

Influences on the sibling relationship:

The relationship between attachment style and the sibling relationship, and the moderating effect of living in a household with an ill child

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ABSTRACT

There has been little research done on how certain aspects of a child's social world, such as their attachment style, may influence their relationship with their sibling, both positively and negatively. Furthermore, the potential moderating influence of living in a household where a sibling has a chronic illness on instances of sibling rivalry has not yet been examined. The purpose of this study was to examine the relationship between attachment style and different aspects of warmth and conflict in the sibling relationship, as well as how living in a household where a sibling has a chronic illness influences this relationship. Warmth, which is the amount of kindness and affection siblings display toward one another, was significantly negatively related to avoidant attachment. Conflict, which is the negative aspects of sibling relationships such as arguing and competing for parental attention, was significantly positively related to anxious attachment. Family illness experience had no significant impact on the relationship between specific relationship factors and attachment styles. These results suggest that low levels of sibling warmth and high levels of sibling conflict are related to insecure attachment styles. They imply that children who grow up ill or with ill siblings interact with their siblings in much the same way that well siblings do, and that children who have experienced illness in their families are at risk for many of the same issues in sibling relationships as well children. Future interventions should be designed to foster intimate, emotionally close sibling relationships to create more securely attached individuals.

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INTRODUCTION

According to the 2010 Current Population Survey, a little over 80% of US children grow up with at least one sibling (McHale, Updegraff, & Whiteman, 2012). Due to this large proportion, it is important to understand the impact that siblings have on each other's overall state of wellbeing and development.

Siblings can shape one's interests, one's personalities, and the way one interacts with one's families and friends (Buist, Dekovic, & Prinzie, 2013). There are many opportunities for siblings to influence each other's development, since they tend to spend an increasing amount of time together without adult supervision (McHale et al, 2012). Siblings can help each other learn about the world and can teach each other how to behave in certain situations through leading by example (Brody, 1998).

Having a sibling impacts how parents treat their children, both with and apart from their siblings (Rosen & Burke, 1999). There is a potential for parental differential treatment to occur, which can cause a variety of challenges in the sibling relationship (Jensen, Whiteman, Fingerman, & Birditt, 2013). Additionally, sibling relationships are influenced by each child's individual temperament and personality, and by the culture that these siblings find themselves in (McHale et al, 2012). In turn, sibling relationships can help determine the coping strategies that a person develops and influence the likelihood that a person will develop adverse internalizing or externalizing behaviors (Buist et al, 2013). There are also some negative aspects of sibling relationships, such as sibling conflict (Van Volkom, Machiz, & Reich, 2011).

However, even these elements in sibling relationships have been shown to have benefits for siblings later in life (McHale et al, 2012).

While there has been some study of sibling relationships, it has not been studied to nearly the same degree as other aspects of children's social world, such as parenting practices, the marital status of a child's parents, or their friendships (McHale et al, 2012). Additionally, there has been little research done on how certain aspects of a child's social world, such as their attachment style, may influence their relationship with their sibling, both positively and negatively.

LITERATURE REVIEW

The majority of children in the United States grow up with at least one sibling (McHale et al, 2012). Having a sibling affects all aspects of a child's life, both within their family and out in the social world. Some of the effects of having a sibling are related to the child's birth order. Volling (1997), for example, found that the eldest child was more likely to be disciplined by their parents than younger children. This pattern occurred even when the parents self-reported disciplining their children equally (Volling, 1997). Additionally, sibling relationships can have an impact on how a child interacts with their peers. Ostrov, Crick, and Stauffacher (2006) found that sibling pairs that exhibited higher levels of relational aggression were more likely to be aggressive when interacting with their peers outside the family. However, the effects of having a sibling are not all negative. A literature view conducted by Meadan, Stoner, and Angeli (2010) found that some siblings of children with Autism Spectrum Disorder reported high levels of social competence and self-concept due to their

sibling relationships. Additionally, there is evidence that children in homes with high parental conflict drew closer to each other, and their close relationship helped to decrease instances of conflict and rivalry between them (Conger, Stocker, & McGuire, 2009).

Due to the pervasive effect a sibling has on children's lives, it is important that we study the effects that sibling relationships have on children and their overall development. While there has been some research on the relationship between attachment style and sibling relationships, the majority of the studies up to this point have examined similarities between parent-child attachments in the same family (Schneider Rosen & Burke, 1999; Lui, 2008; Gallarin & Alonso-Arbiol, 2012). There has been limited research on how differing attachment styles influence the sibling relationships outside of their parents (e.g. Teti & Ablard, 1989; Fortuna, Roisman, Haydon, Groh, & Holland, 2011).

Additionally, about 18.8% of children in the United States are living with a chronic illness (Child and Adolescent Health Measurement Initiative, 2016-2017). Since the majority of children in the United States have at least one sibling, there is a high likelihood that some of them will have siblings with a chronic illness. Chronic illnesses affect the whole family and how the people within it relate to each other, including within the sibling relationship (Boyse et al, 2012). Siblings of children who have chronic illnesses have reported closer sibling bonds than those of healthy siblings (Waite-Jones & Madill, 2008), but they also report having a more cautious attitude towards their own health due to their siblings' illness (Fleary & Heffer, 2013). Additionally, while it has been

found that a child having a chronic illness can lead to higher instances of sibling conflict (Knecht, Hellmers, & Jun, 2015), at this point there is limited research on chronic illnesses as they relate to a sibling's attachment style.

Attachment style

Attachment is defined as “a deep and enduring emotional bond that connects one person to another over time and space” (Ainsworth, 1973, p. 14). Currently, the field recognizes four distinct attachment styles: one secure and three insecure (anxious-avoidant, anxious-ambivalent, and disorganized) (Ainsworth, 1985). Children who are securely attached have had their needs consistently met by their caregiver, while children who are insecurely attached have not had their needs consistently met. There is some evidence that children who have insecure attachment styles have more instances of sibling conflict than children with secure attachment styles (Volling, 2001; Volling & Belksy, 1992). Additionally, younger siblings who were insecurely attached exhibited more negative reactions when their mothers gave attention to their older sibling (Teti et al., 1989). Furthermore, children who are insecurely attached had poorer social skills overall than their securely attached peers (Sroufe, 2005). However, studies done on attachment relationships between siblings have shown that an older sibling (ages 3-5 years) can serve as a secure base that allows the younger sibling (age 2 years) to explore their environment (Samuels, 1980). Perhaps perceiving an older sibling as a secure base could contribute to lower instances of sibling conflict. Additionally, a study done with children ranging from 8 to 17 years old whose parents had divorced found that children who were securely attached felt

the negative impacts of divorce less than those who were insecurely attached (Cummings, Schermerhorn, Davies, Goeke-Morey, & Cummings, 2006). The effects of the secure attachment relationship included less instances of sibling conflict than the insecurely attached children.

Children with an avoidant attachment style are comfortable without close emotional relationships and prefer to feel independent and downplay being reliant on others. Children with avoidant attachment styles tend to have more dismissive attitudes towards their siblings and towards their relationships with them, and siblings of children with an avoidant attachment style reported more conflict in their relationships as young adults (Fortuna, Roisman, Haydon, Groh, & Holland, 2011). Conversely, children with an anxious attachment style want to be completely emotionally open to others and place a high value on close emotional relationships, but often feel that others do not feel the same towards them. For children who have a more anxious attachment style, research has shown that they typically have more detached attitudes towards their family members, particularly their fathers, than children who are securely attached (Maio, Fincham, & Lycett, 2000).

When Ainsworth initially developed the Strange Situation to score attachment style, children were designated as having one of the three above attachment styles (Waters, 2002). However, after additional research on attachment, disorganized attachment was added as an attachment style that children could have in addition to their secure, avoidant, or anxious styles. This is a rare population that is estimated to have a prevalence of less than five percent

(Waters, 2002). These children have often been victims of abuse or neglect (Liotti, 2004) and often alternate between aggression and withdrawal when they interact with peers (Lyons-Ruth, 1996). Additionally, there has been evidence to suggest that gender may play a part in how strong an attachment relationship may be, with mixed gender dyads showing stronger attachment than same gender dyads (Stewart, 1983). However, the research done up to this point has had small sample sizes, and thus more research is needed to ensure that the results are valid.

The literature has shown that children who are insecurely attached to their parents tend to have higher rates of sibling conflict than those that are securely attached (Volling, 1997). Building a secure attachment relationship involves building a deep, lasting connection between a child and another person, typically a primary caregiver. However, children are also capable of forming attachment relationships to other familiar figures in their lives, and siblings certainly fall into this category. If the older sibling is particularly sensitive, then it is more likely that the younger sibling will see them as an attachment figure (Whiteman, McHale, & Soli, 2011). If a younger sibling sees their older sibling as an attachment figure, it can provide another model for how to relate to others, beyond just the parent-child attachment (Whiteman, McHale, & Soli, 2011). Typically, a child's attachment relationship with their primary caregiver, such as their mother or father, serves as a primer for their relationships with other people in their social world (Ainsworth, 1973). Thus, one could suggest that a child's attachment relationship with their primary caregiver, such as their mother or father, would have an impact on the child's relationship with their sibling.

Sibling relationships

Sibling relationships have both positive and negative effects on one's physical, psychological, and social well-being. For example, Buist et al (2013) conducted a meta-analysis that looked at the relationship between the quality of sibling relationships and later psychopathology. They found that higher ratings of sibling warmth were correlated with lower instances of internalizing and externalizing behaviors later in life (Buist et al, 2013). If siblings know that they can trust each other and that they have a healthy relationship, they may be able to better communicate with each other when they are having disagreements (Myers, Brann, & Rittenour, 2008). This communication can help them develop healthy coping skills, which can be used in a variety of situations, and thus would reduce the probability of these siblings developing maladaptive internalizing or externalizing behaviors as a way to cope with their problems (Myers et al, 2008). Sawai and Kato (2017) found similar results in a group of Japanese college students, leading to the conclusion that this is not a uniquely American experience.

Additionally, sibling warmth may be a buffer against negative life events (Conger et al, 2009). For example, one study that examined the potential protective impact of sibling relationships found that children with warm, emotionally close relationships showed fewer internalizing symptoms after stressful life events, such as parental separation or a death in the family (Gass, Jenkins, & Dunn, 2006). There is some evidence that similar relationships exist between sibling warmth and externalizing behaviors, although the results are

mixed (Branje, van Lieshout, van Aken, & Haselager, 2004; Feinberg, Solmeyer, & McHale, 2011). Beyond the individual, warmth in sibling relationships has also been shown to be positively related with emotion regulation and helping behaviors with peers (Buist et al, 2013), which helps individuals interact with others in their social world in a healthy way.

