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Does the Quality of Sibling Relationships Moderate the Negative Impact of Adverse Childhood Experiences (ACEs) on Wellbeing in Adulthood?

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Abstract

Over the past two decades, public health research has demonstrated that Adverse Childhood Experiences (ACEs) are associated with significant and prolonged physical and mental health problems (Campbell et al., 2016; Felitti et al., 1998; Gilbert et al., 2015; Greif Green et al., 2010; Horwitz et al., 2001; Mersky et al., 2013), demanding investigation into factors that may mitigate such poor outcomes. One potential factor that may attenuate the negative impact of ACEs on individuals' mental health is social support. An important source of social support is sibling relationships (Furman & Buhrmester, 1985; Goetting, 1986; Lempers & Clark-Lempers, 1992; Scholte et al., 2001; Wellman & Wortley, 1989). The purpose of the current study was to examine if the perceived quality of sibling relationships may moderate the negative impact of ACEs on wellbeing in adulthood. Data was collected from a total of 439 participants (M_{age} = 35.06, *SD* = 11.20; 73.6% White or European American; 62.4% male). Results revealed that sibling relationships characterized by higher perceived warmth—and, interestingly, higher perceived conflict and rivalry—attenuated the negative impact of ACEs on wellbeing in adulthood. Additionally, higher ACE-IQ scores predicted lower wellbeing when participants' *overall* sibling relationship was characterized by relatively high, but not low, perceived quality. Future research should consider the nuances in the measurement of conflict and rivalry in the context of sibling relationships, and conceptualize overall sibling relationship quality accordingly. Such research will help determine whether overall sibling relationship quality is a factor that can mitigate the negative impact of ACEs on wellbeing.

Does the Quality of Sibling Relationships Moderate the Negative Impact of Adverse Childhood Experiences (ACEs) on Wellbeing in Adulthood?

Over the past two decades, public health research has seen a growing focus on understanding the developmental impact of childhood abuse, neglect, and trauma—collectively referred to as Adverse Childhood Experiences (ACEs). This research has demonstrated that ACEs are associated with significant and prolonged physical and mental health problems (Campbell et al., 2016; Felitti et al., 1998; Gilbert et al., 2015; Greif Green et al., 2010; Horwitz et al., 2001; Mersky et al., 2013), demanding investigation into factors that may mitigate such poor outcomes. One potential factor that may attenuate the negative impact of ACEs on individuals' mental health is social support, which is believed to enhance cognitive and emotional processing of the adverse experience and promote psychological adaptivity (Cohen & Wills, 1985; Thoits, 1986). An important source of social support is sibling relationships (Furman & Buhrmester, 1985; Goetting, 1986; Lempers & Clark-Lempers, 1992; Scholte et al., 2001; Wellman & Wortley, 1989), yet review of the extant literature (utilizing English-language search terms via EBSCOhost Research Platform) revealed no research examining the potential for quality sibling relationships to buffer the negative effects of ACEs on wellbeing. Therefore, the purpose of the current study is to examine if the perceived quality of sibling relationships may moderate the negative impact of ACEs on wellbeing in adulthood.

ACEs

ACEs are traumatic or stressful events experienced by individuals before the age of 18 and include (but are not necessarily limited to) physical, sexual, and emotional abuse; physical and emotional neglect; and household dysfunction (i.e., adult incarceration; mental illness, substance abuse, or violence in the household; parental separation or divorce; Austin, 2018).

Although ACEs were originally defined for investigation as events experienced within the family unit or household (Felitti et al., 1998), more recent research has expanded the definition to include events such as poverty, peer victimization and rejection, discrimination, and exposure to community violence (Anda et al., 2010; Austin, 2018; Cronholm et al., 2015).

Negative Impact of ACEs

The negative impact of ACEs on individuals' physical, psychological, and social wellbeing is well documented (Campbell et al., 2016; Felitti et al., 1998; Gilbert et al., 2015; Greif Green et al., 2010; Horwitz et al., 2001; Mersky et al., 2013). Research over the past two decades has documented the association of ACEs with psychopathology (Benarous et al., 2017; Brady & Back, 2021; Goldenson et al., 2021; Henry et al., 2021; Keyes et al., 2012; Merrick et al., 2019; Sala et al., 2014; Schalinkski et al., 2016, Swopes et al., 2013), highlighting the importance of understanding the mechanisms that may contribute to or explain the association.

One potential explanation for how ACEs impact mental health outcomes is by heightening individuals' vulnerability to stress (McElroy & Hevey, 2014) and/or impairing their physiological stress responses (Shonkoff et al., 2012). ACEs activate the body's stress control system—the hypothalamic-pituitary-adrenocortical axis (HPA axis)—which in turn triggers the release of stress hormones (e.g., cortisol, norepinephrine, and adrenaline; Shonkoff et al., 2012). Although brief increases in this neuroendocrine response are protective, excessive or prolonged exposure to the stress hormones are harmful (Shonkoff et al., 2012). Consequently, when the regulation of the HPA axis is disrupted by excessive or chronic stressors such as ACEs, it complicates the body's return to a homeostatic balance (Shonkoff, 2012). Chronic stress, and therefore persistently elevated levels of stress hormones, can disrupt neurodevelopment during sensitive and critical periods of physical, emotional, and social development in early childhood

when the brain is especially vulnerable to chemical influences (Shonkoff et al., 2009; Weiss & Wagner, 1998), impacting future reactivity to stress and increasing the likelihood of mental health issues later in life (Shonkoff et al., 2012). Such increased stress reactivity to ACEs has been documented as early as adolescence (i.e., 10–16 years of age; Lackova Rebicova et al., 2019) and appears to be sustained as late as older adulthood (65–85+ years of age; Rhee et al., 2019). The impact of ACEs on the stress response and, in turn, mental health appears to be pervasive and long-lasting (Rhee et al., 2019). Given that an impaired stress response may underlie the association between ACEs and individuals' mental health later in life, it is critical to investigate factors that may bolster a healthier stress response in order to mitigate the negative impact of ACEs on individuals' wellbeing.

