that when divorce occurs at a young age, children may be more likely to simply accept that their family is dissolving. As a result, already tenuous child sibling relationships may not grow in closeness over time, eventually leaving these siblings estranged in young adulthood when cohabitation no longer makes their sibling

relationship a requirement. This is also congruent with findings from hypothesis 1 suggesting post-divorce sibling estrangement in young adulthood. In contrast, the subjects with the highest amount of adult sibling rivalry were low-contact adult siblings who were teenagers on average when their parents divorced (i.e., the high age group mean was approximately 17 years old). One possible explanation for this finding may be because teenagers are negotiating the developmental task of identity formation, and therefore part of their self-identity may be entangled with their family's identity. Indeed, past research has found that adolescents' identity formation is significantly associated with their parent-child relationships, suggesting that adolescents' identities are formed within the context of the family (Cooper, Grotevant, & Condon, 1983; Grotevant & Cooper, 1985). When divorce occurs and the family identity shifts from an integrated unit into disintegration, teenagers may feel as if they are losing an important piece of their own self-identity. If teenagers experience their own identity as disintegrating after divorce, they may attempt to strongly re-align with each of their parents individually in order to regain a sense of self-integration. However, the time and attention of the non-custodial parent can often become a rare resource after divorce. Studies have estimated that 80-85% of custody cases result in the mother obtaining sole custody of the children, with father visitation (Kelly, 2007), and non-custodial fathers also evidenced dramatic losses in contact after divorce, suggesting that these fathers disengage from their children as a psychological response to the loss of their intact family (Kruk, 1991). It is possible that the logistical or emotional unavailability of the non-custodial parent may re-ignite or re-intensify teenagers' sibling rivalry to such an extent that it lasts into young adulthood. This may also partially illuminate why subjects' age at the time of parental divorce exerted significant effects on adult sibling rivalry but not conflict, as increasing

the amount or intensity of sibling conflict is not likely to effectively entice the care and attention of an unavailable parent.

Alternatively, siblings may choose sides, where one sibling aligns with one parent while the other sibling aligns with the other parent. Siding with different parents may confer additional risk to the sibling relationship because via the experience of parental divorce, siblings are simultaneously being given the message that irreconcilable differences can lead to the dissolution of a once-intimate relationship. As a result, it is possible for parental divorce to teach siblings to associate personal differences with incompatibility. If siblings differentiate from one another by aligning their loyalties and identities to different parents, then they may also view themselves as having irreconcilable differences with one another, which may ultimately lead to their estrangement in young adulthood.

The above interpretations may also explain why sharp differences in sibling rivalry across age groups occurred only among those with low (and not high) adult sibling contact. That is, siblings who have never been close are more likely to treat their sibling relationships as secondary to their parent-child relationships, and thus are more likely to sacrifice sibling relationship quality in order to meet their parents' needs (or what they perceive as the needs of their parents). For example, siblings who have never been close may be more likely to change their sibling relationship, either by breaking it up in order to internalize their family's dissolution or by intensifying their sibling rivalry in order to re-affirm their alignment to a particular parent. In contrast, siblings who have always maintained high contact may be more likely to give their sibling enough priority that their sibling relationship would be unaffected by the parental divorce, instead acting out their distress in other ways. This explanation is congruent with the

findings of the present study, where adults with high sibling contact showed stable levels of adult sibling rivalry regardless of their age at the time of their parents' divorce.

In addition, such sibling rivalry is also likely to affect siblings differently based on their gender makeup. Studies have noted that mothers have better relationships with daughters, while fathers spend more time and have better relationships with sons (Raley & Bianchi, 2006; Starrels, 1994). As a result, sibling rivalry over an unavailable non-custodial parent is likely to be highest among same-sex siblings who live with their opposite sex-parent. Indeed, studies have found that opposite-sex offspring endorsed a longing to live with the same-sex parent, leading researchers to consider if offspring who live with their opposite-sex parent may develop deep concerns about whether their allegiance is with their caretaking opposite-sex parent or their non-custodial same-sex parent (Buchanan, Maccoby, & Dornbusch, 1991; Warshak & Santrock, 1983). And since mothers are most often the custodial parent after divorce (Kelly, 2007), this means such rivalry would be most likely to occur among male-male sibling dyads with non-custodial fathers. Furthermore, although it is less common, female-female sibling dyads could also experience such rivalry if they live with their father and have a non-custodial mother. In contrast, the lowest levels of sibling rivalry may be among male-female sibling dyads, as such siblings are likely to align with parents along gender lines (i.e., sisters aligning with mothers and brothers aligning with fathers) and therefore would not be in competition for the same parent's attention. However, as previously stated, siding with separate parents has the potential to exacerbate estrangement among siblings. Unfortunately, the present data set did not measure which parent was custodial and which parent was non-custodial, and thus it was not possible to empirically test the above hypothesis about whether siblings' gender makeup may influence competition over a non-custodial parent, thereby increasing sibling rivalry. Future studies are

needed to directly measure custody status of each parent and obtain offspring's reports about the extent to which such custody arrangements influenced the intensity of their sibling rivalry.

In sum, there appear to be two trajectories that most typically occur for siblings after divorce. For those siblings whose parents divorced when they were young children, it appears such siblings may be more unquestioning and thereby accept their family's dissolution, thus growing more and more estranged from one another in the aftermath of their parents' divorce. Alternatively, for those siblings whose parents divorced when they were teenagers, it appears such siblings may feel as if they are losing an important piece of their self-identity and thus may attempt to take sides, increasing their sibling rivalry. The intensity of this rivalry depends on whether or not the siblings put their relationship ahead of their parent-child relationships.