However, sibling relationships can also have a negative impact on one's well-being. In a recent study, Floyd, Purcell, Richardson, and Kupersmidt (2009) examined the quality of sibling relationships when one sibling had an intellectual disability, and how that affected their social functioning. They found that the typically developing sibling was more likely to feel the relationship was one-sided, and this lopsided relationship lead to lower self-esteem for the typically developing sibling (Floyd et al, 2009). Additionally, if one sibling is actively aggressing against the other, it can cause increased levels of sibling rivalry and conflict, as Mackey, Fromuth, and Kelly (2010) found when they examined the impacts of sibling abuse on later psychological adjustment. When Van Volkom, Machiz, and Reich (2011) researched the influence of factors such as birth order and age spacing on sibling relationships, they found that sibling conflict typically comes to a peak in childhood or adolescence, but then declines once the siblings age into adulthood. Thus, there may be some coping strategies that siblings have developed once they become adults that help to reduce instances of conflict (Van Volkom et al, 2011). Given that Floyd et al (2009) found that relationships in which one sibling puts more effort into maintaining the relationship than the other have a negative psychological impact on siblings, that Van Volkom et al (2011)

found that sibling rivalry declines in adulthood, and that Mackey et al (2010) found that active aggression can lead to higher levels of sibling rivalry, it is important to expand our knowledge of the more volatile aspects of sibling relationships.

One such negative aspect that likely impacts sibling relationships is sibling conflict. Sibling conflict may occur as a result of something as simple as unconscious parental favoritism. For example, Finzi-Dottan and Cohen (2010) examined the extent to which parents' favoritism of one sibling over the other influenced the siblings' relationship with each other. They found that even one sibling perceiving that their parents preferred the other sibling over them led to an increase in sibling conflict (Finzi-Dottan et al, 2010). Additionally, there is evidence that sibling conflict can have long-lasting effects on the relationship. Conger and Little (2010) examined how sibling relationships change at five transition points that most American adults typically experience: leaving home, completing education, entering the workforce, getting married, and having children. They found that how healthy and communicative the sibling relationship had been prior to these transitions affected how the siblings reacted to these transitions, and how stable their relationships were (Conger & Little, 2010). For example, when the older sibling left home, a younger sibling was more likely to experience feelings of neglect and abandonment if the dyad had a history of conflict and disagreements (Conger & Little, 2010). Recent studies also found that one of the main causes for sibling rivalry is the younger sibling's birth (Volling, McElwain, & Miller, 2002). This research shows that sibling conflict

can have long-lasting effects on the quality of the sibling relationship, even after much of the rivalry has ceased.

The population in this study will be comprised of young adults, aged 18-22. This is considered a transition period between adolescence and adulthood. As a result, many of the cognitive and developmental tasks that characterized adolescence are still at play. One common developmental characteristic of adolescents is egocentrism (Galanaki, 2012). According to Elkind's theory of adolescent egocentrism, adolescents have the ability to take the perspective of others, due to being in Piaget's stage of formal operations (Muuss, 1982). However, they have a difficult time differentiating between their own thoughts and opinions and those of others. As a result, many adolescents believe that others are as preoccupied with their actions as they are with themselves (Sebastian, Burnett, & Blakemore, 2008). This preoccupation can have a negative effect on adolescents' self-esteem (Baudson, Weber, & Freund, 2016), which can also lead to increases in sibling rivalry (Whiteman et al, 2012).

However, due to social and demographic shifts over the past few decades, the late teens and early twenties have become not solely a transition period but, some would argue, a life stage in their own right. According to Arnett's (2000) theory of emerging adulthood, during this time period young adults are delaying marriage and childbirth in favor of exploring a variety of different lifepaths before ultimately choosing long-term adult roles. Sibling relationships develop and change during this time period, and young adults typically spend less time with their siblings during this time period than they did during adolescence (Scharf,

Shulman, & Avigad-Spitz, 2005). However, they also reported being more emotionally involved with their siblings and showed decreased conflict during this period than during adolescence (Scharf et al, 2005). Additionally, according to Erikson's theory of psychosocial development, individuals are experiencing the conflict between intimacy and isolation during this time. At this stage, people are in a conflict between forming intimate, loving relationships, and avoiding commitment and committed relationships, which can lead to isolation and depression. While Erikson's description of this stage primarily focuses on the intimacy found in romantic relationships, the successful (or unsuccessful) resolution of this conflict may also affect one's ability to maintain close relationships with family members, including siblings. Additionally, since sibling relationships are one of the ways in which people learn how to interact with people their own age (Buist et al, 2013), sibling relationships and the amount of warmth or conflict within their relationships early in life can help set the groundwork for how willing and able someone is able to form intimate relationships later in life.

Developing autonomy is also an important component of this stage of life. Adolescents and young adults are attempting to separate themselves from their parents and live as independent, singular people (Murphy, Greenwell, Resell, Brecht, & Schuster, 2009). Going along with this is the increased likelihood of adolescents and young adults to take risks, such as drinking alcohol or doing drugs (Steinberg, 2007). There has been some concern by researchers in the field that having a sibling with a chronic illness could affect the well child's

development of their autonomy (Seifter Abrams, 2009). This is because the well sibling can easily become “parentified,” and have to take on adult responsibilities at an early age in order to help care for their ill sibling (Murphy et al, 2009). Research has shown, however, that children who showed caregiver behavior towards their parents who were ill were just as capable of becoming autonomous adults as children whose parents were not ill (Murphy et al, 2009). These caregiving behaviors are similar to those observed by Sharpe and Rossiter (2002) when they studied well siblings caring for their ill siblings. Therefore, it is plausible that children with siblings who have a chronic illness will also be able to become fully autonomous adults.

It is also important to examine sibling relationships using a family systems lens. Family systems theory, created by Dr. Murray Bowen, views the family as one unit whose different members affect one another's emotions and stress levels (Bavelas and Segal, 1982). The anxiety or stress that one member of the family feels is "felt", in a way, by all members of the family, and their relationships with this family member are affected accordingly. Perhaps the stress that one sibling feels as a result of an insecure attachment style, or to their chronic illness, can affect their relationship with their sibling in ways that they are unaware of.

Additionally, when we are looking at sibling relationships, it is important to take attachment style and the stability of attachment over time into account. Numerous studies have shown that attachment is stable from infancy to early adulthood (Waters, Weinfield, & Hamilton, 2000; Picardi, Caroppo, Toni, Bitetti, & Di Maria, 2010; Benoit & Parker, 1994). Knowing that attachment style tends

to remain steady over time even as the relationships and contexts the individual is in change is important when we think about understanding healthy sibling relationships, as well as sibling relationships in which one of the siblings is ill. This is because attachment style and the relational blueprint it provides is what individuals will fall back on when they are in a stressful situation, such as when their sibling is ill. Thus, when we are considering sibling relationships, we should take into account the relational blueprint each sibling comes into the relationship with.

Living as a sibling of a child with a chronic illness

As mentioned earlier, about 80% of the population has at least one sibling (McHale et al, 2012). Additionally, it is estimated that approximately 18.8% of children between the ages of 5 and 17 have a chronic illness (Child and Adolescent Health Measurement Initiative, 2016-2017). It is highly likely that there is some overlap between these two populations, and while there is a growing body of literature about siblings of children with chronic illness, the results of these studies examining the impact of having a sibling with a chronic illness are often unclear and contradictory (Nielsen et al, 2012). For example, a study done by Waite-Jones et al (2008) indicated that a child's chronic illness may have a positive influence on sibling relationships. This is thought to be due to the caregiver role that well siblings often take towards their ill sibling. The caregiver role may generate positive feelings towards their sibling. However, in another study done by Williams, Ridder, Setter, Liebergen, Curry, Piamjariyakul, & Williams (2009), they found that parents reported seeing more negative effects on

their well children, such as jealousy and anxiety. Even with this, though, there was a group that reported a mix of positive and negative effects on their children (Williams et al, 2009). Therefore, even within studies it is difficult to discern how having a sibling with a chronic illness affects the well sibling. Due to this ambiguity, it is important that additional research be conducted on sibling relationships of those with chronic illnesses to clarify the nature of these relationships.

In addition, while there has been some research on the relationships of siblings of children with a variety of chronic illnesses (Knecht et al, 2015; Nielsen et al, 2012) most of the research up to this point has only focused on the relationships of siblings of a child with one specific type of chronic illness, such as type 1 diabetes (Wennick & Huus, 2012; Jackson, Richer, & Edge, 2008) or spina bifida (Bellin, Bentley, & Sawin, 2009; Bellin, Kovacs, & Sawin, 2008). Finally, while there has been some research on attachment and sibling relationships, studies have mostly been conducted with healthy children, and there has not been much research that applies attachment theory to relationships where one sibling has a chronic illness (Knecht et al, 2015). This study seeks to apply attachment theory to specific aspects of warmth and conflict within sibling relationships to help address this gap in the literature.

Study purpose

At this point, much of the research on attachment focuses on parent-child relationships, or on similarity of attachment styles among siblings with their parents (e.g., Caspers, Yucuis, Troutman, Arndt, & Langbehn, 2007; Rosen et al,

1999; Maio et al, 2000; Roberto, Carlyle, Goodall, & Castle, 2009). Typically, children who are insecurely attached can have more negative feelings towards their parents than those who are securely attached (Maio et al, 2000). Additionally, there has been little research on how the sibling attachment relationship develops in adolescence and early adulthood (McHale et al, 2011). While research has shown that higher levels of warmth in sibling relationships are related to lower levels of internalizing and externalizing behaviors (Buist et al. 2013), and that higher rates of sibling conflict are correlated with higher rates of these same behaviors (Buist et al, 2013), it is unclear whether or to what extent this is related to siblings' attachment relationships. Furthermore, while there has been research on sibling relationships when one of the siblings has a chronic illness (Boyse et al, 2012; Fleary et al, 2013), there has been little research done on how this affects the relationship between attachment style and sibling warmth, or between attachment style and sibling conflict. This lack of research on how a sibling having a chronic illness affects the relationship between attachment style and different aspects of warmth and conflict in the sibling relationship is the gap that this study attempted to address.

The purpose of this study was to examine the relationship between attachment style and sibling warmth and conflict more generally, as well as the relationship between attachment style and specific warmth and conflict factors. Additionally, this study examined how living in a household where there is an ill child influences these relationships. This is informed by Bandura's social learning theory, which posits that the primary way that humans learn is through

the reinforcement or punishment of their own actions (Whiteman et al, 2011). Attachment theory, meanwhile, posits that the relationship a child has with their primary caregiver lays the groundwork for all other personal relationships. Putting these two theories together, a child should learn, through the reinforcement of their behaviors by their caregivers, how to interact with other people, and this should transfer to how they interact with their sibling. Thus, the researcher expected to see more sibling conflict reported by siblings with higher levels of avoidant and anxious attachment, and more sibling warmth reported by siblings with lower levels of avoidant and anxious attachment. However, the researcher also predicted that living in a household where there is an ill child would be related to lower instances of sibling conflict across all levels of anxious and avoidant attachment, and higher levels of sibling warmth. A child having a chronic illness is a stressful experience for all involved in the child's life, and especially for their parents and sibling. Additionally, the well sibling may have taken on the role of a caretaker with their ill sibling rather than that of a sibling, and as a result, there may be less instances of sibling conflict among sibling pairs where at least one has a chronic illness, and more sibling warmth.