One robust finding in the literature is that social support plays an integral role in how individuals cope with stress (Cohen & Janicki-Deverts, 2009; Cohen & Wills, 1985; Ertel et al., 2009; House et al., 1988; Hughes & Gove, 1981; Kessler et al., 1985; Seeman, 1995; Taylor & Stanton, 2007; Thoits, 1995; Umberson & Montez, 2010). Furthermore, there is substantial evidence demonstrating that social support can buffer the harmful physical and mental health impacts of stress exposure (Cohen & Wills, 1985; Kessler et al., 1985; Thoits, 1995). Considering this evidence, it is possible, arguably likely, that social support can mitigate the negative impact of ACEs on mental health outcomes.

Social Support

Social support is defined as the psychological and material resources provided by one's social ties that can help individuals adapt and cope with stressors (Mosley-Johnson, 2019). Three important functions of social support are emotional sustenance, informational assistance, and instrumental assistance (Thoits, 2011). Emotional sustenance refers to demonstrations of love

and caring, esteem and value, encouragement, and sympathy. Informational assistance refers to the provision of facts that help individuals solve or appraise a problem (i.e., feedback about the individual's interpretation of a situation and guidance regarding possible courses of action). Instrumental assistance refers to the offering or supplying of behavioral or material assistance in response to problems. The functions of social support are understood to bolster individuals' coping repertoire, in part, by providing a sense of control/mastery (i.e., individuals' sense that they are able to control or influence outcomes; Thompson, 1981) and increasing self-esteem (Taylor & Stanton, 2007). Further, the functions of social support are believed to enhance cognitive and emotional processing in response to problems, which promotes psychological adaptivity (Cohen & Wills, 1985; Thoits, 1986). The bolstering of individuals' coping repertoire (and cognitive and emotional processing) affects the stress appraisal response, thereby promoting a more adaptive response to environmental stressors (Cohen & Wills, 1985), such as ACEs. Given that ACEs can contribute to an impaired stress response and are linked to negative psychosocial outcomes, it is important to examine if social support can buffer the negative impact of ACEs on psychosocial outcomes.

Indeed, some empirical attention has been given to the association between social support and psychosocial outcomes among individuals with ACEs. For example, Cheong et al. (2017) recently revealed that higher numbers of ACEs were associated with higher odds of depressive symptoms in adulthood, especially among individuals who perceived their social support to be low. Specifically, among individuals perceiving low levels of social support, exposure to any ACE (compared to exposure to no ACEs) was associated with almost three times the odds of experiencing depressive symptoms. Although evidence exists linking perceived social support as a factor helping to reduce the negative impact of ACEs on mental health, the research does not

elucidate the importance of different sources of social support. Thoits (2011) proposed two broad categories for sources of social support: *significant others* and *similar others*. Significant others refer to intimate others such as partners, family, or friends who, as part of one's primary network, have a "role obligation" (Thoits, 2011, p. 148) to provide support, especially emotional support. Similar others refer to typically less intimate others such as coworkers, neighbors, or acquaintances who may provide empathy and understanding based on social or experiential similarity (Hatteberg, 2020; Thoits, 2011). Thoits posited that the two sources of social support can differ in their supportive behaviors, the relative effectiveness of their supportive behaviors, and the mechanisms involved in the support given. Thoits further stated that "fortunate individuals are those whose *significant* others include experientially *similar* others" (Thoits, 2011, p. 152). In the context of providing support for exposure to ACEs, it may be that siblings—who often maintain long lasting relationships with their brothers and/or sisters throughout the lifespan (Noller, 2005) and who are likely to be experientially similar—may be an exemplary source of social support.

Siblings as Sources of Social Support

According to 2021 U.S. Census data, about 80% of children in the United States have at least one sibling (U. S. Census Bureau, 2021). Data show that across childhood, these children tend to spend more time with their siblings than anyone else, including their parents (Buist et al., 2013). This consistent and close contact with siblings typically fosters the development of a shared social understanding that provides the context for sibling social support beginning in early childhood (Feinberg et al., 2012). There is substantial research demonstrating the role of strong (i.e., high quality) sibling relationships on positive psychosocial outcomes. For example, siblings promote regular practice with conflict resolution and teach each other how to communicate (i.e.,

share and respond to) their thoughts and feelings (Howe et al., 2001). Further, other factors that are important in promoting positive sibling interactions, such as emotion regulation, positive internal working models for relationships, and fair play behaviors, appear to provide the foundations for a strong context for social support among siblings (Feinberg et al., 2012).

Despite the near ubiquity of siblings, siblings as a source of social support has received little empirical attention. Importantly though, sibling relationships are understood to be "emotionally ambivalent" (Deater-Deckard et al., 2002, p. 572), reflecting varying degrees of warmth and conflict in different situations or contexts. Thus, siblings who may provide valuable social support to one another during times of adversity can also be a source of discord and conflict during other times (Deater-Deckard et al., 2002). The dynamic and sometimes ambivalent nature of sibling relationships necessitates a clear understanding of the factors that qualify sibling relationship "quality."

Sibling Relationship Quality

Quality of sibling relationships is generally defined by three dimensions: warmth, conflict, and differential treatment (also referred to as sibling rivalry; Buist et al., 2013). Warmth and conflict characterize the positive or negative nature of the sibling relationship, respectively, whereas differential treatment characterizes how a parent can affect the quality of the sibling relationship. Specifically, warmth reflects positive relationship characteristics between siblings, such as intimacy, affection, support, companionship, and closeness (Buist et al., 2013). In contrast, conflict reflects negative relationship characteristics between siblings, such as arguing, bickering, fighting, aggression, hostility, negativity, and coercion (Buist et al., 2013).