The present results have clinical implications for divorce therapy. Although family therapy approaches have emphasized attending to the sibling subsystem in divorce cases, the primary focus of treatment for many therapists has been the relationships between divorcing parents and their children (Isaacs, Montalvo, & Abelson, 1986; Nichols, 1986). For therapists primarily focusing on parent-child issues, therapy may typically look as follows: In cases where divorce is being considered, clinicians may provide guidance to help parents understand that their potential divorce will likely do lasting damage to their children's psychological health. Furthermore, in cases where divorce is currently in progress, clinicians may focus on stabilizing the relationship between children and their divorcing parents by conducting joint sessions where parents can use the therapy room as a safe space to explain the meaning of their divorce to their children. Such therapy sessions may also help explain the divorce process in order to give the children an understanding of what to expect and what will happen next (e.g., explaining that the children will live with one parent and see the other parent on weekends). Clinicians may also

take time with each child individually to help them understand that it is not their fault that their parents are getting divorced, as well as help them to process grief associated with the loss of their intact family (Isaacs, et al., 1986). However, present evidence supports a family systems approach to divorce therapy, suggesting that clinical interventions do not go far enough if they stop at the parent-child relationship without considering sibling relationships. Specifically, present data emphasizes the importance of helping parents understand that their divorce will likely damage their children's sibling relationships in addition to damaging each individual child's psychological health and parent-child relationship.

Providing information about divorce's negative impact on sibling relationships could potentially reinvigorate parents' motivation to work on their marriage or even prevent some parents from going through with an imminent divorce. Divorce effects on sibling relationships may be especially persuasive for preventing divorce because parents are not directly involved in the development of such effects. Past literature has demonstrated that individuals possess a deep need for the psychological perception of control and that they often change their behaviors in order to meet this need (Rothbaum, Weiss, & Snyder, 1982). It is possible that when informed about parent-child divorce effects, parents may believe on some level that they are in more of a position to control the extent to which their children are hurt by their divorce because they perceive such effects as direct responses to their actions. Indeed, explaining parent-child divorce effects may inadvertently enable parents to feel more in control and comfortable with the idea of getting divorced rather than effectively communicating how out of control parents will be regarding the effects on their children. That is, parents may leave such marriage counseling sessions with the belief that they now know which negative effects could potentially occur and as a result they will be able to stop these effects from occurring. In contrast, parents are not direct

participants in the divorce effects on sibling relationships, and thus such information may more effectively communicate how divorce can produce negative effects that extend beyond the scope of parental intervention or parental control.

Furthermore, the present results have clinical implications for how therapists may work with sibling offspring going through parental divorce. With regard to young children, therapists should intervene in the dissolution of sibling bonds after divorce by helping siblings understand that their sibling relationship can survive the breakup of their parents' marriage. With young child siblings, therapists could hold joint sessions with siblings and without parents, and play out scenarios where the siblings help each other when parents are not around, alongside messages such as, "Wow, you are always such caring sisters even when your mom and dad can't be around!" or "Brothers are best buds for life!" These child sessions should be accompanied by collateral parent sessions encouraging divorcing parents to increase their children's sibling contact as much as possible, as present evidence has shown that high sibling contact stabilizes the extent to which sibling rivalry is influenced by the timing of parental divorce.

With older children and teenagers, therapists can teach how sibling relationships are one of the longest lasting and most important relationships a person can have, and thus how important it is to work at having a good relationship with one's sibling. In addition, current data indicates that therapists should focus on issues of sibling rivalry surrounding the unavailable parent following divorce, as well as whether siblings are each identifying/aligning with different parents in order to differentiate themselves from one another. In the case of increased post-divorce sibling rivalry, therapists can intervene by having joint sessions with adolescent siblings in order to help them communicate their feelings of jealousy towards one another, as well as help them connect how their rivalrous feelings relate to post-divorce parental unavailability. In cases



where adolescent siblings are each aligning with different parents, therapists should explore whether such identification/alignment may be connected to the belief that the siblings are too different to maintain a relationship, and whether such beliefs may be connected to the experience of seeing their parents have irreconcilable differences that split them apart. When appropriate, therapists can then challenge the maladaptive belief that the siblings are irreconcilably different by noting how they were raised together, have faced great difficulties together, and have intimate knowledge of one another. Therapists can then work to challenge the core belief that differences result in incompatibility by showing that the therapeutic relationship was able to survive differences between the patient and therapist. Specifically, therapists can use this experience to teach that even if two people are very different, they can find enough common ground to have joyful, meaningful, and even profound experiences with one another.

Lastly, the present study has clinical implications for exploring issues of sibling estrangement in adult patients with a history of parental divorce, as well as fostering reconnection between estranged adult siblings. For example, therapists may explore whether a depressed patient's overall sense of loneliness or deprivation may be partially due to the loss of sibling support, which may then connect further back to the experience of parental divorce. In addition, patients with divorced parents may not connect their poor sibling relationships to their parents' divorce, or may even be completely unaware that siblings could be lasting or even lifelong sources of support. In such cases, therapists can help their patients forgive siblings for past transgressions by exploring the role those transgressions may have played in putting parent-child relationships ahead of sibling bonds. Therapists can then encourage such patients to contact their siblings and foster reconnection.

### Limitations and Future Directions

A primary limitation of the present study is its use of the Stocker, Lanthier, and Furman (1997) sibling contact scale, which is an older contact scale that does not capture many modern electronic methods of contact between siblings. Specifically, the current scale only focuses on telephone and face-to-face contact, but does not include text messaging, email, social networking (e.g. Facebook), and cell phone contact between siblings. This limitation may be especially salient for emerging adult siblings, who may primarily connect through social networking sites and only secondarily connect through face-to-face discussions or telephone conversations. Thus, while unlikely, it is possible that siblings from divorced families are not becoming estranged but instead may be relegating all their contact to social networking status updates. Future studies are needed to create new scales or modify the Stocker, Lanthier, and Furman (1997) scale in order to gain a more comprehensive measure of sibling contact, including contact via modern forms of electronic communication, and replicate the present findings of sibling estrangement using these new or modified scales. Another limitation of the present study is that the Internet does not yet allow for randomized or probabilistic sampling (Andrews, Nonnecke, & Preece, 2003), thus leaving the present study vulnerable to sampling selection bias. Although past research has suggested Internet surveys are comparable to traditional paper-and-pencil surveys in terms of age and socioeconomic status (Gosling, et al., 2004; Kaplowitz, et al., 2004; Ritter, et al., 2004), Internet survey populations may still differ from the general population. Specifically, since Internet survey participation requires ownership of or access to a personal computer with Internet access, participants may be of a higher socioeconomic status. Furthermore, Internet survey participants must have a working knowledge of modern technology, a skill which is often easier for young people to grasp. In addition, because the present study was conducted over the

Internet, there was also no way of controlling for environmental factors while participants took the survey, such on-screen or off-screen auditory and visual distractions. And regardless of past research showing comparability between Internet and traditional sampling methods, future studies are needed to replicate the current findings with traditional paper-and-pencil surveys.