RESEARCH PURPOSE

The purpose of my research was threefold. First, given that there is little research on attachment relationships between siblings and whether their attachment style is related to sibling relationships, I wanted to understand how attachment style was influenced by levels of warmth and conflict in sibling relationships. Is having an anxious attachment style associated with higher rates

of conflict, or higher rates of warmth? Similarly, is having an avoidant attachment style associated with higher rates of conflict, or higher rates of warmth?

Second, given that there has been little research on specific aspects of warmth and conflict and how they are related to attachment style in sibling relationships, I wanted to understand what specific aspects of conflict or warmth in a sibling relationship was related to attachment. If warmth is significantly related to anxious or avoidant attachment, is similarity, affection, knowledge, or some other warmth factor significantly related to attachment? Alternatively, if conflict is significantly related to anxious or avoidant attachment, is quarreling, antagonism, competition, or dominance significantly related to attachment? The specific factors that were explored to answer this question were dependent on what was found to be significant when answering the primary research question.

Third, given that there has been a lack of research on how a sibling having a chronic illness affects the relationship between attachment style and specific aspects of sibling relationships, I wanted to understand what, if any, moderating influence living in a household where a child has a chronic illness had on the relationship between attachment style and specific factors of sibling warmth and conflict. Does living in a household where a child has a chronic illness change the relationship between anxious or avoidant attachment style and significant factors of sibling warmth, such as similarity, affection, and/or knowledge? Conversely, does living in a household where a child has a chronic illness change the relationship between anxious or avoidant attachment style and significant

factors of sibling conflict, such as quarreling, antagonism, and/or dominance?

The specific factors that were explored to answer this question were dependent on what was found to be significant in answering the primary research question.

These questions are important because they help professionals to understand the socioemotional needs of families moving through the healthcare system, and thus help us to provide care that best meets their needs.

RESEARCH QUESTIONS

Three main research questions guided this proposed study. They are as follows:

1. Are warmth and conflict related to anxious and avoidant attachment styles?
2. If so, what specific factors within warmth and conflict are related to anxious and avoidant attachment?
3. How are these relationships moderated by whether or not the sibling lives in a household where a child has a chronic illness?

The first question was intended to measure what relationship, if any, a sibling relationship's levels of warmth and conflict has with anxious and avoidant attachment styles. If there was a significant relationship between warmth and/or conflict and attachment, the second question was intended to find what specific factors within warmth and conflict were related to anxious and avoidant attachment styles. The third question was intended to measure how the impact of factors of warmth and/or conflict attachment were changed, if at all, by whether

or not the participant lived in a household where there was an ill child (either themselves or a sibling).

METHODS

PROCEDURES

This study was originally approved by the respective Internal Review Board (IRB) during the initial investigation. At a large public Southwestern university, 418 college students were surveyed for this study. Students qualified for the study if they had answered yes to a question asking whether they had a sibling. The mean age was 18.92 (SD = 1.48), with an age range of 18-35 years old. Two hundred and forty-six participants were female (58.4%). Seventy-four point one percent were White/Caucasian, 15.2% were Hispanic, 4% were African American, 5.2% were Asian, and 0.7% answered other or mixed race.

Students completed surveys containing questions about their current quality of life, their experiences in close relationships, and their relationships with their siblings. They also completed measures on their own feelings or concerns about their childhood relationship with their siblings and demographics. Students were compensated for their participation by receiving credit for their Introduction to Psychology course.

MEASURES

Adult Sibling Relationship Questionnaire

The Adult Sibling Relationship Questionnaire (ASRQ) examines how adults perceive their relationships with their sibling(s). The ASRQ is grouped

into 3 scales: Warmth, Conflict, and Rivalry (Stocker, Lanthier, & Furman, 1997). For the purpose of this study, the researcher only analyzed the participants' answers to questions in the Warmth and Conflict scales. The Warmth scale measures instances of kindness and affection in the sibling relationship across the lifespan. The Conflict scale measures more negative aspects, such as arguing and competing for parental attention, of the sibling relationship across the lifespan. The Rivalry scale contains the factors of Maternal Rivalry and Paternal Rivalry; however, based on the literature described previously, the researcher decided to focus on the other two scales. The Warmth scale consists of 8 subscales: Similarity (4 questions), Intimacy (6 questions), Affection (6 questions), Admiration (6 questions), Emotional Support (6 questions), Instrumental Support (6 questions), Acceptance (6 questions), and Knowledge (6 questions) (Stocker et al, 1987). The Conflict scale consists of 4 subscales: Quarreling (5 questions), Antagonism (6 questions), Competition (6 questions), and Dominance (6 questions) (Stocker et al, 1987). Participants rated how much they agree with the statement on a Likert scale ranging from 1 (hardly at all) to 5 (extremely much). Subscales were summed to create composite warmth and conflict scores for each participant.

Experiences in Close Relationships Scale

The Experiences in Close Relationships scale (ECR; Fraley, Waller, & Brennan, 2000) is designed to assess attachment relationships across a variety of relationship types, (i.e. parental, sibling, romantic partner, etc.). Participants ranked their answers to each of the 36 statements using a Likert scale of 1

(strongly disagree) to 7 (strongly agree). The scale is divided into two subscales: Anxious and Avoidant. The Anxious subscale measures how anxious a person is in their attachment relationships (e.g., I worry that romantic partners won't care about me as much as I care about them; Fraley et al, 2000). The Avoidant subscale measures how avoidant a person is in their attachment relationships (e.g., I am very comfortable being close to romantic partners; Fraley et al, 2000). Scores on each subscale were summed to create a composite Anxious and Avoidant score for each participant. A higher score on each scale equated to higher levels of Anxious or Avoidant attachment, respectively. Some items were reverse coded in order to create consistency in the Likert scale range across all questions.

ANALYSES

Before any analysis is conducted, the data was cleaned in SPSS. Preliminary descriptive analyses were conducted to ensure that the data was linearly related, normally distributed, had homogeneity of variance, and had independent errors. Data was found to be normally distributed. Several multiple regression analyses were estimated on the variables to determine the association between attachment relationship and aspects of the sibling relationship, and whether having a chronic illness moderates these relationships. Age, race, and gender were controlled for to account for the variability innate in these characteristics.

The first model estimated the relationship between avoidant attachment and levels of warmth and conflict in the sibling relationship. It was hypothesized

that warmth will negatively predict avoidant attachment and that conflict will positively predict avoidant attachment. The equation for this model was as follows: avoidant attachment = age + gender + race + warmth + conflict.

The second model estimated the relationship between scores on the anxiety attachment and levels of warmth and conflict in the sibling relationship. It was hypothesized that conflict will positively predict anxious attachment and that warmth will negatively predict anxious attachment. The equation for this model was as follows: anxious attachment = age + gender + race + warmth + conflict.

Since there was a significant relationship between avoidant attachment and warmth, eight additional models were constructed to explore what specific factors within warmth (Similarity, Intimacy, Affection, Admiration, Emotional Support, Instrumental Support, Acceptance, and Knowledge) were significantly related to avoidant attachment. Preliminary analyses suggested that avoidant attachment was more related to warmth than conflict, and it was expected that this relationship will be explored further in these models. The model was constructed as follows: avoidant attachment = age + gender + race + warmth factor.

Since there was a significant relationship between anxious attachment and conflict, four additional models were constructed to estimate the relationship between scores on the Anxiety subscale and specific conflict factors (Quarreling, Antagonism, Competition, and Dominance). Preliminary analyses suggested that anxious attachment was more related to conflict than warmth, and it was expected that this relationship would be explored further in these models. The model was

constructed as follows: avoidant attachment = age + gender + race + conflict factor.

Once these models were constructed, additional models were estimated to determine the main interaction effect of family illness experience and aspects of warmth or conflict that have a significant relationship with each attachment style. Since all warmth factors were found to be significantly related to avoidant attachment, eight additional models were constructed to estimate the relationship between scores on the Avoidance subscale and the interaction of family illness experience (either well sibling, ill sibling, or well sibling of an ill child) and specific warmth factors. The model was constructed as follows: avoidant attachment = age + gender + race + family illness experience + warmth factor + (family illness experience * warmth factor).

Since all conflict factors were found to be significantly related to anxious attachment, four additional models were constructed to estimate the relationship between scores on the Anxiety subscale and the interaction of family illness experience and specific conflict factors. The model was constructed as follows: anxious attachment = age + gender + race + family illness experience + conflict factor + (family illness experience * conflict factor).

RESULTS

A total of 418 young adults (74.6% white, 58.9% female) participated in this study. The well sibling sample was predominately white (75.8%) and female (63.2%) and had a mean age of 18.96 years (SD = 1.48). The ill child/sibling of ill

child sample was also predominately white (73.3%) and female (53.8%) and had a mean age of 18.88 years ($SD = 1.53$). Participants' demographics are presented in Table 1. The well sibling sample had an average score of 69.25 on the avoidant attachment subscale ($SD = 9.59$), an average score of 58.60 on the anxious attachment subscale ($SD = 18.24$), an average score of 58.24 on the conflict subscale ($SD = 18.37$), and an average score of 165.17 on the sibling warmth scale ($SD = 34.19$). The ill child/sibling of ill child sample had an average score of 69.45 on the avoidant attachment subscale ($SD = 10.00$), an average score of 61.56 on the anxious attachment subscale ($SD = 18.87$), an average score of 56.64 on the conflict subscale ($SD = 17.06$) and an average score of 161.40 on the warmth subscale ($SD = 34.51$) (see Table 2). The Warmth and Conflict scales used in this study provide questions that are most closely related to sibling relationships and that are significantly correlated with Anxious and Avoidant scales in the Experiences in Close Relationships scale. Independent sample t-tests were conducted to determine whether there was any significant difference in attachment style, conflict, and warmth between the well child and ill family member samples (both ill child and sibling of ill child samples). The two samples will be referred to as the well child and ill child samples for the rest of the paper. There was no significant difference in avoidant attachment scores between the two samples, $t(416) = 0.21, p = .67$. There was no significant difference in anxious attachment scores between the well and ill family member samples, $t(416) = -1.63; p = .38$. There was no significant difference in overall conflict scores between the well child and ill family member samples, $t(416) = .92, p =$

.20. There was no significant difference in overall warmth scores between the two samples, $t(416) = 1.12$, $p = .19$; see Table 2).