Differential treatment reflects children's perception that a parent behaves differently toward them compared to their sibling/s (Buist et al., 2013).

The value of siblings as a potential (valuable) source of social support has been demonstrated in research linking high quality sibling relationships to reduced psychopathology. For example, among research examining the relationship between sibling warmth (i.e., one of the three dimensions of sibling relationship quality) and psychopathology, results have revealed negative associations between warmth and internalizing and externalizing problems (Branje et al., 2004; Dunn, 2005; East & Rook, 1992; Gass et al., 2007; Kim et al., 2007; Noller, 2005; Pike et al., 2005). Specifically, children with sibling relationships characterized by high perceived warmth have been found to develop fewer internalizing problems than children with sibling relationships characterized by less perceived warmth (East & Rook, 1992; Kim et al., 2007). In addition to the direct association between perceived sibling warmth and internalizing problems, studies have demonstrated that warm sibling relationships can protect against the development of internalizing problems after stressful life events (Buist et al., 2013).

Among research examining the association between sibling warmth and externalizing problems, studies have generally found that higher levels of warmth are related to fewer externalizing problems (Branje et al., 2004; Dunn et al., 2005). In fact, some researchers have found that a warm sibling relationship is associated with healthy emotion regulation (Kennedy & Kramer, 2008) and prosocial behavior (Pike et al., 2005), and therefore may act as a protective factor against externalizing behaviors (Buist et al., 2013). Explanations for the association between sibling warmth and psychopathology tend to be explained by attachment theory (Buist et al., 2013), where higher sibling warmth contributes to secure attachment representations,

which bolster a positive self-image and view of the social world serving to protect against maladjustment (Buist et al., 2013).

In addition to the role of sibling warmth on psychopathology, researchers have also examined the role of sibling conflict (i.e., one of the three dimensions of sibling relationship quality) on psychopathology. Here, researchers tend to use social learning theory as the lens to understand the association between sibling conflict and psychopathology (Buist et al., 2013). "[S]ocial learning theory suggests that negative interaction patterns in the sibling relationship may be generalized to other contexts" and that "sibling relationships may be used as a training ground for hostile and aggressive interactions," ultimately increasing the odds of externalizing problems such as aggression and delinquency (Buist et al., 2013, p. 98). Indeed, several studies reveal that high sibling conflict is a risk factor for the development of externalizing behaviors (Kim et al., 1999; Natsuaki et al., 2009). Social learning theory also helps to explain the association between highly conflictual sibling relationships and the development of internalizing problems (Buist et al., 2013). For example, children who grow up with high sibling conflict may experience increased levels of hopelessness and guilt that "contribute to a negative attribution style, which may subsequently result in development of depressive symptoms" (Buist et al., 2013, p. 99). These ideas are supported by several studies documenting the link between sibling conflict and internalizing problems (Kim et al., 2007; Pike et al., 1996; Stocker, 1994; Vogt Yuan, 2009). Thus, sibling relationships with high conflict—an indicator of lower sibling relationship quality overall—are clearly linked to negative outcomes.

Finally, among research examining the role of differential treatment (i.e., the last dimension of sibling relationship quality) on psychopathology, ideas within social comparison theory tend to inform current understanding (Buist et al., 2013). According to social comparison

theory, “children tend to compare themselves to others and derive their sense of self-esteem from this comparison”, and “comparison is very likely in the case of siblings due to comparability and availability” (Buist et al., 2013, p. 99). Differential treatment by parents may cause comparisons between siblings that result in feelings of unfairness, insecurity, and anxiety that contribute to the development of internalizing problems, both “for the sibling who feels treated worse (lower self-worth) as well as for the sibling who feels treated better (afraid of status loss, and feelings of guilt)” (Buist et al., 2013, p. 99). Generally, researchers have documented a stronger effect of differential treatment on externalizing problems than on internalizing problems (Buist et al., 2013), perhaps because children may externalize or act out to elicit more attention from parents by whom they feel neglected as compared to their sibling (Richmond et al., 2005). Overall, it is clear that differential treatment is associated with both internalizing and externalizing problems.

Although research has demonstrated that the individual components—warmth, conflict, and differential treatment—comprising the quality of sibling relationships are associated with psychopathology, research has also demonstrated the association between “overall” sibling relationship quality and psychopathology (see meta-analysis by Buist et al., 2013). It suggests that high quality sibling relationship may provide a rich source of social support, serving to protect against negative effects of exposure to ACEs, and therefore reduce risk for negative outcomes.

Current Study

The purpose of the current study was to examine if the perceived quality of individuals’ sibling relationships moderates the negative impact of ACEs on wellbeing in adulthood. Specifically, the current study examined if high quality sibling relationships attenuate the negative effects of ACEs on wellbeing in adulthood.

Method

Participants

Participants were recruited using Amazon's Mechanical Turk (MTurk), which is a crowdsourcing web service that facilitates the recruitment of "workers" (e.g., participants) who meet a set of criteria determined by the "requester" (e.g., researchers) to complete "human intelligence tasks" or "HITs" (e.g., surveys; Paolacci et al., 2010). Participants who were 18 years of age or older, had a living sibling, and had at least a 90% HIT approval rate with a minimum of 50 HITs completed were invited to participate.

An a priori power analysis, using G*Power (Faul et al., 2007), for a hierarchical multiple regression with two continuous predictors indicated that for a medium (R^2 = .15) effect size, with a power of 90% and .05 significance level, 89 participants were needed.