The present study took a number of precautions in order to attenuate the influence of potential age and socioeconomic sampling bias as well as the lack of a controlled laboratory environment. First, although auditory and visual distractions may be a significant confound in studies assessing current mood or stress levels that fluctuate based on environmental factors, the current study design focused on stable constructs, such as general belief systems and current family relationships. Thus, although this Internet study did not benefit from a controlled laboratory's low level of distractions, the constructs under study were chosen because they did not rely on capturing current stress or mood states which may fluctuate based on environmental factors. Second, the central research questions only concerned effects on young adults aged 18-29 years, limiting the potential for age skew due to Internet sampling. Third, the survey design included a question regarding parents' income during the subjects' childhood in order to control for any skew in the socioeconomic status of the participants that may have been the result of Internet sampling. The inclusion of this control variable proved beneficial after the present sample was compared against U.S. Census data from 1980 and 1990 (i.e. subjects aged 18-29 years circa 2009 were born between 1980 and 1991) and found that parents' income was higher than the general population of the United States of America. According to the 2010 U.S. Census, 43.6% and 47.3% of households in 1980 and 1990 respectively made \$50,000 or more annually (U.S. Census Bureau, 2010) whereas 73.8% of the full sample and 66.6% of the subsample from the present study reported that their family's annual income while growing up was \$45,000 or

more. The difference between the current study sample and the general population emphasizes that it is important for future Internet studies to include control variables that measure indicators of socioeconomic status, such as parents' income.

However, despite the presence of a control variable for parents' income level, the present study design is still limited by a lack of sensitivity to divorce-related issues, which may leave unaccounted variability in the study's measures of socioeconomic status. That is, because the present study is a secondary analysis of a previously collected data set that was not primarily focused on divorce, measures were not tailored to issues surrounding the divorce process. Specifically, the income question stating, "What was the approximate total income of your family/household when you were growing up?" becomes an ambiguous question in cases where families are broken apart by divorce. Studies have shown significant negative economic consequences of divorce, especially for mothers who are most often the custodial parents (Weitzman, 1985). Specifically, women have been shown to have a 27% drop in their standard of living versus only a 10% drop in standard of living for men (Peterson, 1996). As a result, a more comprehensive answer to the income question in the present study may also rely on subjects' answers to other questions, such as which parent they lived with after the divorce. In addition, subjects were not instructed about whether to estimate the pre-divorce or post-divorce family income, leaving room for variability in subjects' responses. Specifically, when estimating the total income of their parents, some subjects may have recalled their parents' shared income prior to the divorce, others may have added up the two separate incomes of their divorced parents, and others may have merely estimated the income of their one-parent post-divorce household. Thus, despite the presence of a control variable measuring parents' income, current findings are likely

to be more generalizable to individuals with high socioeconomic status, and future studies are needed to replicate findings with more divorce-sensitive measures of socioeconomic status.

The study's design is also limited by its lack of divorce-related questions about income dynamics in addition to a question about income level. Studies have suggested that in addition to total family income, income dynamics may influence parents' divorce risk by increasing family tensions (Lyngstad, 2011). That is, couples where wives work for pay, work long hours, or make equal or greater salaries than their husbands have been shown to have a greater risk of separation and divorce compared to couples where the wives do not work, do not work long hours, or make less money than their husbands (Amato, Booth, Johnson, & Rogers, 2007; Brines and Joyner, 1999; Kalmijn, Loeve, & Manting, 2007). It is possible that parents' income dynamics may affect sibling relationships a greater extent than income level itself, as income dynamics are more likely to impact tensions in the family system. More study is needed into the role that income dynamics may play in exacerbating family tension during and after parental divorce, and whether this mechanism may negatively impact sibling relationships in childhood and young adulthood.

Subjects may have found it similarly difficult to estimate an answer to the question, "If your parents divorced, what age were you when your parents first divorced?" For example, some parents may separate for a long period without getting officially divorced. In addition, some divorce processes may end quickly while other divorces have a long, drawn out custody battles that delay the resolution of the divorce process. As a result, subjects may have had a hard time estimating whether they were being asked for their age at the time of their parents' separation, the moment when the divorce process began, or the moment when the divorce process ended and their parents became officially divorced. Future studies should include more detailed questions

about the divorce process, such as the subjects' age when parents first separated, their age when the parents first began the divorce process, and their age when their parents' divorce was finalized. These additional questions will give us insight into the length of the divorce battle, as well as greater precision regarding subjects' age when their families were first disrupted.

In addition, because the current study was a secondary analysis of a data set that did not focus on divorce, the current study was limited by a lack of variables measuring the parents' marital relationship and the parent-child relationships before and after divorce. For instance, the present study did not include variables measuring the extent to which the parental divorce was amicable between the parents and the amount of contact that the parents have with each other and with the offspring before versus after the divorce. The present study also did not measure subjects' or family members' perceptions about why the divorce occurred, including the extent of marital conflict before and after the divorce, whether or not domestic violence was present, who hurt whom, and the extent to which domestic violence influenced the decision to get divorced. It is possible that these factors could alter how the sibling relationship is experienced as well as how the siblings experience and cope with their parents' divorce. Future studies are needed to elucidate whether there are different kinds of divorce have different effects on emerging adult sibling offspring, such as amicable divorce versus high conflict divorce or divorce in the aftermath of domestic violence.

The present study was also limited by a lack of data about the temperament of the parents and sibling offspring. For example, an alternate explanation of the present findings is that temperamentally cold individuals were drawn to one another, then married and had temperamentally cold offspring. In such cases, temperamental coldness could have led to their divorce, and thereby would be the extraneous factor responsible for evidence of divorce as well

as evidence of decreased warmth in the sibling relationship. Future studies are needed to replicate findings while controlling for the individual temperament of each of the family members.