Table 1. *Descriptive statistics for sample.*

	All participants (N = 418)	Ill child (N = 79)	Sibling of ill child (N = 117)	Well sibling (N = 223)	Ill child and sibling of ill child (N = 196)	Results of T- Test and Chi Square Test
Mean Age	18.92; SD = 1.483	18.99; SD = 2.098	18.81; SD = 0.999	18.96; SD = 1.440	18.88; SD = 1.534	$t(224.133) =$ -1.405; $p = .161$
Gender (%)	58.9% Female	52.6% Female	54.7% Female	63.2% Female	53.8% Female	$\chi^2 = 3.87$ $p = 0.144$
White/nonwhite (%)	74.6% / 25.4%	76.9% / 23.1%	70.9% / 29.1%	75.8% / 24.2%	73.3% / 26.7%	$\chi^2 = 11.247$ $p = 0.188$

Table 2. *Average score on measures.*

	All participants (N = 418) Mean (Standard deviation)	Ill child (N = 79) Mean (Standard deviation)	Sibling of ill child (N = 117) Mean (Standard deviation)	Ill child & Sibling of ill child (N = 196) Mean (Standard Deviation)	Well sibling (N = 223) Mean (Standard deviation)	Results of T-Test t(p value)
Average avoidant attachment score	69.342 (9.763)	69.872 (9.409)	69.171 (10.381)	69.451 (9.985)	69.247 (9.586)	0.214 (0.671)
Average anxious attachment score	59.979 (18.572)	61.218 (18.212)	61.786 (19.368)	61.559 (18.869)	58.596 (18.239)	-1.630 (.377)
Average sibling conflict score	57.493 (17.763)	58.487 (16.424)	55.402 (17.422)	56.636 (17.055)	58.242 (18.366)	.922 (.195)
Average sibling warmth score	163.409 (34.350)	164.603 (32.812)	159.256 (35.568)	161.395 (34.506)	165.170 (34.193)	1.121 (.186)

Avoidant attachment and sibling relationship factors

After controlling for age, gender, and ethnicity, sibling warmth, which here is defined as a positive measure of the overall warmth and affection that siblings show each other throughout their lives, ($\beta = -.26, p < .001$) was found to be significantly related to avoidant attachment among all participants, $\Delta R^2 = .02, F(4, 413) = 2.79, p < .001$. These results suggest that participants who reported higher levels of warmth in their sibling relationship had lower levels of avoidant attachment. Sibling conflict, which here is defined as more negative aspects of the sibling relationship, such as arguing or competing for parental attention, was not significantly related to avoidant attachment ($\beta = -.05, p = .28$; see Table 3).

Table 3. *Multiple regression results of the relationship between avoidant attachment and warmth and conflict.*

Predictor	ΔR^2	<i>b</i>	<i>SEB</i>	95% <i>CI</i>	β	<i>p value</i>
Step 1	.013					.132
Constant		75.685	6.575	62.76, 88.61		.000
Age		-.124	.324	-0.761, .512	-.019	.701
Gender		-1.649	.975	-3.565, .267	-.083	.091
Ethnicity		-1.833	1.094	-3.984, .318	-.082	.095
Step 2	.081***					.000
Constant		88.825	6.999	75.067, 102.583		.000
Age		-.142	.313	-0.758, .474	-.022	.651
Gender		-1.122	.952	-2.993, .749	-.057	.239
Ethnicity		-1.588	1.060	-3.672, .495	-.071	.135
Conflict (total)		-.029	.026	-0.080, .034	-.052	.278
Warmth (total)		-.075	.014	-.101, -.048	-.263***	.000

Note. *CI* = confidence interval; * $p < .05$; ** $p < .01$; *** $p < .001$

Separate hierarchical linear multiple regression analyses were completed for each warmth factor and avoidant attachment with age, gender, and ethnicity entered in step 1 and the respective factor entered in step 2. Similarity was entered in step 1 and the respective factor entered in step 2. Similarity was significantly negatively related to avoidant attachment ($\beta = -.11$; $\Delta R^2 = .03$, $F(4, 413) = 2.80$ $p < .05$; see Table 4). Similarity is defined as the commonalities that siblings have, both in their personalities and in their lifestyle choices that contribute to increased warm and affectionate behavior between them. These results suggest that siblings with similar personalities and lifestyles are less likely to have avoidant attachment.

Table 4. Multiple regression results of the relationship between avoidant attachment and similarity.

Predictor	ΔR^2	<i>b</i>	<i>SEB</i>	95% <i>CI</i>	β	<i>p-value</i>
Step 1	.013					.132
Constant		75.685	6.575	62.76, 88.61		.000
Age		-.124	.324	-.761, .512	-.019	.701
Gender		-1.649	.975	-3.565, .267	-.083	.091
Ethnicity		-1.833	1.094	-3.984, .318	-.082	.095
Step 2	.026*					.026
Constant		78.39	6.642	65.334, 91.447		.000
Age		-.144	.322	-.777, .489	-.022	.655
Gender		-1.649	.969	-3.555, .256	-.083	.090
Ethnicity		-1.645	1.091	-3.79, .501	-.073	.133
Similarity		-.277	.119	-.511, -.044	-.114*	.020

Note. *CI* = confidence interval; * $p < .05$; ** $p < .01$; *** $p < .001$

Intimacy was significantly negatively related to avoidant attachment ($\beta = -.25$; $\Delta R^2 = .07$, $F(4, 413) = 8.24$, $p < .001$; see Table 5). Intimacy is defined as the frequency at which siblings disclose personal information and struggles in each

other, either for advice or as a confidant. These results suggest that siblings who frequently disclose intimate, personal details to each other are less likely to have avoidant attachment.

Table 5. Multiple regression results of the relationship between avoidant attachment and intimacy.

Predictor	ΔR^2	<i>b</i>	<i>SEB</i>	95% <i>CI</i>	β	<i>p</i> -value
Step 1	.013					.132
Constant		75.685	6.575	62.76, 88.61		.000
Age		-.124	.324	-.761, .512	-.019	.701
Gender		-1.649	.975	-3.565, .267	-.083	.091
Ethnicity		-1.833	1.094	-3.984, .318	-.082	.095
Step 2	.074***					.000
Constant		78.207	6.397	65.632, 90.782		.000
Age		-.048	.314	-.665, .57	-.007	.880
Gender		-1.018	.953	-2.892, .856	-.051	.286
Ethnicity		-1.504	1.063	-3.594, .586	-.067	.158
Intimacy		-.396	.076	-.546, -.246	-.248***	.000

Note. *CI* = confidence interval; * $p < .05$; ** $p < .01$; *** $p < .001$

Affection was significantly negatively related with low avoidant attachment ($\beta = -.23$; $\Delta R^2 = .07$, $F(4, 413) = 7.26$, $p < .001$; see Table 6).

Affection is defined as how friendly and intimate of a relationship the siblings have with each other. These results suggest that siblings who show more affection towards each other are less likely to have avoidant attachment.

Table 6. Multiple regression results of the relationship between avoidant*attachment and affection.*

Predictor	ΔR^2	<i>b</i>	<i>SEB</i>	95% <i>CI</i>	β	<i>p</i> - value
Step 1	.013					.132
Constant		75.685	6.575	62.76, 88.61		.000
Age		-.124	.324	-.761, .512	-.019	.701
Gender		-1.649	.975	-3.565, .267	-.083	.091
Ethnicity		-1.833	1.094	-3.984, .318	-.082	.095
Step 2	.066***					.000
Constant		82.412	6.558	69.521, 95.303		.000
Age		-.162	.316	-.782, .458	-.025	.608
Gender		-1.309	.952	-3.181, .562	-.066	.170
Ethnicity		-1.852	1.066	-3.948, .244	-.083	.083
Affection		-.385	.080	-.543, -.227	-.229***	.000

Note. *CI* = confidence interval; * $p < .05$; ** $p < .01$; *** $p < .001$

Admiration was significantly negatively related to avoidant attachment ($\beta = -.18$, $\Delta R^2 = .04$, $F(4, 413) = 4.80$, $p < .001$; see Table 7). Admiration is defined as the degree to which the siblings look up to each other and are proud of each other for their individual accomplishments in life. These results suggest that siblings who admire and look up to each other are less likely to have avoidant attachment.

Table 7. Multiple regression results of the relationship between avoidant attachment and admiration.

Predictor	ΔR^2	<i>b</i>	<i>SEB</i>	95% <i>CI</i>	β	<i>p</i> -value
Step 1	.013					.132
Constant		75.685	6.575	62.76, 88.61		.000
Age		-.124	.324	-.761, .512	-.019	.701
Gender		-1.649	.975	-3.565, .318	-.083	.091
Ethnicity		-1.833	1.094	-3.984, .318	-.082	.095
Step 2	.044***					.001
Constant		82.544	6.745	69.285, 95.803		.000
Age		-.169	.319	-.797, .458	-.026	.596
Gender		-1.227	.967	-3.128, .674	-.062	.205
Ethnicity		-1.842	1.078	-3.961, .278	-.082	.088
Admiration		-.365	.100	-.562, -.169	-.177***	.000

Note. *CI* = confidence interval; * $p < .05$; ** $p < .01$; *** $p < .001$.

Emotional support was significantly negatively related to avoidant attachment ($\beta = -.27$; $\Delta R^2 = .08$, $F(4, 413) = 9.48$, $p < .001$; see Table 8).

Emotional support is defined as how often siblings try to support each other in emotional ways, such as attempting to cheer each other up or helping each other talk through difficult problems. These results suggest that siblings who frequently support each other emotionally are less likely to have avoidant attachment.

Table 8. Multiple regression results of the relationship between avoidant attachment and emotional support.

Predictor	ΔR^2	<i>b</i>	<i>SEB</i>	95% <i>CI</i>	β	<i>p</i> -value
Step 1	.013					.132
Constant		75.685	6.575	62.76, 88.61		.000
Age		-.124	.324	-.761, .512	-.019	.701
Gender		-1.649	.975	-3.565, .267	-.083	.091
Ethnicity		-1.833	1.094	-3.984, .318	-.082	.095
Step 2	.084***					.000
Constant		80.086	6.391	67.523, 92.649		.000
Age		-.093	.312	-.707, .521	-.014	.767
Gender		-.767	.953	-2.64, 1.107	-.039	.422
Ethnicity		-1.601	1.056	-3.678, .475	-.071	.130
Emotional support		-.441	.078	-.595, -.288	-.270***	.000

Note. *CI* = confidence interval; * $p < .05$; ** $p < .01$; *** $p < .001$

Instrumental support was significantly negatively related to avoidant attachment ($\beta = -.21$; $\Delta R^2 = .06$, $F(4, 413) = 6.27$, $p < .001$; see Table 9). Instrumental support is defined as how frequently the siblings try to support each other in non-emotional ways, such as through lending each other money or doing other such favors for each other. These results suggest that siblings who frequently support each other in non-emotional ways are less likely to have avoidant attachment.

Table 9. Multiple regression results of the relationship between avoidant attachment and instrumental support.