A total of 627 adults—recruited to reflect one of three annual household incomes (i.e., less than $25,000 ($n$ = 146), $25,000-$49,999 (n = 148), $50,000-$74,999 (n = 145)—participated. These three ranges were purposefully oversampled to adequately represent participants from various household income categories who may experience variability in ACEs. Of the 627 adults, 50 were excluded when screening for eligibility criteria and an additional 138 (31.4%) participants were excluded for failing a quality assurance item. This percentage is lower than typical, as a recent review of MTurk data quality from 2011-2020 revealed an overall exclusion rate of 37% (Nadler et al., 2021). Consequently, a total of 439 participants ranging in age from 18 to 71 (M_{age} = 35.06, SD = 11.20) are included in the current study's sample (see Table 1). Participants were predominantly male (n = 274) and White or European American (n = 323), reflecting an over-representation that is common among studies recruiting participants in the U.S. via MTurk (Nadler et al., 2021). Despite under-representation of Black, Hispanic, and

multiracial participants in the current study, who—as previous studies (Merrick et al., 2018) have documented—report higher rates of ACEs, the mean number of ACEs reported in the current study was higher than is typical in other studies using the ACE-IQ (Pace et al., 2022). This is perhaps due to the purposeful recruitment of participants from lower annual household income ranges, who also report higher rates of ACEs (Merrick et al., 2018). A majority of participants reported on a full biological sibling (n = 351).

Measures

Adverse Childhood Experiences

The Adverse Childhood Experiences International Questionnaire (ACE-IQ; World Health Organization [WHO], 2018) is a 31-item self-report measure that assesses individuals' exposure to and experiences with adverse events during childhood (see Appendix A). The ACE-IQ assesses 13 categories reflecting exposure to different adverse childhood experiences: emotional abuse; physical abuse; sexual abuse; violence against household members; living with household members who were substance abusers; living with household members who were mentally ill or suicidal; living with household members who were imprisoned; parental/guardian death; parental separation or divorce; emotional neglect; bullying; community violence; war/collective violence. Items across the 13 categories are rated using various response scales (i.e., 1 [*many times*] to 4 [*never*], 1 [*always*] to 5 [*never*], 1 [*yes*] or 2 [*no*]) and can be scored to reflect the *number* and/or *frequency* of individuals' exposure to and experiences with adverse childhood events (see Table 2 for the frequency of each ACE category reported in the study). To compute the *number* of adverse childhood experiences, responses reflecting any occurrence (i.e., once, a few times, many times) of an ACE across the 13 categories are summed. Higher scores reflect a greater number of adverse childhood experiences (maximum score of 13). To compute the *frequency* of

adverse childhood experiences, responses reflecting a heightened occurrence of an ACE (i.e., a few times, many times, always) across the 13 categories are summed. Higher scores reflect more frequent adverse childhood experiences (maximum score of 13). Although data for calculating both the number and frequency of ACEs were collected in the current study, only the *number* of ACEs has been analyzed. Validation of the ACE-IQ is ongoing, with growing evidence demonstrating that the measure is psychometrically sound (Almuneef et al., 2014; Ford et al., 2014; Kazeem, 2015; Kidman et al., 2019; Murphy et el., 2014; WHO, 2011). The ACE-IQ has been used in several countries, including Netherlands (van der Feltz-Cornelis et al., 2019), China (Chang et al., 2019), Lebanon (Naal et al., 2018), Kenya (Goodman et al., 2017), and Brazil (Gonçalves Soares et al., 2016).

Quality of Sibling Relationships

The short form of the Adult Sibling Relationship Questionnaire (ASRQ-S; Lanthier et al., 2000) is a 47-item self-report questionnaire measuring the quality of sibling relationships in early adulthood and beyond; specifically, the ASRQ-S measures individuals' perceptions of their own behavior and feelings toward their sibling, as well as their perceptions of their sibling's behavior and feelings toward them (see Appendix B; Lanthier et al., 2000). The original form of the ASRQ was developed as an age-appropriate extension of the Sibling Relationship Questionnaire (SRQ; Furman & Buhrmester, 1985), which assessed children's perceptions of their sibling relationship qualities. The ASRQ assesses three dimensions of sibling relationship quality—warmth, conflict, and rivalry—across 14 subscales (i.e., similarity, intimacy, affection, admiration, emotional support, instrumental support, acceptance, knowledge, quarreling, antagonism, competition, dominance, maternal rivalry, and paternal rivalry; (Fortuna et al., 2011; Lanthier et al., 1992). The ASRQ-S was designed by selecting items from subscales that loaded

highly on Warmth and Conflict (items assessing Rivalry were unchanged for the ASRQ-S; Lanthier et al., 2000), decreasing the total number of items from 81 to 47 (18 Warmth items, 17 Conflict items, and 12 Rivalry items). For all items, individuals respond using a 7-point Likert scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). Per the General Information and Scoring Document provided by the measure's author (C. Stocker, personal communication, September 9, 2020), items *within* each dimension were averaged, with higher scores reflecting greater levels of the dimension. Internal consistencies for the current study were α = .96 (warmth), α = .94 (conflict), and α = .94 (rivalry), meeting or exceeding those established by the original author—α = .96 (warmth), α = .93 (conflict), and α = .91 (rivalry; Stocker, 2000). After reverse scoring the conflict and rivalry items, all items *across* the dimensions were averaged, with higher scores reflecting higher perceived (overall) quality sibling relationships (α = .94 in the current study). The SRQ, ASRQ, and ASRQ-S are psychometrically sound measures (Lanthier et al., 2000; Riggio, 2000; Stocker et al., 1997).

Wellbeing

The short form of the Mental Health Continuum (MHC-SF; Keyes et al., 2008) is a 14-item measure that assesses three categories of wellbeing (i.e., emotional, psychological, and social; see Appendix C). Participants rate how frequently, over the past month, they have felt each item (e.g., happy, interested in life, satisfied with life) on a 7-point Likert scale ranging from 1 (*never*) to 7 (*every day*). All items are averaged, with higher scores reflecting higher levels of wellbeing. Internal consistency for the current study was α = .93 (entire scale), which exceeds all subscale internal consistencies reported by the original author (αs > .80; Keyes, 2009).