The present study is also limited by its inclusion of participants with more than one sibling. This study design choice was not a limitation when the original purpose was only to create a control group that would stand in contrast to siblings of individuals with developmental disabilities. However, for the present secondary analysis into divorce effects, some error may have been introduced by study instructions asking participants to think about a sibling of their choice and answer questions related to that sibling. These participants may have been guided by sibling relationship factors when deciding which sibling to think about. Specifically, participants with more than one sibling may have been more likely to speak about their favorite or least preferred sibling relationship than their most unremarkable sibling relationship. It is important to note that this tendency would likely skew results towards high conflict or high warmth, whereas the present results found low warmth and no significant results regarding conflict. Nevertheless, future studies are needed to correct for this limitation by either restricting participants to those with only one sibling or by including a control variable measuring the number of children in subjects' immediate families.

The present study was also limited by a lack of mother reports, father reports, or reports from the other sibling regarding the quality of the offspring sibling relationship. Logistical limitations prevented us from obtaining these alternate reports regarding the offspring sibling relationship. Such data is often difficult to collect because family members may not be on speaking terms, and thus a large team effort as well as significant time and financial incentives are necessary to persuade these family members to come and speak about their painful past

experiences with this frequently distressing topic. However, if future studies are able to obtain these family reports, all the data could be combined and analyzed to present a more complex and accurate picture of the sibling relationship quality after divorce. Future large-scale studies should direct a significant portion of their grant funding to obtaining reports from multiple family members and attempt to replicate the present findings with their richer data set. Another limitation of the current study is that it had a larger percentage of females than males, with the full sample of 1,052 subjects being 79.1% female and the subsample of 296 participants being 79.7% female. One possible reason for this gender skew might have been that the survey focused on sibling relationships, which may have been a family-oriented topic area that appealed more to women. Women are often socialized into nurturing roles, and as such are often asked to protect and sustain the connections between kin (Hagestad, 1986; Silverstein & Bengtson, 1997). Indeed, during survey recruitment we noted this gender skew and responded by only putting out recruitment flyers and posts asking for male participants. However, even after attempting to correct for sampling skew, incoming survey participants remained majority female. Similarly, the present study is limited by a low number of participants who identify as ethnic minorities, with 66.1% of the full sample and 72% of the subsample identifying as Caucasian. As a result, the present results are likely to be more generalizable to Caucasian families with siblings containing at least one female than male-only siblings.

Lastly, future studies are needed to clarify how separation, individuation, and identity formation impact the relationship between parental divorce exposure and adult sibling relationship quality. Specifically, the present results suggested that parental divorce may increase the risk of sibling estrangement because young adult offspring may individuate themselves from their sibling relationships during the process of separating from their parents by leaving their



childhood home. However, these interpretations need more study, as the present survey did not directly measure how parental divorce may have affected subjects' identity formation, the timing of their developmental milestones related to separation and individuation, or how these factors may be connected to their sibling relationships. An additional limitation is that the present study was cross-sectional and used retrospective accounts, with subjects recalling and recording time-related variables, such as their age at the time of their parents' divorce. Thus, prospective longitudinal studies are needed to correct for this limitation, replicate the present results, and expand upon the present findings by including additional scales that measure offspring's developmental tasks and how these tasks relate to sibling relationships after parental divorce.

Another future direction relates to the positive aspects of the sibling relationship in emerging adults exposed to parental divorce. That is, although this study focused on the dysfunctional aspects of sibling relationships after divorce, the data also suggests that many of the family dynamics are also quite normative post-divorce. For example, data suggests that siblings closer in age have higher rivalry with one another and that female sibling pairs have greater contact than male sibling pairs, and this data is generally what we would expect to see in typically developing families. The presence of such normality in the data set serves as a check on our sample's representativeness (i.e. it serves as evidence that we did not sample abnormal individuals). In addition, from a positive psychology standpoint, the normality present in the data set also serves to note that while divorce may result in deleterious effects on sibling relationships, the individuals in these relationships appear to be displaying normally and displaying typical age and gender characteristics. Future studies are needed to follow-up upon the present findings from this positive psychology standpoint by investigating when estranged siblings do choose to bond, what the patterns are when these siblings bond, the extent to which

their bonding occurs over issues related to their parents' divorce, and what goes right when outlying adult siblings do not show evidence of sibling estrangement in the aftermath of parental divorce.

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## Appendix

1. The full text of the classified advertisements distributed to obtain respondents for the first phase of the study's data collection read, "We are a research team at Columbia University, Teachers College studying sibling relationships. As we all know, sibling relationships can have a significant and enduring impact on our lives. This study is designed to explore these issues in a large and diverse group of people. Our purpose in conducting this survey is to understand how sibling relationships change across the lifespan and influence wellbeing. We hope that you can contribute to this effort. More information on these topics will be provided to you after completing the survey. If you are 18 or older and have a sibling, we invite you to click the link below to participate in our survey!"
2. The full text of the instructions that participants were given at the beginning of the survey instructing them to choose a specific sibling (to think about and answer questions about) read, "This questionnaire is concerned with your relationship with one of your siblings. Please select one of your siblings and answer the questions as they pertain to this sibling. Each question asks you to rate how much different behaviors and feelings occur in your relationship. Try and answer each question as quickly and accurately as you can. Try and answer the questions as your relationship is now, not how it was in the past, nor how you think it might be in the future. For the remainder of this questionnaire, whenever you see THIS SIBLING or YOUR SIBLING we are talking about the specific sibling you are completing the study about."