Predictor	ΔR^2	<i>b</i>	<i>SEB</i>	95% <i>CI</i>	β	<i>p</i> -value
Step 1	.013					.132
Constant		75.685	6.575	62.76, 88.61		.000
Age		-.124	.324	-.761, .512	-.019	.701
Gender		-1.649	.975	-3.565, .267	-.083	.091
Ethnicity		-1.833	1.094	-3.984, .318	-.082	.095
Step 2	.057***					.000
Constant		81.308	6.562	68.409, 94.208		.000
Age		-.186	.317	-.809, .437	-.028	.558
Gender		-1.329	.957	-3.209, .552	-.067	.166
Ethnicity		-2.002	1.072	-4.108, .105	-.089	.062
Instrumental support		-.410	.094	-.594, -.226	-.210***	.000

Note. *CI* = confidence interval; * $p < .05$; ** $p < .01$; *** $p < .001$

Acceptance was significantly negatively related to avoidant attachment ($\beta = -.16$; $\Delta R^2 = .04$, $F(4, 413) = , p < .01$; see Table 10). Acceptance is defined as the degree to which siblings recognize and acknowledge each other's unique personalities, skills, and lifestyles. These results suggest that siblings who accept each other's personalities and lifestyles are less likely to have avoidant attachment.

Table 10. Multiple regression results of the relationship between avoidant attachment and acceptance.

Predictor	ΔR^2	<i>b</i>	<i>SEB</i>	95% <i>CI</i>	β	<i>p-value</i>
Step 1	.012					.172
Constant		75.160	6.634	62.118, 88.203		.000
Age		-.105	.327	-.748, .537	-.016	.747
Gender		-1.666	.994	-3.620, .287	-.084	.094
Ethnicity		-1.645	1.117	-3.840, .550	-.073	.141
Step 2	.036**					.005
Constant		81.218	6.837	67.776, 94.660		.000
Age		-.108	.323	-.744, .528	-.016	.739
Gender		-1.443	.985	-3.379, .494	-.072	.144
Ethnicity		-1.354	1.108	-3.533, .824	-.060	.222
Acceptance		-.351	.111	-.570, -.132	-.156**	.002

Note. *CI* = confidence interval; * $p < .05$; ** $p < .01$; *** $p < .001$

Knowledge was significantly negatively related to avoidant attachment ($\beta = .23$; $\Delta R^2 = .07$, $F(4, 413) = 7.18$, $p < .001$; see Table 11). Knowledge is defined as how much the siblings know about each other as people and about the different aspects of each sibling's life and relationships. These results suggest that siblings who know more about each other's lives are less likely to have avoidant attachment.

Table 11. Multiple regression results of the relationship between avoidant attachment and knowledge.

Predictor	ΔR^2	<i>b</i>	<i>SEB</i>	95% <i>CI</i>	β	<i>p</i> -value
Step 1	.013					.132
Constant		75.685	6.575	62.76, 88.61		.000
Age		-.124	.324	-.761, .512	-.019	.701
Gender		-1.649	.975	-3.565, .267	-.083	.091
Ethnicity		-1.833	1.094	-3.984, .318	-.082	.095
Step 2	.065***					.000
Constant		80.160	6.477	67.427, 92.892		.000
Age		-.085	.316	-.705, .536	-.013	.789
Gender		-1.111	.957	-2.991, .769	-.056	.246
Ethnicity		-1.599	1.068	-3.697, .5	-.071	.135
Knowledge		-.420	.088	-.594, -.247	-.229***	.000

Note. *CI* = confidence interval; * $p < .05$; ** $p < .01$; *** $p < .001$

Table 12 shows the relationship between avoidant attachment and all warmth factors.

Table 12. Multiple regression results of the relationship between avoidant attachment and warmth factors.

Predictor	ΔR^2	<i>b</i>	<i>SEB</i>	95% <i>CI</i>	β	<i>p</i> -value
Step 1	.012					.172
Constant		75.160	6.634	62.118, 88.203		.000
Age		-.105	.327	-.748, .537	-.016	.747
Gender		-1.666	.994	-3.620, .287	-.084	.094
Ethnicity		-1.645	1.117	-3.840, .550	-.073	.141
Step 2	.089***					.000
Constant		80.993	7.007	67.216, 94.769		.000
Age		-.075	.322	-.707, .558	-.011	.817
Gender		-.606	.996	-2.564, 1.352	-.030	.543
Ethnicity		-1.686	1.108	-3.866, .493	-.075	.129
Similarity		.228	.162	-.091, .546	.090	.160
Intimacy		-.075	.168	-.406, .255	-.046	.654
Affection		-.030	.162	-.348, .288	-.017	.854
Admiration		-.039	.166	-.366, .287	-.019	.813
Emotional support		-.263	.170	-.597, .071	-.155	.122
Instrumental support		-.101	.132	-.360, .159	-.051	.447
Acceptance		-.029	.157	-.337, .278	-.013	.851
Knowledge		-.142	.162	-.460, .176	-.075	.380

Note. *CI* = confidence interval; * $p < .05$; ** $p < .01$; *** $p < .001$

Anxious attachment and sibling relationship factors

After controlling for age, gender, and ethnicity, sibling conflict ($\beta = .27, p < .001$) was found to be significantly related with anxious attachment among all participants, $\Delta R^2 = .08, F(5, 412) = 7.37$. Sibling warmth was not found to be significantly related to anxious attachment, ($\beta = -.04, p = .44$; see Table 13). These results provide evidence that participants who reported higher levels of conflict in their sibling relationship had higher levels of anxious attachment.

Table 13. Multiple regression results of the relationship between anxious attachment and warmth and conflict.

Predictor	ΔR^2	<i>b</i>	<i>SEB</i>	95% <i>CI</i>	β	<i>p-value</i>
Step 1	.007					.404
Constant		52.080	12.549	27.411, 76.748		.000
Age		.627	.618	-.587, 1.842	.050	.310
Gender		-2.279	1.860	-5.935, 1.377	-.060	.221
Ethnicity		-.472	2.088	-4.577, 3.633	-.011	.821
Step 2	.082***					.000
Constant		35.334	13.304	9.181, 61.487		.008
Age		.754	.596	-.417, 1.925	.060	.206
Gender		-1.289	1.809	-4.846, 2.267	-.034	.476
Ethnicity		-.521	2.014	-4.481, 3.439	-.012	.796
Conflict (total)		.280	.050	.182, .378	.268***	.000
Warmth (total)		-.020	.026	-.071, .031	-.037	.438

Note. *CI* = confidence interval; * $p < .05$; ** $p < .01$; *** $p < .001$

Separate hierarchical linear multiple regression analyses were completed for each conflict subscale and avoidant attachment with age, gender, and ethnicity entered in step 1 and the respective subscale entered in step 2. Quarrelling was significantly positively related to anxious attachment ($\beta = .21; \Delta R^2 = .05, F(4, 413) = 5.44, p < .001$; see Table 14). Quarreling is defined as how often the siblings argue with and criticize each other. These results suggest that siblings who argue more are more likely to have anxious attachment.

Table 14. Multiple regression results of the relationship between anxious attachment and quarreling.

Predictor	ΔR^2	<i>b</i>	<i>SEB</i>	95% <i>CI</i>	β	<i>p</i> -value
Step 1	.007					.404
Constant		52.080	12.549	27.411, 76.748		.000
Age		.627	.618	-.587, 1.842	.050	.310
Gender		-2.279	1.860	-5.935, 1.377	-.060	.221
Ethnicity		-.472	2.088	-4.577, 3.633	-.011	.821
Step 2	.050***					.000
Constant		43.860	12.435	19.416, 68.305		.000
Age		.659	.605	-.531, 1.848	.053	.277
Gender		-1.693	1.827	-5.284, 1.897	-.045	.354
Ethnicity		-.282	2.045	-4.302, 3.739	-.007	.891
Quarreling		.816	.189	.445, 1.187	.208***	.000

Note. *CI* = confidence interval; * $p < .05$; ** $p < .01$; *** $p < .001$

Antagonism was significantly positively related to anxious attachment (β

= .26; $\Delta R^2 = .07$, $F(4, 413) = 8.15$, $p < .001$; see Table 15). Antagonism is defined

as how frequently the siblings purposefully irritate and tease each other. These

results suggest that siblings who antagonize and annoy each other more frequently

are more likely to have anxious attachment.

Table 15. Multiple regression results of the relationship between anxious

attachment and antagonism.

Predictor	ΔR^2	<i>b</i>	<i>SEB</i>	95% <i>CI</i>	β	<i>p</i> -value
Step 1	.007					.404
Constant		52.080	12.549	27.411, 76.748		.000
Age		.627	.618	-.587, 1.842	.050	.310
Gender		-2.279	1.860	-5.935, 1.377	-.060	.221
Ethnicity		-.472	2.088	-4.577, 3.633	-.011	.821
Step 2	.073***					.000
Constant		41.715	12.288	17.560, 65.871		.001
Age		.750	.598	-.426, 1.925	.060	.211
Gender		-1.556	1.804	-5.102, 1.991	-.041	.389
Ethnicity		-.134	2.021	-4.107, 3.838	-.003	.947
Antagonism		.852	.157	.543, 1.161	.258***	.000

Note. *CI* = confidence interval; * $p < .05$; ** $p < .01$; *** $p < .001$

Competition was significantly positively related to anxious attachment ($\beta = .19$; $\Delta R^2 = .04$, $F(4, 413) = 4.49$, $p < .001$; see Table 16). Competition is defined as how competitive the siblings are with each other and how often they try to out-do each other. These results suggest that siblings who compete with each other more frequently are more likely to have anxious attachment.

Table 16. Multiple regression results of the relationship between anxious attachment and competition.

Predictor	ΔR^2	<i>b</i>	<i>SEB</i>	95% <i>CI</i>	β	<i>p-value</i>
Step 1	.007					.404
Constant		52.080	12.549	27.411, 76.748		.000
Age		.627	.618	-.587, 1.842	.050	.310
Gender		-2.279	1.860	-5.935, 1.377	-.060	.221
Ethnicity		-.472	2.088	-4.577, 3.633	-.011	.821
Step 2	.042**					.001
Constant		44.990	12.479	20.460, 69.520		.000
Age		.667	.608	-.527, 1.862	.053	.273
Gender		-1.496	1.841	-5.114, 2.122	-.040	.417
Ethnicity		-1.373	2.067	-5.437, 2.690	-.032	.507
Competition		.602	.156	.296, .908	.189***	.000

Note. *CI* = confidence interval; * $p < .05$; ** $p < .01$; *** $p < .001$

Dominance was significantly positively related to anxious attachment ($\beta = .27$; $\Delta R^2 = .08$, $F(4, 413) = 8.72$, $p < .001$; see Table 17). Dominance is defined as the degree to which the siblings exert their own superiority over the other. These results suggest that siblings who frequently attempt to exert dominance over each other are more likely to have anxious attachment.

Table 17. Multiple regression results of the relationship between anxious attachment and dominance.

Predictor	ΔR^2	<i>b</i>	<i>SEB</i>	95% <i>CI</i>	β	<i>p</i> -value
Step 1	.007					.404
Constant		52.080	12.549	27.411, 76.748		.000
Age		.627	.618	-.587, 1.842	.050	.310
Gender		-2.279	1.860	-5.935, 1.377	-.060	.221
Ethnicity		-.472	2.088	-4.577, 3.633	-.011	.821
Step 2	.078***					.000
Constant		38.575	12.343	14.312, 62.838		.002
Age		.836	.597	-.338, 2.010	.067	.163
Gender		-2.202	1.795	-5.730, 1.326	-.058	.221
Ethnicity		-.003	2.017	-3.967, 3.961	.000	.999
Dominance		1.000	.178	.651, 1.349	.267***	.000

Note. *CI* = confidence interval; * $p < .05$; ** $p < .01$; *** $p < .001$

Table 18 shows the relationships between anxious attachment and all conflict factors.