In longitudinal studies and those reflecting nationally representative samples, the MHC-SF has demonstrated strong internal consistency (Keyes, 2009), test-retest reliability across a three-month period (Lamers et al., 2011) and sound factor structure (Joshanloo, 2017).

Procedure

After receiving Xavier University Institutional Review Board approval for the study (see Appendix D), Amazon's MTurk was used to recruit participants. To access the study materials, potential participants—who reported their annual household income as reflecting less than $25,000, $25,000-$49,999, or $50,000-$74,999—clicked a secure transfer protocol on the MTurk recruitment page that externally directed them to a (Xavier University) Qualtrics survey. The secure transfer protocol opened to a pre-screening questionnaire composed of demographic items (see Appendix E), including a question about whether the potential participants had any living siblings. If participants did not report having at least one living sibling, they were directed to the end of the survey, where they received a statement explaining that they did not meet the inclusion criteria for the study and should not submit the HIT (see Appendix F). Participants who reported having at least one sibling were directed to an informed consent document (see Appendix G). After providing consent, participants responded to questions about the characteristics of their sibling (see Appendix H). Subsequently, participants completed questionnaires assessing their adverse childhood experiences, the perceived quality of their sibling relationship (if participants reported more than one sibling, they were instructed to think about the sibling who has had the most impact on their life), and their wellbeing. Consistent with other research utilizing MTurk, quality assurance checks were included to maintain data quality (Goodman et al., 2013; Paolacci et al., 2010). To help ensure data quality, three questions were included in the study as quality assurance checks (e.g., "Name a color that is also a fruit.").

Participants who failed any quality assurance item had their HIT rejected and their data was excluded from the study. After completing these tasks, participants were debriefed (see Appendix I) and thanked for their participation. Participants were compensated $1.25 for their time. Due to the sensitive nature of some questions in the study (i.e., adverse childhood experiences), the debriefing provided participants with a resource for a reputable, reliable, and responsible mental health service in the U.S. (see Appendix J), so they could seek help or support if needed.

Results

Preliminary Analyses

Data Screening

Prior to testing the study's hypotheses, preliminary analyses were conducted to check the data for violations of the assumptions of the general linear model. The data were examined for outliers, which reveal the presence of extreme scores; normality, which assesses the shape of the distribution of scores; and homoscedasticity, which assesses the relative equivalence of variability in scores between continuous measures. Outliers were visually inspected using box plots (i.e., scores exceeding the inner fence or ±1.5 times the interquartile range) and statistically examined using *z* scores (i.e., scores exceeding ±3.3 as recommended by Tabachnick & Fidell, 1996). Although visual inspection of the boxplots suggested some extreme values, no scores exceeded 3.3 standard deviations above or below a variable's mean and, therefore, no outliers were detected for any of the study's variables. To determine if the shape of the distribution of scores for each continuous variable was normal, results from Shapiro-Wilks test were examined. Results revealed that all continuous variables departed from normality and all but one (i.e., sibling relationship quality) were negatively skewed. However, because the general linear model

is robust to violations of this assumption, no transformations of the data were made. Finally, visual inspection of bivariate scatterplots revealed no apparent violations of the assumption of homoscedasticity among study variables.

Quality Assurance Items. Participants responded to three quality assurance items to assess their attention to detail during the study. As described previously, quality assurance items were included in the study to address the potential for random or careless responding, which is common in online research and can pose a threat to the integrity of the data (Osborne & Blanchard, 2011). The primary analyses described below were conducted excluding data from participants who failed any quality assurance item (n = 138).

Potential Covariate. To examine if household income affected participants' wellbeing, a one-way ANOVA was conducted. Results revealed a statistically significant difference, $F(2, 436) = 5.06$, $p = .007$, such that individuals in the lowest SES range reported lower wellbeing ($M = 3.72$, $SD = 1.20$) than individuals in the middle ($M = 4.05$, $SD = 0.97$) and highest ($M = 4.07$, $SD = 1.02$) SES ranges. The wellbeing of individuals in the middle and highest SES ranges did not differ. Consequently, household income was entered as a covariate in all primary analyses.

Primary Analyses

Means, medians, and standard deviations associated with, and bivariate correlations among, all variables measured in the study are found in Table 3. In the current study, the mean ACE-IQ score was 6.40, which is higher than means reported in other studies using the ACE-IQ (Pace et al., 2022). Indeed, a recent systematic review of 24 international studies reporting ACE-IQ scores revealed an average ACE-IQ total score of 3.28 (Pace et al., 2022). However, Pace et al.'s (2022) review examined research conducted primarily in non-Western regions (i.e., 76% of the studies reviewed), whereas the current study examined a predominantly Western sample.

Perhaps the difference in mean ACE-IQ scores reported in this study compared to those reported in others utilizing the ACE-IQ is related to variability among geographic regions. In the current study, the means for the three ASRQ-S subscales were 4.68 (warmth), 3.63 (conflict), and 4.08 (rivalry), respectively, which are all slightly higher than means reported in the measure's development study, which were closer to the middle of the scale (ASRQ-S; Lanthier et al., 2000). For the MHC-SF in the current study, the mean score was 3.95, which is similar to the means reported in other studies using the measure (Keyes et al., 2008; Lamers et al., 2011).