Table 1  
*Descriptive Data for Study Demographics*

| Demographics                        |                        | Full Sample (n=1,052) |       |      | From Divorced Families (n=296) |       |      |
|-------------------------------------|------------------------|-----------------------|-------|------|--------------------------------|-------|------|
| Age                                 |                        | Range                 | M     | SD   | Range                          | M     | SD   |
| Subject                             |                        | 18-29                 | 22.73 | 3.26 | 18-29                          | 22.72 | 3.53 |
| Sibling                             |                        | 0-54                  | 23.02 | 5.87 | 1-42                           | 22.76 | 6.06 |
|                                     |                        | %                     |       |      | %                              |       |      |
| <b>Gender</b>                       |                        |                       |       |      |                                |       |      |
| Subject                             | Male                   |                       | 20.9% |      |                                | 20.3% |      |
|                                     | Female                 |                       | 79.1% |      |                                | 79.7% |      |
| Sibling                             | Male                   |                       | 46.8% |      |                                | 43.4% |      |
|                                     | Female                 |                       | 53.2% |      |                                | 56.6% |      |
| <b>Birth order</b>                  |                        |                       |       |      |                                |       |      |
| Subject                             | Firstborn              |                       | 39.9% |      |                                | 42.2% |      |
|                                     | Secondborn             |                       | 37.0% |      |                                | 33.0% |      |
|                                     | Third or laterborn     |                       | 23.0% |      |                                | 24.9% |      |
| Sibling                             | Firstborn              |                       | 37.6% |      |                                | 35.5% |      |
|                                     | Secondborn             |                       | 43.2% |      |                                | 45.6% |      |
|                                     | Third or laterborn     |                       | 19.2% |      |                                | 18.9% |      |
| <b>Parental divorce status</b>      |                        |                       |       |      |                                |       |      |
|                                     | From intact family     |                       | 71.9% |      |                                | --    |      |
|                                     | From divorced family   |                       | 28.1% |      |                                | 100%  |      |
| <b>Family's ethnicity</b>           |                        |                       |       |      |                                |       |      |
|                                     | White/Caucasian        |                       | 66.1% |      |                                | 72.0% |      |
|                                     | Hispanic/Latino        |                       | 7.1%  |      |                                | 9.1%  |      |
|                                     | Black/African-American |                       | 4.4%  |      |                                | 9.1%  |      |
|                                     | Asian/Pacific-Islander |                       | 14.8% |      |                                | 3.4%  |      |
|                                     | Other                  |                       | 7.5%  |      |                                | 6.4%  |      |
| <b>Level of education completed</b> |                        |                       |       |      |                                |       |      |
| <b>Subject</b>                      |                        |                       |       |      |                                |       |      |
|                                     | Grade school           |                       | 3.3%  |      |                                | 4.7%  |      |
|                                     | High school            |                       | 46.9% |      |                                | 61.5% |      |
|                                     | College                |                       | 35.4% |      |                                | 25.4% |      |
|                                     | Graduate school        |                       | 14.4% |      |                                | 8.4%  |      |
| <b>Sibling</b>                      |                        |                       |       |      |                                |       |      |
|                                     | Grade school           |                       | 17.9% |      |                                | 6.4%  |      |
|                                     | High school            |                       | 39.8% |      |                                | 33.9% |      |
|                                     | College                |                       | 28.3% |      |                                | 20.4% |      |
|                                     | Graduate school        |                       | 14.0% |      |                                | 10.5% |      |

Table 2  
*Descriptive data for study variables*

| Variables                                    | Full Sample of Emerging Adults<br>(n=1,052) |        |       | Adults Exposed to Parental Divorce<br>(n=296) |        |       |
|--|---|--------|-------|---|--------|-------|
|  | Range                                       | M      | SD    | Range   | M      | SD    |
| 1. Adult sibling warmth                      | 51 – 226                                    | 148.39 | 36.46 | 56 – 225                                      | 143.77 | 41.44 |
| 2. Adult sibling conflict                    | 23 – 105                                    | 52.78  | 16.14 | 23 – 101                                      | 52.84  | 17.40 |
| 3. Adult sibling rivalry                     | 12 – 60                                     | 34.59  | 7.14  | 14 – 59                                       | 34.72  | 6.95  |
| 4. Parental divorce exposure                 | 0 – 1                                       | --     | --    | 0 – 1   | --     | --    |
| 5. Subjects' age at time of parental divorce | --  | --     | --    | 0 – 27  | 10.14  | 6.42  |
| 6. Current sibling contact                   | 4 – 20                                      | 12.10  | 3.46  | 4 – 20  | 12.03  | 3.56  |
| 7. Parents' income                           | 1 – 10                                      | 5.21   | 2.26  | 1 – 10  | 4.70   | 2.14  |
| 8. Sibling's gender match                    | -2 – 1                                      | --     | --    | -2 – 1  | --     | --    |
| 9. Same-sex sibling pairs' gender            | -1 – 1                                      | --     | --    | -1 – 1  | --     | --    |
| 10. Siblings' age gap                        | 0 – 5.57                                    | 1.87   | 0.72  | 0 – 4.69                                      | 1.91   | 0.77  |
| 11. Siblings' birth order                    | 0 – 1                                       | --     | --    | 0 – 1   | --     | --    |
| 12. Siblings' geographical proximity         | 1 – 10                                      | 5.87   | 3.46  | 1 – 10  | 5.93   | 3.30  |
| 13. Subjects' attachment anxiety             | 1 – 6.67                                    | 3.21   | 1.26  | 1 – 6   | 3.22   | 1.25  |
| 14. Subjects' attachment avoidance           | 1 – 6.47                                    | 3.04   | 1.09  | 1 – 6   | 3.15   | 1.11  |
| 15. Subjects' self-efficacy                  | 8 – 28                                      | 20.94  | 3.89  | 8 – 28  | 21.14  | 3.96  |

Table 3

*Intercorrelations of study variables among full sample of emerging adults (n=1,052)*

|   | 1      | 2      | 3     | 4      | 5     | 6      | 7      | 8     | 9     | 10    | 11   | 12    | 13     | 14 |
|---|--------|--------|-------|--------|-------|--------|--------|-------|-------|-------|------|-------|--------|----|
| 1. Adult sibling warmth                       | --     |        |       |        |       |        |        |       |       |       |      |       |        |    |
| 2. Adult sibling conflict                     | -.12** | --     |       |        |       |        |        |       |       |       |      |       |        |    |
| 3. Adult sibling rivalry                      | .13**  | .02    | --    |        |       |        |        |       |       |       |      |       |        |    |
| 4. Parental divorce exposure                  | -.08   | .01    | .02   | --     |       |        |        |       |       |       |      |       |        |    |
| 5. Current sibling contact                    | .64**  | .06    | .07*  | -.01   | --    |        |        |       |       |       |      |       |        |    |
| 6. Parents' income during subjects' childhood | .15**  | .04    | .03   | -.16** | .05   | --     |        |       |       |       |      |       |        |    |
| 7. Siblings' gender match                     | .09    | .14**  | .07   | -.00*  | .13** | -.00   | --     |       |       |       |      |       |        |    |
| 8. Same-sex sibling pairs' gender             | .16**  | .14**  | .04   | .05    | .25** | .01    | .45**  | --    |       |       |      |       |        |    |
| 9. Siblings' age gap                          | -.02   | -.11** | -.05  | .05    | -.03  | -.06*  | .03    | .05   | --    |       |      |       |        |    |
| 10. Siblings' birth order                     | -.00   | .13**  | .14** | .01    | -.00  | -.02   | -.02   | .02   | -.05  | --    |      |       |        |    |
| 11. Sibling geographical proximity            | -.04   | .12**  | .04   | .02    | .23** | -.11** | -.01   | .04   | .01   | .10** | --   |       |        |    |
| 12. Attachment anxiety                        | -.15** | .22**  | -.00  | .02    | -.00  | -.09*  | -.11** | -.05  | -.05  | .03   | .06  | --    |        |    |
| 13. Attachment avoidance                      | .14**  | .13**  | .04   | .07    | -.03  | -.05   | -.09*  | -.09* | -.09* | -.05  | .03  | .43** | --     |    |
| 14. Self-efficacy                             | .23**  | -.16** | -.01  | .03    | -.06  | .11**  | .09*   | .05   | -.03  | -.03  | -.04 | .43** | -.34** | -- |