Table 18. Multiple regression results of the relationships between anxious attachment and all conflict factors.

Predictor	ΔR^2	<i>b</i>	<i>SEB</i>	95% <i>CI</i>	β	<i>p</i> -value
Step 1	.007					.404
Constant		52.080	12.549	27.411, 76.748		.000
Age		.627	.618	-.587, 1.842	.050	.310
Gender		-2.279	1.860	-5.935, 1.377	-.060	.221
Ethnicity		-.472	2.088	-4.577, 3.633	-.011	.821
Step 2	.088***					.000
Constant		37.854	12.334	13.610, 62.099		.002
Age		.828	.597	-.344, 2.001	.066	.166
Gender		-1.682	1.814	-5.247, 1.884	-.045	.354
Ethnicity		-.352	2.038	-4.358, 3.654	-.008	.863
Quarrelling		-.254	.332	-.908, .399	-.065	.445
Antagonism		.555	.304	-.043, 1.152	.168	.069
Competition		.204	.183	-.155, .563	.064	.264
Dominance		.565	.295	-.014, 1.145	.151	.056

Note. *CI* = confidence interval; * $p < .05$; ** $p < .01$; *** $p < .001$

Interactions between sibling population, attachment, and sibling relationship factors

After controlling for age, gender, and ethnicity, multiple regression analyses were conducted to determine if the relationship between specific warmth factors (similarity, intimacy, affection, admiration, emotional support, instrumental support, acceptance, and knowledge) and avoidant attachment style was dependent on family illness experience status. The two family illness experience groups were (1) growing up as an ill child or the sibling of an ill child and (2) growing up in a family with no ill children. Age, gender, and ethnicity were entered in step 1, family illness experience and the respective subscale were entered in step 2, and the interaction of family illness experience and the respective subscale was entered in step 3. The relationship between similarity and avoidant attachment style was not dependent on family illness experience (interaction family illness experience x similarity $\beta = .08$; $p = .69$; see Table A in Appendix I). The relationship between intimacy and avoidant attachment style was not dependent on family illness experience (interaction family illness experience x intimacy $\beta = .08$; $p = .29$; see Table B in Appendix I). The relationship between affection and avoidant attachment style was not dependent on family illness experience (interaction family illness experience x affection $\beta = .04$; $p = .87$; see Table C in Appendix I). The relationship between admiration and avoidant attachment style was not dependent on family illness experience (interaction family illness experience x admiration $\beta = .18$; $p = .46$; see Table D in Appendix I). The relationship between emotional support and avoidant attachment

style was not dependent on family illness experience (interaction family illness experience x emotional support $\beta = .002$; $p = .99$; see Table E in Appendix I). The relationship between instrumental support and avoidant attachment style was not dependent on family illness experience (interaction family illness experience x instrumental support $\beta = -.05$; $p = .76$; see Table F in Appendix I). The relationship between acceptance and avoidant attachment style was not dependent on family illness experience (interaction family illness experience x acceptance $\beta = -.19$; $p = .46$; see Table G in Appendix I). The relationship between knowledge and avoidant attachment style was not dependent on family illness experience (interaction family illness experience x knowledge $\beta = .03$; $p = .88$; see Table H in Appendix I).

After controlling for age, gender, and ethnicity, multiple regression analyses were conducted to measure the relationship between the interaction of family illness experience and specific conflict factors (quarreling, antagonism, competition, dominance) and anxious attachment. Age, gender, and ethnicity were entered in step 1, family illness experience and the respective subscale were entered in step 2, and the interaction of family illness experience and the respective subscale was entered in step 3. The relationship between quarreling and anxious attachment style was not dependent on family illness experience (interaction family illness experience x quarreling $\beta = -.11$; $p = .52$; see Table A in Appendix II). The relationship between antagonism and anxious attachment style was not dependent on family illness experience (interaction family illness experience x antagonism $\beta = -.02$; $p = .91$; see Table B in Appendix II). The

relationship between competition and anxious attachment style was not dependent on family illness experience (interaction family illness experience x competition $\beta = -.15$; $p = .37$; see Table C in Appendix II). The relationship between dominance and anxious attachment style was not dependent on family illness experience (interaction family illness experience x dominance $\beta = .02$; $p = .93$; see Table D in Appendix II).

The same relationships were also explored between the ill child and sibling of ill child family experience groups. No significant relationships were found among any of the interactions between family illness experience and specific warmth factors and low avoidant attachment, nor between the interactions of family illness experience and specific conflict factors and anxious attachment.

DISCUSSION

The results of this study suggest that increased warmth in the sibling relationship was related to lower levels of avoidant attachment. This relationship was significant for all warmth factors (similarity, intimacy, affection, admiration, emotional support, instrumental support, acceptance, and knowledge). This is inconsistent with the study's hypothesis that conflict would be positively related with avoidant attachment, as conflict was not found to be significantly related to avoidant attachment. However, it was consistent with the hypothesis that warmth would be negatively related to lower levels of avoidant attachment. Additionally, increased conflict in the sibling relationship was related to higher levels of anxious attachment, and this relationship was significant for all conflict factors (quarreling, antagonism, competition, and dominance). This is consistent with the

study's hypothesis that conflict would be positively related with anxious attachment, but inconsistent with the hypothesis that higher levels of warmth would be negatively related with anxious attachment. The relationship between individual warmth factors and avoidant attachment style was not dependent on family illness experience, nor was the relationship between individual conflict factors and anxious attachment style. This is inconsistent with the study's hypothesis that having grown up in a household with an ill child would lead to a decrease in conflict.

The results of this study suggest that siblings with relationships that are less warm are more likely to have an avoidant attachment style. This relationship is not completely unexpected, given that people with avoidant attachment styles tend to downplay their reliance on others and eschew close emotional relationships (Fortuna et al, 2011). Siblings who have an avoidant attachment relationship with their parents typically have been shown less warmth and affection than those who are securely attached, and it is anticipated that they would expand these interaction patterns to their other relationships, including those with their siblings (Ainsworth, 1973).

While all aspects of sibling warmth were found to be inversely related to avoidant attachment, intimacy and emotional support had the strongest relationships, according to the significance level of the regressions in this study. This may be because intimacy and emotional support are some indicators of secure attachment, since people with secure attachment styles have relationships characterized by trust and sharing with others (Cummings et al, 2006). The

stronger inverse relationship between these two factors and avoidant attachment may be because of the prevalence of these traits in siblings with secure relationships. Clinicians should encourage parents and caregivers to foster warm relationships between siblings, particularly those that emphasize close emotional disclosure. Promoting emotional closeness in siblings could help prevent some of the difficulties associated with avoidant attachment. Additionally, future research could examine whether intimacy and emotional support are strong predictors of having a secure attachment style.

Conflict in sibling relationships was found to have no significant impact on avoidant attachment style. This goes against previous findings that siblings with avoidant attachment style had more conflict in their relationships as young adults (Fortuna et al, 2011; Volling, 1997). One reason for the lack of a significant relationship could be that people with avoidant attachment styles put effort into detaching from and removing themselves from emotionally-charged situations, both positive and negative, due to their general dismissiveness towards emotional relationships (Fortuna et al, 2011).

Research has shown healthy coping skills as one of the benefits of emotionally close sibling relationships (Buist et al, 2013). Additionally, warmth and healthy coping skills have been found to be related to more securely attached individuals (Cummings et al, 2006). Since the results of this study suggest that warmth is related to lower levels of avoidant attachment, it could also be presumed that warmth could also be related to healthy coping strategies. Encouraging such emotional disclosure at a young age could help create more

securely attached individuals and help children to develop healthy coping strategies early in life, which could help prevent internalizing and externalizing problems in adolescence and adulthood.

Additionally, the results of this study suggest that conflict in the sibling relationship is positively related to anxious attachment. This is consistent with the literature on this topic showing that siblings who are insecurely attached often have relationships with more conflict than those who are securely attached (Volling, 2001; Volling et al, 1992). Given that these siblings who have been anxiously attached have been primed by their relationship with their primary caregiver to believe that relationships with others are often chaotic and uncertain, it is expected that these children would have relationships with their siblings that are characterized by conflict (Simpson & Rholes, 2010). Since all conflict factors had strong relationships with anxious attachment, this tells us that all aspects of sibling conflict are important in relation to attachment style. It is not one specific factor of conflict that is related to attachment style; rather, the existence of conflict on its own is enough to influence anxious attachment. Therefore, if conflict is observed in a sibling relationship, these siblings should have supports in place to work through their conflict, so they can learn the healthy coping skills that they may gain in warmer, more secure relationships.

It is important to note that warmth was not significantly related to anxious attachment in this study. This is not unexpected, given that previous research has shown that children with anxious attachment styles value relationships with high levels of emotional disclosure (Maio et al, 2000). While people with anxious

attachment styles place a high value on emotional relationships, they often do not feel that their feelings are reciprocated (Maio et al, 2000). Perhaps if there is already warmth and closeness in a sibling relationship, those involved do not feel anxious about whether a person is going to be there for them, since their feelings are being outwardly reciprocated by their sibling. The warmth in a sibling relationship therefore would not cause feelings that would lead to detachment and an anxious attachment style.

This study found no moderating relationship of family illness experience on the relationship between warmth factors and avoidant attachment, nor between conflict factors and anxious attachment. Given that the literature examining the impact of having an ill child in the household on family members typically notes some positive influence of having an ill child on the sibling relationship (Waite-Jones et al, 2008; Williams et al, 2009), this study contradicts previous findings related to this topic. One potential reason for this result and a limitation of this study is that there was only one source reporting on the sibling relationship – one of the siblings. There were no interactions with the other siblings in question, nor were there outside observations that could have provided additional insight into the quality of the sibling relationship. Having more sources of information about how the participants in this study interacted with their siblings could have provided a more thorough picture of any potential interactions by providing concrete examples of sibling interactions that inspired warmth or conflict in the sibling relationships. Knowing more about what these sibling relationships look like in context and being able to speak to the participants about their feelings

towards their siblings would provide a better understanding of sibling relationships and how aspects of warmth and conflict influence them. Future research on this topic should be conducted with this in mind so that they may provide more in-depth knowledge of the sibling relationship.

Another reason why there was no moderating relationship of family illness experience on the relationship between warmth factors and avoidant attachment, nor between conflict factors and anxious attachment may be due to the mix of illnesses reported in the families, and the likely varying severity. Due to the variance in disease and severity and the inability of this study to operationalize these factors, every participant's family illness experience was treated as similar. If the study focused on specific illnesses and severity levels, the results may have been different, and, at the very least, we would have more confidence in the results.