To test the predictions that sibling relationships characterized by higher warmth, lower conflict, and lower rivalry would attenuate the negative impact of ACEs on wellbeing in adulthood, continuous x continuous hierarchical multiple regressions were conducted (Hypotheses 1–3). A separate regression analysis was conducted for each sibling relationship quality variable (i.e., warmth, conflict, rivalry). In the regressions, household income was entered in Step 1 as a control variable. Step 2 contained standardized ACE-IQ scores and one of the sibling relationship variables (i.e., warmth, conflict, or rivalry subscale scores from the ASRQ-S). Step 3 contained the product term carrying the two-way interaction between the variables entered at Step 2. As seen in Tables 4, 5, and 6, results revealed that ACE-IQ scores and two of the sibling relationship variables—warmth and conflict—were uniquely associated with participants' wellbeing. The regressions also revealed significant interactions between ACE-IQ scores and each of the sibling relationship variables: warmth ($\beta = .10$, $\Delta R^2 = .01$, $p = .019$), conflict ($\beta = .29$, $\Delta R^2 = .08$, $p < .001$), and rivalry ($\beta = .22$, $\Delta R^2 = .05$, $p < .001$).

Post hoc simple slope analyses were conducted to probe the significant interactions between ACE-IQ scores and the sibling relationship variables (i.e., warmth, conflict, and rivalry). As seen in Figure 1, higher ACE-IQ scores predicted lower wellbeing when

participants' sibling relationship was characterized by relatively low (β = -.24, t = -3.76, p < .001) but not high (β = -.04, t = -0.67, p = .50) warmth. As seen in Figure 2, higher ACE-IQ scores predicted lower wellbeing when participants' sibling relationships were characterized by relatively low (β = -.50, t = -7.43, p < .001) but not high (β = .06, t = 1.02, p = .31) conflict. Finally, as seen in Figure 3, higher ACE-IQ scores predicted lower wellbeing when participants' sibling relationships were characterized by relatively low (β = -.42, t = -5.72, p < .001) but not high (β = .04, t = 0.58, p = .56) rivalry. These results demonstrate that sibling relationships characterized by higher warmth—and, interestingly, *higher* conflict and rivalry—attenuated the negative impact of ACEs on wellbeing in adulthood.

To test the prediction that sibling relationships characterized by higher overall quality (operationalized as higher warmth, lower conflict, and lower rivalry) would attenuate the negative impact of ACEs on wellbeing in adulthood, a continuous x continuous hierarchical multiple regression was conducted (Hypothesis 4). In the regression, household income was entered in Step 1 as a control variable. Step 2 contained standardized ACE-IQ scores and sibling relationship quality scores (i.e., the average of items across the ASRQ-S with appropriate subscales reverse-scored such that higher ASRQ-S scores reflect higher quality sibling relationships). Step 3 contained the product term carrying the two-way interaction between the variables entered at Step 2. As seen in Table 7, results revealed that overall sibling relationship quality scores, but not ACE-IQ scores, were uniquely associated with participants' wellbeing. The regression also revealed a significant interaction between ACE-IQ scores and overall sibling relationship quality (β = -.15, ΔR^2 = .02, p = .002). A post hoc simple slope analysis was conducted to probe the significant interaction between ACE-IQ scores and overall sibling relationship quality. As seen in Figure 4, higher ACE-IQ scores predicted lower wellbeing when

participants' overall sibling relationship was characterized by relatively high (β = -.27, t = -3.56, p <.001) but not low (β = .04, t = 0.65, p = .51) quality.

Discussion

Over the past two decades, public health research has seen a growing focus on understanding the developmental impact of ACEs. This research has demonstrated that ACEs are associated with significant and prolonged physical and mental health problems (Campbell et al., 2016; Felitti et al., 1998; Gilbert et al., 2015; Greif Green et al., 2010; Horwitz et al., 2001; Mersky et al., 2013), demanding investigation into factors that may mitigate such poor outcomes. The current study examined whether one such factor—the perceived quality of sibling relationships—may moderate the negative impact of ACEs on wellbeing in adulthood. Results revealed that that sibling relationships characterized by higher warmth—and, interestingly, *higher* conflict and rivalry—attenuated the negative impact of ACEs on wellbeing in adulthood. Results also revealed that higher ACE-IQ scores predicted lower wellbeing when participants' *overall* sibling relationship was characterized by relatively *high,* but not low, quality.

As predicted, results revealed that higher numbers of adverse childhood experiences predicted lower wellbeing when participants perceived their sibling relationships to be characterized by relatively low—but not high—warmth. Such results suggest that sibling relationships characterized by high warmth reduce the negative impact of experiencing ACEs on wellbeing in adulthood. These results support the extant literature demonstrating the psychological benefits of experiencing warm sibling relationships, especially the power of warmth to protect against the development of psychopathology after stressful life events (Buist et al., 2013; Gass et al., 2007) such as ACEs. Because siblings can serve, as Thoits (2011) suggested, as exemplars of social support, perceiving and/or experiencing a warm sibling

relationship may be important in buffering the negative effects of ACEs on wellbeing in adulthood.

Unexpectedly, higher (not lower) conflict attenuated the negative impact of ACEs on wellbeing. Such a result suggests that sibling conflict may serve an adaptive function in response to ACEs. The idea that conflict (in general) can be adaptive is described in the cognitive developmental literature (see seminal work by Piaget, 1965, 1985), and it has been linked to healthy social development (Rinaldi & Howe, 1998). For example, when sibling conflict involves constructive resolution strategies (see Deutsch, 1973) such as problem-solving and communication, the relationships tend to be warmer and more prosocial (Rinaldi & Howe, 1998). Importantly, the benefits of constructive sibling conflict allow individuals to learn strategies that have been shown to generalize to other areas of life (Dunn & Munn, 1986; Shantz, 1987), increasing wellbeing. The adaptive nature of conflict supports a conceptualization of sibling conflict as nuanced and not solely indicative of poor relationship quality (Lindell et al. (2014), which may help explain why *higher* (not lower) conflict attenuated the negative impact of ACEs on wellbeing in the current study.