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

Table 4

*Intercorrelations of study variables among subsample of participants from divorced families (n=296)*

|  | 1     | 2      | 3    | 4     | 5     | 6      | 7     | 8    | 9     | 10   | 11   | 12    | 13     | 14 |
|--|-------|--------|------|-------|-------|--------|-------|------|-------|------|------|-------|--------|----|
| 1. Adult sibling warmth                              | --    |        |      |       |       |        |       |      |       |      |      |       |        |    |
| 2. Adult sibling conflict                            | -.01  | --     |      |       |       |        |       |      |       |      |      |       |        |    |
| 3. Adult sibling rivalry                             | .15*  | .09    | --   |       |       |        |       |      |       |      |      |       |        |    |
| 4. Siblings' age at the time of the parental divorce | .06   | -.03   | .18* | --    |       |        |       |      |       |      |      |       |        |    |
| 5. Current sibling contact                           | .67** | .15*   | .02  | -.02  | --    |        |       |      |       |      |      |       |        |    |
| 6. Parents' income during subjects' childhood        | .27** | .06    | .01  | .26** | .13*  | --     |       |      |       |      |      |       |        |    |
| 7. Siblings' gender match                            | .08   | .19**  | -.02 | .07   | .12*  | .08    | --    |      |       |      |      |       |        |    |
| 8. Same-sex sibling pairs' gender                    | .18*  | .14    | .02  | .01   | .21** | .03    | .53** | --   |       |      |      |       |        |    |
| 9. Siblings' age gap                                 | -.17* | -.19** | -.07 | .08   | -.09  | -.15*  | .02   | .04  | --    |      |      |       |        |    |
| 10. Siblings' birth order                            | -.03  | .12    | .10  | .17** | .01   | -.08   | .04   | .04  | -.05  | --   |      |       |        |    |
| 11. Sibling geographical proximity                   | -.14  | .23**  | .01  | -.12  | .20** | -.18** | .04   | .05  | -.01  | .13* | --   |       |        |    |
| 12. Attachment anxiety                               | -.12  | .17*   | -.10 | -.01  | -.07  | -.12   | -.07  | -.05 | -.08  | .03  | .05  | --    |        |    |
| 13. Attachment avoidance                             | -.19* | .12    | .01  | .04   | -.08  | -.04   | -.03  | -.09 | -.18* | -.08 | -.03 | .42** | --     |    |
| 14. Self-efficacy                                    | .33** | -.12   | .05  | .12   | .10   | .17*   | .02   | .11  | -.04  | -.03 | -.10 | .48** | -.43** | -- |

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

Table 5  
*Standard multiple regression analysis for correlates of sibling relationship warmth (n=1,052)*

| Variables                                   | $\beta$ | SE   | p      |
|---|---------|------|--------|
| Step 1:                                     |         |      |        |
| Parental divorce exposure                   | -5.17   | 2.44 | 0.034* |
| Current sibling contact                     | 7.30    | 0.34 | 0.000* |
| Parents' income                             | 1.04    | 0.50 | 0.038* |
| Sibling gender match                        | 0.83    | 0.84 | 0.321  |
| Same-sex sibling pairs' gender              | -1.59   | 1.97 | 0.420  |
| Siblings' age gap                           | -3.26   | 1.99 | 0.102  |
| Siblings' birth order                       | -13.77  | 6.07 | 0.024* |
| Age gap x birth order                       | 8.82    | 3.09 | 0.004* |
| Siblings' geographical proximity            | -1.90   | 0.33 | 0.000* |
| Step 2:                                     |         |      |        |
| Parental divorce exposure                   | -17.88  | 8.87 | 0.044* |
| Current sibling contact                     | 6.99    | 0.40 | 0.000* |
| Parents' income                             | 1.02    | 0.50 | 0.041* |
| Sibling gender match                        | 0.79    | 0.84 | 0.343  |
| Same-sex sibling pairs' gender              | -1.46   | 1.97 | 0.458  |
| Siblings' age gap                           | -3.08   | 2.00 | 0.124  |
| Siblings' birth order                       | -13.95  | 6.06 | 0.022* |
| Age gap x birth order                       | 8.87    | 3.09 | 0.004* |
| Siblings' geographical proximity            | -1.86   | 0.33 | 0.000* |
| Parental divorce exposure x sibling contact | 1.04    | 0.70 | 0.137  |

*Note.* Total  $R^2$  at step 1 = 0.463; Total  $R^2$  at step 2 = 0.465; Change in  $R^2$  = 0.002