This result could also have been influenced by the sample size in this study. There were 418 participants, and the sample was predominately white, female, and concentrated in the 18-22 age range. This sample is neither large nor diverse enough to be representative of the greater population, which could explain why there was no clear moderating impact of family illness experience on the relationship between sibling warmth and conflict and attachment style.

However, there is also the possibility that, even in studies centered on a specific illness, siblings interact the same based on attachment style regardless of attachment style. This tells us that all the other factors that come along with having an ill child in the family, such as hospital visits, time away from family,

and worries about the ill child's health, are not strong enough to alter the foundation laid by attachment style. The results of this study help clarify how much influence one's attachment style has on their relationships.

Limitations and implications

One limitation of this study is the sample. There were 418 participants in this study, and it was concentrated at one university in one part of the country. Additionally, the sample is very homogenous in terms of age, gender, and ethnicity compared to the general population. Due to the characteristics of this sample, it is difficult to generalize the results of this study to the greater population. However, the results may hold true for young adults growing up in the region of the country where this study was conducted. Additionally, a larger and more diverse sample would have allowed for a more sufficient analysis of the variables in this study. A more variable sample would lend more strength to the claims made in this study, since it would be able to be generalized to the greater population. Efforts should be made in the future to conduct research with more diverse samples in terms of the ages, genders, and ethnicities of this population.

Some of the implications for future research have already been discussed, including research with more diverse populations, more information sources on the nature of the sibling relationships, and conducting research on this topic centered on one specific illness at a time. Additionally, it may help in future research to ask more specific questions about the nature of warmth and conflict in a sibling relationship and operationalizing the measures more precisely. For example, siblings quarreling once a week may be seen by one participant as

frequently arguing, and another as typical arguing. Standardizing measures to more specific numbers can help to create a clearer image of what sibling relationships are truly like in this population.

Another important demographic variable to consider in future research is the makeup of the families these siblings are in. Growing up in a two-parent household, single-parent household, or a household in which multiple generations live together can have an impact on the lived experience of these siblings. Additionally, the number of siblings that are in a particular family and their relationships with each other can impact the relationships between particular sibling pairs in a household, as well as whether there are multiple ill children in the same household. Furthermore, it is important to consider the length of diagnosis when conducting research with this population. A family, and the siblings within it, with a child who has recently been diagnosed and is adjusting to the lifestyle changes that come along with a diagnosis will have a different lived experience compared to a family with a child who has had a diagnosis for several years and is therefore more adjusted to the lifestyle that the diagnosis brings. Therefore, it is important to take these variables into account to determine whether these familial circumstances are having an impact on the sibling relationships.

Since warmth is related to lower levels of avoidant attachment, clinicians should promote warmth and affective closeness among family members and should make an effort to help children whose parents are not as warm with them to show more warmth towards others. Furthermore, since conflict has been found

to reflect anxious attachment, and since anxious attachment is typically found among children who are more detached from their parents (Maio et al, 2000), children in conflictual sibling relationships should be asked about their relationships with their parents as well, and attempts should be made to promote healthier bonds between all members of the family system that are more consistent and less chaotic. One example of an intervention that could be used to accomplish these goals is nurture groups. Developed initially to promote social-emotional development in school settings (Doyle, 2004), the principles of a teacher or clinician modeling proper developmentally-appropriate social skills could be expanded to a variety of contexts, including those with siblings. Clinicians could take on the role of modeling the social behaviors for the siblings to emulate, while also providing a safe, supportive environment for the siblings to practice working through conflicts and confiding in each other.

The results of this study suggest that warmth in the sibling relationship is negatively related with avoidant attachment, and that conflict in the sibling relationship is positively related with anxious attachment. However, no interaction was found between family illness experience and warmth with avoidant attachment, nor between family illness experience and conflict with anxious attachment. There is a need for future research on this topic that examines more specific examples of interactions that lead to both warmth and conflict in the sibling relationship and that has multiple sources of information on the aspects and qualities of the sibling relationships in the study. Future research could also

look at sibling relationships more longitudinally to determine whether these relationships are causative in nature.

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APPENDIX I

Multiple regression results of the relationship between avoidant attachment and family illness experience and the interaction between family illness experience and warmth factors

Table A. Multiple regression results of the relationship between avoidant attachment and family illness experience and the interaction between family illness experience and similarity.

Predictor	ΔR^2	<i>b</i>	<i>SEB</i>	95% <i>CI</i>	β	<i>p</i> -value
Step 1	.013					.132
Constant		75.685	6.575	62.76, 88.61		.000
Age		-.124	.324	-.761, .512	-.019	.701
Gender		-1.649	.975	-3.565, .267	-.083	.091
Ethnicity		-1.833	1.094	-3.984, .318	-.082	.095
Step 2	.026					.051
Constant		78.568	6.905	64.994, 92.142		.000
Age		-.145	.323	-.78, .489	-.022	.652
Gender		-1.658	.975	-3.576, .259	-.084	.090
Ethnicity		-1.647	1.093	-3.796, .501	-.074	.133
Illness experience		-.091	.956	-1.971, 1.789	-.005	.924
Similarity		-.278	.119	-.512, -.044	-.114*	.020
Step 3	.027					.083
Constant		79.801	7.552	64.955, 94.647		.000
Age		-.140	.323	-.776, .495	-.021	.665
Gender		-1.685	.979	-3.608, .239	-.085	.086
Ethnicity		-1.650	1.094	-3.8, .501	-.074	.132
Illness experience		-.954	2.333	-5.54, 3.632	-.049	.683
Similarity		-.422	.374	-1.157, .314	-.173	.261
Interaction		.097	.238	-.372, .565	.075	.685

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

Table B. Multiple regression results of the relationship between avoidant attachment and family illness experience and the interaction between family illness experience and intimacy.

Predictor	ΔR^2	<i>b</i>	<i>SEB</i>	95% <i>CI</i>	β	<i>p</i> - <i>value</i>
Step 1	.013					.132
Constant		75.685	6.575	62.76, 88.61		.000
Age		-.124	.324	-.761, .512	-.019	.701
Gender		-1.649	.975	-3.565, .267	-.083	.091
Ethnicity		-1.833	1.094	-3.984, .318	-.082	.095
Step 2	.074***					.000
Constant		78.481	6.648	65.412, 91.55		.000
Age		-.049	.315	-.668, .57	-.007	.876
Gender		-1.032	.959	-2.917, .852	-.052	.282
Ethnicity		-1.509	1.065	-3.602, .585	-.067	.157
Illness experience		-.143	.932	-1.976, 1.69	-.007	.878
Intimacy		-.396	.076	-.546, -.246	-.249***	.000
Step 3	.077***					.000
Constant		78.633	6.649	65.563, 91.702		.000
Age		-.022	.316	-.643, .599	-.003	.944
Gender		-.964	.961	-2.852, 91.702	-.049	.316
Ethnicity		-1.560	1.066	-3.655, .535	-.070	.144
Illness experience		-.981	1.22	-3.379, 1.416	-.050	.421
Intimacy		-.454	.094	-.638, -.27	-.285***	.000
Interaction		.097	.091	-.082, .275	.075	.287

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

Table C. Multiple regression results of the relationship between avoidant attachment and family illness experience and the interaction between family illness experience and affection.

Predictor	ΔR^2	<i>b</i>	<i>SEB</i>	95% <i>CI</i>	β	<i>p</i> - <i>value</i>
Step 1	.013					.132
Constant		75.685	6.575	62.76, 88.61		.000
Age		-.124	.324	-.761, .512	-.019	.701
Gender		-1.649	.975	-3.565, .267	-.083	.091
Ethnicity		-1.833	1.094	-3.984, .318	-.082	.095
Step 2	.066***					.000
Constant		82.329	6.798	68.965, 95.693		.000
Age		-.162	.316	-.783, .46	-.025	.610
Gender		-1.305	.958	-3.188, .579	-.066	.174
Ethnicity		-1.851	1.068	-3.95, .249	-.083	.084
Illness experience		.044	.936	-1.796, 1.884	.002	.962
Affection		-.385	.080	-.543, -.227	-.229***	.000
Step 3	.066***					.000
Constant		82.953	7.807	67.606, 98.3		.000
Age		-.160	.317	-.783, .462	-.024	.613
Gender		-1.309	.960	-3.196, .577	-.066	.173
Ethnicity		-1.845	1.070	-3.948, .258	-.082	.085
Illness experience		-.404	2.904	-6.113, 5.305	-.029	.883
Affection		-.423	.245	-.905, .06	-.252	.086
Interaction		.026	.162	-.291, .344	.039	.871

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

Table D. Multiple regression results of the relationship between avoidant attachment and family illness experience and the interaction between family illness experience and admiration.

Predictor	ΔR^2	<i>b</i>	<i>SEB</i>	95% <i>CI</i>	β	<i>p</i> - <i>value</i>
Step 1	.013					.132
Constant		75.685	6.575	62.76, 88.61		.000
Age		-.124	.324	-.761, .512	-.019	.701
Gender		-1.649	.975	-3.565, .267	-.083	.091
Ethnicity		-1.833	1.094	-3.984, .318	-.082	.095
Step 2	.044**					.002
Constant		82.489	6.984	68.761, 96.217		.000
Age		-.169	.320	-.798, .46	-.026	.598
Gender		-1.224	.973	-3.137, .689	-.062	.209
Ethnicity		-1.841	1.080	-3.964, .282	-.082	.089
Illness experience		.029	.947	-1.832, 1.89	.001	.976
Admiration		-.365	.100	-.562, -.169	-.177***	.000
Step 3	.046**					.004
Constant		86.309	8.672	69.262, 103.356		.000
Age		-.160	.320	-.789, .47	-.024	.619
Gender		-1.252	.975	-3.168, .663	-.063	.200
Ethnicity		-1.820	1.081	-3.945, .305	-.081	.093
Illness experience		-2.68	3.764	-10.079, 4.719	-.137	.477
Admiration		-.582	.308	-1.189, .024	-.283	.060
Interaction		.148	.199	-.244, .54	.178	.457

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

Table E. Multiple regression results of the relationship between low avoidant attachment and family illness experience and the interaction between family illness experience and emotional support.

Predictor	ΔR^2	<i>b</i>	<i>SEB</i>	95% <i>CI</i>	β	<i>p</i> -value
Step 1	.013					.132
Constant		75.685	6.575	62.76, 88.61		.000
Age		-.124	.324	-.761, .512	-.019	.701
Gender		-1.649	.975	-3.565, .267	-.083	.091
Ethnicity		-1.833	1.094	-3.984, .318	-.082	.095
Step 2	.084***					.000
Constant		80.704	6.649	67.634, 93.773		.000
Age		-.097	.313	-.712, .518	-.015	.757
Gender		-.796	.958	-2.679, 1.087	-.040	.407
Ethnicity		-1.611	1.058	-3.691, .468	-.072	.129
Illness experience		-.317	.928	-2.142, 1.508	-.016	.733
Emotional support		-.443	.078	-.597, -.289	-.271***	.000
Step 3	.084***					.000
Constant		80.738	7.608	65.783, 95.692		.000
Age		-.097	.313	-.713, .519	-.015	.758
Gender		-.796	.960	-2.683, 1.091	-.040	.408
Ethnicity		-1.611	1.060	-3.695, .473	-.072	.129
Illness experience		-.347	2.494	-5.241, 4.564	-.017	.918
Emotional support		-.445	.242	-.921, .031	-.272	.067
Interaction		.001	.156	-.305, .307	.002	.993

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

Table F. Multiple regression results of the relationship between avoidant attachment and family illness experience and the interaction between sibling population and instrumental support.