Among research utilizing a more nuanced operationalization of sibling conflict, several factors appear to influence sibling relationship quality. For example, Campione-Barr and Smetana (2010) examined two domains of conflict: personal domain invasions (e.g., borrowing without permission) and issues of equality and fairness (e.g., whose turn it is to do chores). Notably, of the two types of conflict, only personal domain invasions, and not issues of equality and fairness, were significantly and negatively associated with poorer sibling relationship quality. Other research describes how ordinal position and gender dyad composition (Campione-Barr et al., 2013) affect sibling relationship quality, particularly conflict. This research suggests

that conceptualizing conflict as a single unidimensional concept—as was done in the current study—ignores the nuanced nature of the variable and obscures the potential adaptive nature of the conflict experience for siblings. Future research should employ a more nuanced operationalization of sibling conflict, as well as measure other sibling relationship factors including ordinal position and gender dyad composition, that have been known to influence sibling relationship quality and subsequent wellbeing (Campione-Barr et al., 2013).

The unexpected finding that higher (not lower) rivalry attenuated the negative impact of ACEs on wellbeing is curious and seems contradictory to a robust literature documenting the negative effects of sibling rivalry (i.e., differential treatment) on wellbeing (Barret Singer & Weinstein, 2000; Boyle et al., 2004; Buist et al, 2013; Coldwell et al., 2008). However, because the measure of sibling rivalry used in the current study—as measured by the ASRQ-S (Lanthier et al., 2000)—really reflects parental differential treatment, it is possible that participants with relatively high ACEs may have perceived they received more favorable parental treatment than their sibling, resulting in positive effects on their wellbeing in adulthood. Such a supposition is supported by social comparison theory (Festinger, 1954); if participants engaged in downward comparisons—frequently comparing themselves to the less favored (i.e., less well treated) sibling—their subsequent wellbeing may have increased (Berry Mendes et al. 2001).

It is also possible, albeit unlikely, that individual difference variables, such as perceived fairness or empathy, may explain why higher (not lower) rivalry attenuated the negative impact of ACEs on later wellbeing. For example, Ng et al. (2020) proposed that fairness may moderate the negative effect of parental differential treatment on psychosocial wellbeing. Specifically, Ng et al. argued that perceiving parental differential treatment as fair (e.g., due to a sibling's greater need) might weaken the negative association between parental differential treatment and

psychosocial wellbeing. Similarly, Ng et al. (2020) posited that individuals with heightened empathy may better understand their parents' differential behaviors—potentially judging them as fairer—which may attenuate the negative effect of parental differential treatment on wellbeing. Future research should examine the merit of Ng et al.'s (2020) ideas, which could offer a possible explanation for why higher rivalry attenuated the negative relationship between ACEs and later wellbeing in the current study.

Limitations and Future Directions

Surprising, higher (overall) sibling relationship quality did *not* attenuate the negative impact of ACEs on wellbeing in adulthood. This counterintuitive finding reflects a significant limitation of the current study's operationalization of quality. Overall sibling relationship quality was operationalized in the current study to reflect higher warmth, lower conflict, and lower rivalry, which may not align with what is adaptive for individuals with higher numbers of ACEs. It may be the case that, as Lindell et al. (2014) argued, sibling relationships are nuanced and relationship quality may not be best measured by applying the same operationalization to all sibling relationships (i.e., higher warmth, lower conflict, and lower rivalry). Instead, for some relationships, it may be that higher conflict between or among siblings increases their overall relationship quality. Or, as Ng et al. (2020) argued, it is possible that children's perceptions of their parents' differential treatment as fair and justifiable prevents them from internalizing the treatment and perceiving rivalry with their siblings. Future research should more closely examine the construct of overall sibling relationship quality to understand how to best operationalize it.

Some culturally based limitations of the study are important to consider. First, several questions in the ACE-IQ and the ASRQ-S assume that participants experienced a heteronormative, two-parent household during their childhoods. For example, on all 12 rivalry

items on the ASRQ-S, respondents are asked to reflect on the treatment received from their mother or father. It is likely that this heteronormative and binary conceptualization of parents did not apply to all participants in the current study. For example, a participant may have been raised by LGBTQIA+ parents. Furthermore, 14.6% of the participants in this study reported on the ACE-IQ that one or more parent/guardian died within the first 18 years of their lives. It is possible, then, that a heteronormative and binary conceptualization of parents did not apply to all participants. Second, a limitation related to linguistic considerations is the diction in the ASRQ-S conflict and rivalry items. Specifically, it could be argued that the items are written with explicit negative connotation that may evoke values-based judgement in participants that could influence their responding. For example, rivalry item "This sibling dominates me" may evoke feelings of embarrassment or humiliation that activate values such as pride, influencing the participant to respond with a social desirability bias. Future research, using these measures or studying familial relationships more generally, should ensure the use of more inclusive language to adequately assess the diverse experience of families.

A procedural consideration that may have limited the study is participants' potential lack of adherence to instructions on the ASRQ-S. Specifically, the questionnaire instructs participants to "answer the questions as your relationship is now, not how it was in the past, nor how you think it might be in the future." However, it could be difficult for a participant not to respond based on retrospective evaluation their parents' treatment of them and their siblings, and thus rate a rivalry item more mildly (or more severely) than they may have without such reflection on the past. It could be helpful to repeat the instruction multiple times throughout the measure and/or modify the diction to more explicitly emphasize the present tense (i.e., "currently," "recently," "nowadays").