Table 6  
*Standard multiple regression analysis for correlates of sibling relationship conflict (n=1,052)*

| Variables                                   | $\beta$ | SE   | p      |
|---|---------|------|--------|
| Step 1:                                     |         |      |        |
| Parental divorce exposure                   | 0.61    | 1.38 | 0.658  |
| Current sibling contact                     | -0.10   | 0.19 | 0.607  |
| Parents' income                             | 0.45    | 0.28 | 0.112  |
| Sibling gender match                        | 1.00    | 0.48 | 0.037* |
| Same-sex sibling pairs' gender              | 1.97    | 1.13 | 0.081  |
| Siblings' age gap                           | -0.92   | 1.15 | 0.425  |
| Siblings' birth order                       | 8.92    | 3.47 | 0.010* |
| Age gap x birth order                       | -3.30   | 1.76 | 0.062  |
| Siblings' geographical proximity            | 0.56    | 0.19 | 0.003* |
| Step 2:                                     |         |      |        |
| Parental divorce exposure                   | -7.36   | 5.04 | 0.144  |
| Current sibling contact                     | -0.30   | 0.23 | 0.186  |
| Parents' income                             | 0.44    | 0.28 | 0.120  |
| Sibling gender match                        | 0.99    | 0.48 | 0.037* |
| Same-sex sibling pairs' gender              | 2.02    | 1.13 | 0.073  |
| Siblings' age gap                           | -0.79   | 1.16 | 0.493  |
| Siblings' birth order                       | 8.84    | 3.46 | 0.011* |
| Age gap x birth order                       | -3.28   | 1.76 | 0.063  |
| Siblings' geographical proximity            | 0.57    | 0.19 | 0.002* |
| Parental divorce exposure x sibling contact | 0.65    | 0.40 | 0.100  |

*Note.* Total  $R^2$  at step 1 = 0.066; Total  $R^2$  at step 2 = 0.070; Change in  $R^2$  = 0.004

Table 7  
*Standard multiple regression analysis for correlates of sibling relationship rivalry (n=1,052)*

| Variables                                   | $\beta$ | SE   | p      |
|---|---------|------|--------|
| Step 1:                                     |         |      |        |
| Parental divorce exposure                   | 0.19    | 0.60 | 0.748  |
| Current sibling contact                     | 0.14    | 0.08 | 0.089  |
| Parents' income                             | 0.07    | 0.12 | 0.584  |
| Sibling gender match                        | 0.19    | 0.20 | 0.354  |
| Same-sex sibling pairs' gender              | -0.06   | 0.48 | 0.909  |
| Siblings' age gap                           | -1.65   | 0.50 | 0.001* |
| Siblings' birth order                       | -2.88   | 1.49 | 0.053  |
| Age gap x birth order                       | 2.61    | 0.76 | 0.001* |
| Siblings' geographical proximity            | 0.06    | 0.08 | 0.469  |
| Step 2:                                     |         |      |        |
| Parental divorce exposure                   | 2.22    | 2.22 | 0.316  |
| Current sibling contact                     | 0.19    | 0.10 | 0.052  |
| Parents' income                             | 0.07    | 0.12 | 0.571  |
| Sibling gender match                        | 0.19    | 0.20 | 0.346  |
| Same-sex sibling pairs' gender              | -0.06   | 0.48 | 0.901  |
| Siblings' age gap                           | -1.68   | 0.50 | 0.001* |
| Siblings' birth order                       | -2.86   | 1.49 | 0.055  |
| Age gap x birth order                       | 2.60    | 0.76 | 0.001* |
| Siblings' geographical proximity            | 0.05    | 0.08 | 0.508  |
| Parental divorce exposure x sibling contact | -0.17   | 0.17 | 0.342  |

*Note.* Total  $R^2$  at step 1 = 0.048; Total  $R^2$  at step 2 = 0.049; Change in  $R^2$  = 0.001

Table 8  
*Standard multiple regression analysis for correlates of sibling relationship warmth among participants from divorced families (n=296)*

| Variables   | $\beta$ | SE    | p      |
|---|---------|-------|--------|
| Step 1:   |         |       |        |
| Subject's age at time of divorce                      | 0.33    | 0.45  | 0.462  |
| Current sibling contact                               | 7.67    | 0.73  | 0.000* |
| Parents' income                                       | 0.98    | 1.33  | 0.464  |
| Sibling gender match                                  | -1.59   | 1.98  | 0.424  |
| Same-sex sibling pairs' gender                        | 5.39    | 4.44  | 0.227  |
| Siblings' age gap                                     | -3.50   | 4.22  | 0.409  |
| Siblings' birth order                                 | -5.00   | 13.20 | 0.705  |
| Age gap x birth order                                 | 0.91    | 6.48  | 0.888  |
| Siblings' geographical proximity                      | -2.36   | 0.81  | 0.004* |
| Step 2:   |         |       |        |
| Subject's age at time of divorce                      | 1.47    | 1.41  | 0.302  |
| Current sibling contact                               | 8.73    | 1.45  | 0.000* |
| Parents' income                                       | 1.00    | 1.34  | 0.455  |
| Sibling gender match                                  | -1.41   | 1.99  | 0.481  |
| Same-sex sibling pairs' gender                        | 4.95    | 4.48  | 0.271  |
| Siblings' age gap                                     | -2.93   | 4.28  | 0.496  |
| Siblings' birth order                                 | -5.27   | 13.21 | 0.691  |
| Age gap x birth order                                 | 0.92    | 6.48  | 0.887  |
| Siblings' geographical proximity                      | -2.31   | 0.81  | 0.005* |
| Subject's age at time of divorce<br>x sibling contact | -0.10   | 0.12  | 0.399  |

*Note.* Total  $R^2$  at step 1 = 0.525; Total  $R^2$  at step 2 = 0.527; Change in  $R^2$  = 0.002

Table 9  
*Standard multiple regression analysis for correlates of sibling relationship conflict among participants from divorced families (n=296)*

| Variables   | $\beta$ | SE   | p      |
|---|---------|------|--------|
| Step 1:   |         |      |        |
| Subject's age at time of divorce                      | -0.25   | 0.26 | 0.328  |
| Current sibling contact                               | -0.13   | 0.42 | 0.755  |
| Parents' income                                       | 0.86    | 0.73 | 0.236  |
| Sibling gender match                                  | 1.22    | 1.14 | 0.288  |
| Same-sex sibling pairs' gender                        | 2.25    | 2.56 | 0.379  |
| Siblings' age gap                                     | -2.12   | 2.36 | 0.371  |
| Siblings' birth order                                 | 11.68   | 7.66 | 0.129  |
| Age gap x birth order                                 | -5.35   | 3.71 | 0.152  |
| Siblings' geographical proximity                      | 1.28    | 0.45 | 0.005* |
| Step 2:   |         |      |        |
| Subject's age at time of divorce                      | 0.57    | 0.83 | 0.494  |
| Current sibling contact                               | 0.61    | 0.82 | 0.461  |
| Parents' income                                       | 0.85    | 0.73 | 0.242  |
| Sibling gender match                                  | 1.39    | 1.16 | 0.230  |
| Same-sex sibling pairs' gender                        | 1.99    | 2.57 | 0.440  |
| Siblings' age gap                                     | -1.76   | 2.38 | 0.462  |
| Siblings' birth order                                 | 11.48   | 7.66 | 0.136  |
| Age gap x birth order                                 | -5.42   | 3.71 | 0.147  |
| Siblings' geographical proximity                      | 1.32    | 0.45 | 0.004* |
| Subject's age at time of divorce<br>x sibling contact | -0.07   | 0.07 | 0.299  |