Predictor	ΔR^2	<i>b</i>	<i>SEB</i>	95% <i>CI</i>	β	<i>p</i> -value
Step 1	.013					.132
Constant		75.685	6.575	62.76, 88.61		.000
Age		-.124	.324	-.761, .512	-.019	.701
Gender		-1.649	.975	-3.565, .267	-.083	.091
Ethnicity		-1.833	1.094	-3.984, .318	-.082	.095
Step 2	.057***					.000
Constant		81.819	6.830	68.394, 95.245		.000
Age		-.190	.318	-.814, .435	-.029	.551
Gender		-1.354	.962	-3.245, .537	-.068	.160
Ethnicity		-2.011	1.073	-4.121, .099	-.090	.062
Illness experience		-.258	.942	-2.109, 1.594	-.013	.785
Instrumental support		-.411	.094	-.596, -.227	-.211***	.000
Step 3	.058***					.000
Constant		80.819	7.598	65.884, 95.754		.000
Age		-.187	.318	-.812, .439	-.028	.558
Gender		-1.372	.965	-3.269, .525	-.069	.156
Ethnicity		-2.008	1.075	-4.12, .105	-.090	.062
Illness experience		.412	2.411	-4.328, 5.153	.021	.864
Instrumental support		-.329	.287	-.894, .236	-.169	.252
Interaction		-.057	.189	-.429, .315	-.054	.763

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

Table G. Multiple regression results of the relationship between avoidant attachment and family illness experience and the interaction between family illness experience and acceptance.

Predictor	ΔR^2	<i>b</i>	<i>SEB</i>	95% <i>CI</i>	β	<i>p</i> -value
Step 1	.012					.172
Constant		75.16	6.634	62.118, 88.203		.000
Age		-.105	.327	-.748, .537	-.016	.747
Gender		-1.666	.994	-3.620, .287	-.084	.094
Ethnicity		-1.645	1.117	-3.84, .55	-.073	.141
Step 2	.037*					.010
Constant		82.268	7.130	68.252, 96.284		.000
Age		-.114	.324	-.751, .523	-.017	.725
Gender		-1.494	.991	-3.442, .454	-.075	.132
Ethnicity		-1.363	1.109	-3.544, .818	-.061	.220
Illness experience		-.512	.974	-2.426, 1.403	-.026	.600
Acceptance		-.356	.112	-.575, -.136	-.158**	.002
Step 3	.038*					.016
Constant		86.707	9.296	68.431, 104.984		.000
Age		-.100	.325	-.738, .539	-.015	.759
Gender		-1.540	.993	-3.493, .413	-.077	.122
Ethnicity		-1.327	1.111	-3.511, .857	-.059	.233
Illness experience		-3.635	4.306	-12.101, 4.83	-.185	.399
Acceptance		-.603	.350	-1.291, .086	-.267	.086
Interaction		.167	.224	-.273, .607	.188	.457

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

Table H. Multiple regression results of the relationship between avoidant attachment and family illness experience and the interaction between family illness experience and knowledge.

Predictor	ΔR^2	<i>b</i>	<i>SEB</i>	95% <i>CI</i>	β	<i>p</i> -value
Step 1	.013					.132
Constant		75.685	6.575	62.76, 88.61		.000
Age		-.124	.324	-.761, .512	-.019	.701
Gender		-1.649	.975	-3.565, .267	-.083	.091
Ethnicity		-1.833	1.094	-3.984, .318	-.082	.095
Step 2	.065***					.000
Constant		80.481	6.733	67.245, 93.717		.000
Age		-.087	.316	-.708, .535	-.013	.784
Gender		-1.127	.962	-3.018, .764	-.057	.242
Ethnicity		-1.604	1.069	-3.706, .498	-.072	.134
Illness experience		-.166	.937	-2.008, 1.676	-.008	.859
Knowledge		-.421	.088	-.595, -.247	-.229***	.000
Step 3	.065***					.000
Constant		81.068	7.836	65.665, 96.472		.000
Age		-.087	.317	-.709, .535	-.013	.783
Gender		-1.134	.964	-3.029, .762	-.057	.240
Ethnicity		-1.602	1.071	-3.707, .502	-.071	.135
Illness experience		-.551	2.779	-6.015, 4.913	-.028	.843
Knowledge		-.459	.274	-.998, .079	-.250	.094
Interaction		.026	.176	-.32, .372	.029	.883

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

APPENDIX II

Multiple regression results of the relationship between anxious attachment and family illness experience and the interaction between family illness experience and conflict factors

Table A. Multiple regression results of the relationship between anxious attachment and family illness experience and the interaction between family illness experience and quarrelling.

Predictor	ΔR^2	<i>b</i>	<i>SEB</i>	95% <i>CI</i>	β	<i>p-value</i>
Step 1	.007					.404
Constant		52.080	12.549	27.411, 76.748		.000
Age		.627	.618	-.587, 1.842	.050	.310
Gender		-2.279	1.860	-5.935, 1.377	-.060	.221
Ethnicity		-.472	2.088	-4.577, 3.633	-.011	.821
Step 2	.059***					.000
Constant		36.867	12.897	11.515, 62.219		.004
Age		.706	.603	-.481, 1.892	.056	.243
Gender		-1.314	1.831	-4.912, 2.285	-.035	.473
Ethnicity		-.157	2.039	-4.166, 3.852	-.004	.939
Illness experience		3.515	1.794	-.012, 7.041	.095	.051
Quarrelling		.848	.189	.477, 1.219	.216***	.000
Step 3	.060***					.000
Constant		33.511	13.907	6.174, 60.847		.016
Age		.724	.605	-.464, 1.913	.058	.232
Gender		-1.323	1.832	-4.924, 2.278	-.035	.471
Ethnicity		-.043	2.048	-4.070, 3.983	-.001	.983
Illness experience		5.478	3.522	-1.445, 12.402	.147	.121
Quarrelling		1.209	.588	.053, 2.366	.308	.040
Interaction		-.246	.379	-.990, .499	-.107	.517

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

Table B. Multiple regression results of the relationship between anxious attachment and family illness experience and the interaction between family illness experience and antagonism.

Predictor	ΔR^2	<i>b</i>	<i>SEB</i>	95% <i>CI</i>	β	<i>p</i> -value
Step 1	.007					.404
Constant		52.080	12.549	27.411, 76.748		.000
Age		.627	.618	-.587, 1.842	.050	.310
Gender		-2.279	1.860	-5.935, 1.377	-.060	.221
Ethnicity		-.472	2.088	-4.577, 3.633	-.011	.821
Step 2	.080***					.000
Constant		35.504	12.726	10.488, 60.520		.006
Age		.793	.597	-.381, 1.966	.063	.185
Gender		-1.222	1.809	-4.777, 2.334	-.032	.500
Ethnicity		-.023	2.016	-3.987, 3.940	-.001	.991
Illness experience		3.201	1.768	-.275, 6.677	.086	.071
Antagonism		.863	.157	.555, 1.171	.261***	.000
Step 3	.080***					.000
Constant		35.040	13.365	8.768, 61.312		.009
Age		.796	.598	-.380, 1.973	.064	.184
Gender		-1.238	1.816	-4.808, 2.332	-.033	.496
Ethnicity		-.005	2.025	-3.986, 3.976	.000	.998
Illness experience		3.485	3.037	-2.486, 9.455	.094	.252
Antagonism		.915	.480	-.029, 1.860	.277	.057
Interaction		-.037	.319	-.663, .590	-.018	.909

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

Table C. Multiple regression results of the relationship between anxious attachment and family illness experience and the interaction between family illness experience and competition.

Predictor	ΔR^2	<i>b</i>	<i>SEB</i>	95% <i>CI</i>	β	<i>p</i> -value
Step 1	.007					.404
Constant		52.080	12.549	27.411, 76.748		.000
Age		.627	.618	-.587, 1.842	.050	.310
Gender		-2.279	1.860	-5.935, 1.377	-.060	.221
Ethnicity		-.472	2.088	-4.577, 3.633	-.011	.821
Step 2	.050**					.001
Constant		38.446	12.938	13.013, 63.879		.003
Age		.712	.606	-.480, 1.904	.057	.241
Gender		-1.133	1.846	-4.761, 2.496	-.030	.540
Ethnicity		-1.293	2.062	-5.345, 2.760	-.030	.531
Illness experience		3.323	1.801	-.217, 6.862	.089	.066
Competition		.622	.156	.316, .928	.195***	.000
Step 3	.051**					.001
Constant		33.485	14.081	5.804, 61.165		.018
Age		.764	.609	-.434, 1.962	.061	.211
Gender		-1.120	1.846	-4.749, 2.510	-.030	.544
Ethnicity		-1.184	2.066	-5.245, 2.876	-.028	.567
Illness experience		5.977	3.473	-.850, 12.803	.161	.086
Competition		1.023	.475	.090, 1.956	.320	.032
Interaction		-.278	.312	-.891, .334	-.147	.372

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

Table D. Multiple regression results of the relationship between anxious attachment and family illness experience and the interaction between family illness experience and dominance.

Predictor	ΔR^2	<i>b</i>	<i>SEB</i>	95% <i>CI</i>	β	<i>p</i> -value
Step 1	.007					.404
Constant		52.080	12.549	27.411, 76.748		.000
Age		.627	.618	-.587, 1.842	.050	.310
Gender		-2.279	1.860	-5.935, 1.377	-.060	.221
Ethnicity		-.472	2.088	-4.577, 3.633	-.011	.821
Step 2	.083***					.000
Constant		33.558	12.762	8.472, 58.644		.009
Age		.869	.597	-.304, 2.042	.069	.146
Gender		-1.931	1.801	-5.471, 1.609	-.051	.284
Ethnicity		.084	2.014	-3.875, 4.044	.002	.967
Illness experience		2.671	1.764	-.797, 6.140	.072	.131
Dominance		.996	.177	.648, 1.345	.266***	.000
Step 3	.083***					.000
Constant		33.969	13.703	7.033, 60.905		.014
Age		.868	.598	-.306, 2.043	.069	.147
Gender		-1.923	1.805	-5.472, 1.626	-.051	.287
Ethnicity		.066	2.029	-3.922, 4.054	.002	.974
Illness experience		2.399	3.725	-4.924, 2.027	.065	.520
Dominance		.953	.546	-.120, 2.027	.254	.082
Interaction		.030	.360	-.679, .738	.014	.934

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