*Note.* Total  $R^2$  at step 1 = 0.162; Total  $R^2$  at step 2 = 0.168; Change in  $R^2$  = 0.006

Table 10  
*Standard multiple regression analysis for correlates of sibling relationship rivalry among participants from divorced families (n=296)*

| Variables   | $\beta$ | SE   | p      |
|---|---------|------|--------|
| Step 1:   |         |      |        |
| Subject's age at time of divorce                      | 0.22    | 0.09 | 0.022* |
| Current sibling contact                               | 0.08    | 0.16 | 0.616  |
| Parents' income                                       | -0.40   | 0.27 | 0.135  |
| Sibling gender match                                  | 0.03    | 0.43 | 0.940  |
| Same-sex sibling pairs' gender                        | 0.53    | 0.96 | 0.580  |
| Siblings' age gap                                     | -2.71   | 0.90 | 0.003* |
| Siblings' birth order                                 | -8.07   | 2.90 | 0.006* |
| Age gap x birth order                                 | 4.65    | 1.43 | 0.001* |
| Siblings' geographical proximity                      | 0.01    | 0.17 | 0.948  |
| Step 2:   |         |      |        |
| Subject's age at time of divorce                      | 0.87    | 0.31 | 0.005* |
| Current sibling contact                               | 0.66    | 0.31 | 0.032* |
| Parents' income                                       | -0.42   | 0.26 | 0.116  |
| Sibling gender match                                  | 0.13    | 0.43 | 0.767  |
| Same-sex sibling pairs' gender                        | 0.39    | 0.95 | 0.684  |
| Siblings' age gap                                     | -2.51   | 0.89 | 0.006* |
| Siblings' birth order                                 | -8.38   | 2.86 | 0.004* |
| Age gap x birth order                                 | 4.71    | 1.41 | 0.001* |
| Siblings' geographical proximity                      | 0.05    | 0.17 | 0.758  |
| Subject's age at time of divorce<br>x sibling contact | -0.05   | 0.02 | 0.028* |

*Note.* Total  $R^2$  at step 1 = 0.107; Total  $R^2$  at step 2 = 0.136; Change in  $R^2$  = 0.029

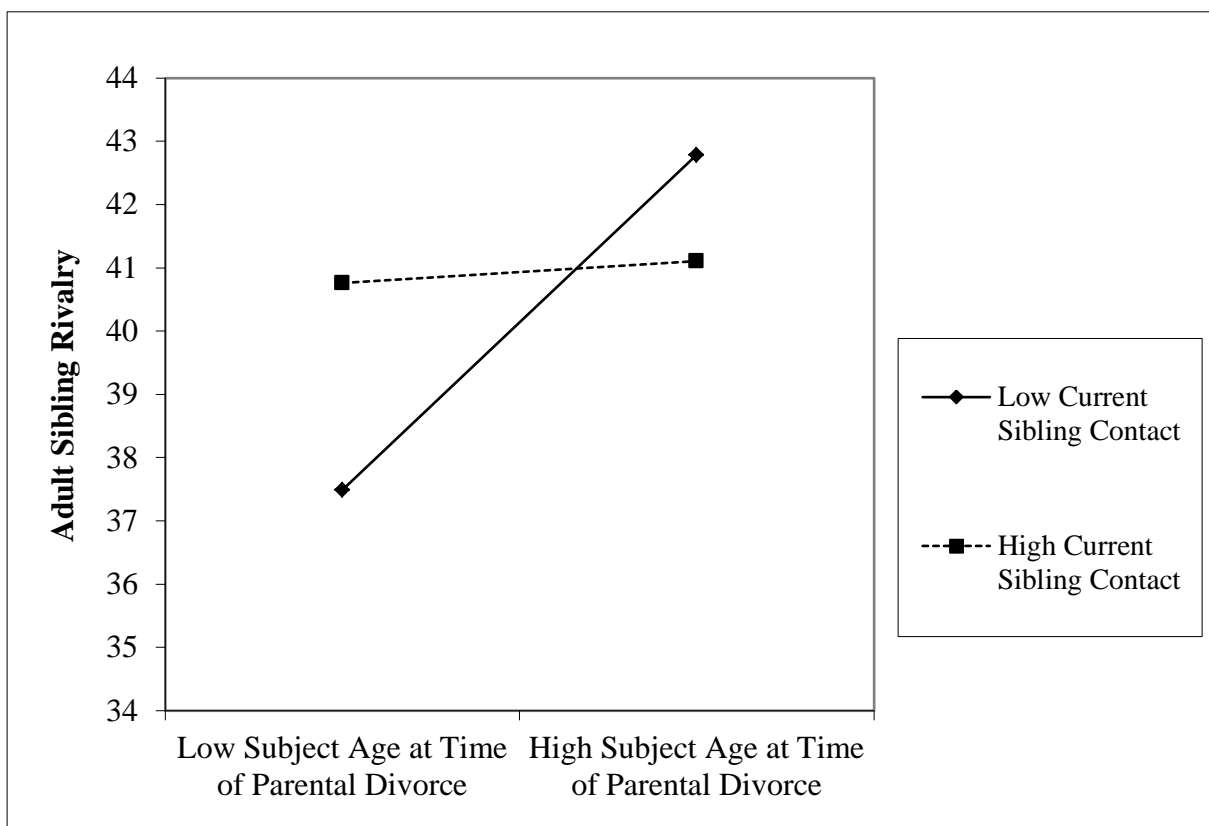


Figure 1. *Interaction Plot of Age at Time of Parental Divorce x Sibling Contact to predict Sibling Rivalry (n=296)*