Although not a limitation emerging from the current study, future research could examine the extent to which experiential similarity between and among siblings may promote warm sibling relationships and, therefore, reduce the impact of ACEs on wellbeing. Given the current study's results, compelling next questions arise, such as: do siblings raised in the same household, ostensibly sharing many similar experiences (i.e., higher experiential similarity), experience higher warmth than siblings not raised in the same household; do siblings who spend more time together in the same household experience more warmth in their relationships than siblings who spend less time together (e.g., split custody situations, siblings with larger age gaps); is it the case that the positive effect of warmth to reduce the negative impact of ACEs on wellbeing would be more pronounced for siblings with higher experiential similarity compared to those with lower experiential similarity? Answers to these questions could help enrich the scientific understanding of the mechanisms underlying sibling warmth's beneficial effects on wellbeing.

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Tables

Table 1

Number and Percentage of Sociodemographic Characteristics of Participants

	Characteristic	*n*	%
Age			
	18–25	99	22.6
	26–35	184	41.9
	36–45	88	20.0
	46–64	52	11.8
	65+	16	3.6
Race/Ethnicity			
	Asian	54	12.3
	Black or African American	29	6.6
	Hispanic American or Latino/a	36	8.2
	Middle Eastern or North African	3	0.7
	Native American or Alaskan Native	13	3.0
	Native Hawaiian or Other Pacific Islander	3	0.7
	White or European American	323	73.6
	Biracial or Multiracial	5	1.1
	Race/Ethnicity not listed	2	0.5
	Prefer not to respond	3	0.7
Gender			
	Man	274	62.4

	Woman	160	36.4
	Transgender man	5	1.1
	Transgender woman	4	0.9
	Gender non-conforming/nonbinary	6	1.4
	Do not identify as a woman, a man, or a transgender person	2	0.5
	Identity not listed	2	0.5
	Prefer not to respond	2	0.5
Sibling Type			
	Full sibling	351	80.0
	Half sibling	70	15.9
	Step sibling	11	2.5
	Adopted sibling	6	1.4
	Foster sibling	1	0.2

Note. $N = 439$

Table 2

Number and Percentage of Participants who Reported Each Category of ACEs

Category	*n*	%
Community violence	328	74.7
Household member treated violently	323	73.6
Emotional abuse	321	73.1
Bullying	315	71.8
Physical abuse	265	60.4
Physical neglect	257	58.5
Collective violence	183	41.7
Contact sexual abuse	168	38.3
Emotional neglect	158	36.0
One or no parents, or parental separation/divorce	152	34.6
Alcohol and/or drug abuser in the household	138	31.4
Someone chronically depressed, mentally ill, institutionalized, or suicidal	128	29.2
Incarcerated household member	75	17.1

Note. $N = 439$

Table 3

Means, Medians, and Standard Deviations Associated with, and Bivariate Correlations Among, All Variables

	M	*Mdn*	*SD*	1	2	3	4	5	6
1. ACE-IQ	6.40	7.00	3.42	---	-.07	.30**	.35**	-.33**	-.16**
2. Warmth	4.68	4.89	1.42	-.07	---	.06	-.05	.56**	.44**
3. Conflict	3.63	3.82	1.37	.30**	.06	---	.64**	-.74**	.06
4. Rivalry	4.08	4.17	1.48	.35**	-.05	.64**	---	-.75**	-.02
5. Quality	4.37	4.13	0.95	-.33**	.56**	-.74**	-.75**	---	.23**
6.Wellbeing	3.95	3.93	1.08	-.16**	.44**	.06	-.02	.23**	---

**$p \leq .01$

Table 4

Results for the Hierarchical Regression Analysis Examining the Interaction Between ACE-IQ Scores and the Warmth of Participants' Sibling Relationships on Their Wellbeing

	Beta	*t*	*F*	ΔR^2
Step 1			8.16**	.02**
SES	.14	2.86**		
Step 2			39.63***	.20***
ACE-IQ	-.13	-3.01**		
Sibling Warmth	.42	9.78***		
Step 3			31.41***	.01*
ACE-IQ x Sibling Warmth	.10	2.35*		

*$p < .05$, **$p \leq .01$, ***$p \leq .001$

Table 5

Results for the Hierarchical Regression Analysis Examining the Interaction Between ACE-IQ Scores and the Conflict in Participants' Sibling Relationships on Their Wellbeing

	Beta	*t*	*F*	ΔR^2
Step 1			8.16**	.02**
SES	.14	2.86**		
Step 2			8.07***	.03***
ACE-IQ	-.19	-3.81***		
Sibling Conflict	.11	2.22*		
Step 3			17.07***	.08***
ACE-IQ x Sibling Conflict	.29	6.46***		

*$p < .05$, **$p \leq .01$, ***$p \leq .001$

Table 6

Results for the Hierarchical Regression Analysis Examining the Interaction Between ACE-IQ Scores and the Rivalry in Participants' Sibling Relationships on Their Wellbeing

	Beta	*t*	*F*	ΔR^2
Step 1			8.16**	.02**
SES	.14	2.86**		
Step 2			6.45***	.02**
ACE-IQ	-.16	-3.25***		
Sibling Rivalry	.03	.52		
Step 3			10.61***	.05***
ACE-IQ x Sibling Rivalry	.22	4.71***		

**p ≤ .01 ***p ≤ .001

Table 7

Results for the Hierarchical Regression Analysis Examining the Interaction Between ACE-IQ Scores and the Quality of Sibling Relationships on Participants' Wellbeing

	Beta	*t*	*F*	ΔR^2
Step 1			8.16**	.02**
SES	.14	2.86**		
Step 2			11.96***	.06***
ACE-IQ	-.09	-1.83		
Sib Rel Quality	.20	4.01***		
Step 3			11.55***	.02**
ACE-IQ x Sib Rel Quality	-.15	-3.10**		

**p ≤ .01 ***p ≤ .001

Figures

Figure 1

Simple Slope Analysis Examining the Interaction Between ACE-IQ Scores and Warmth

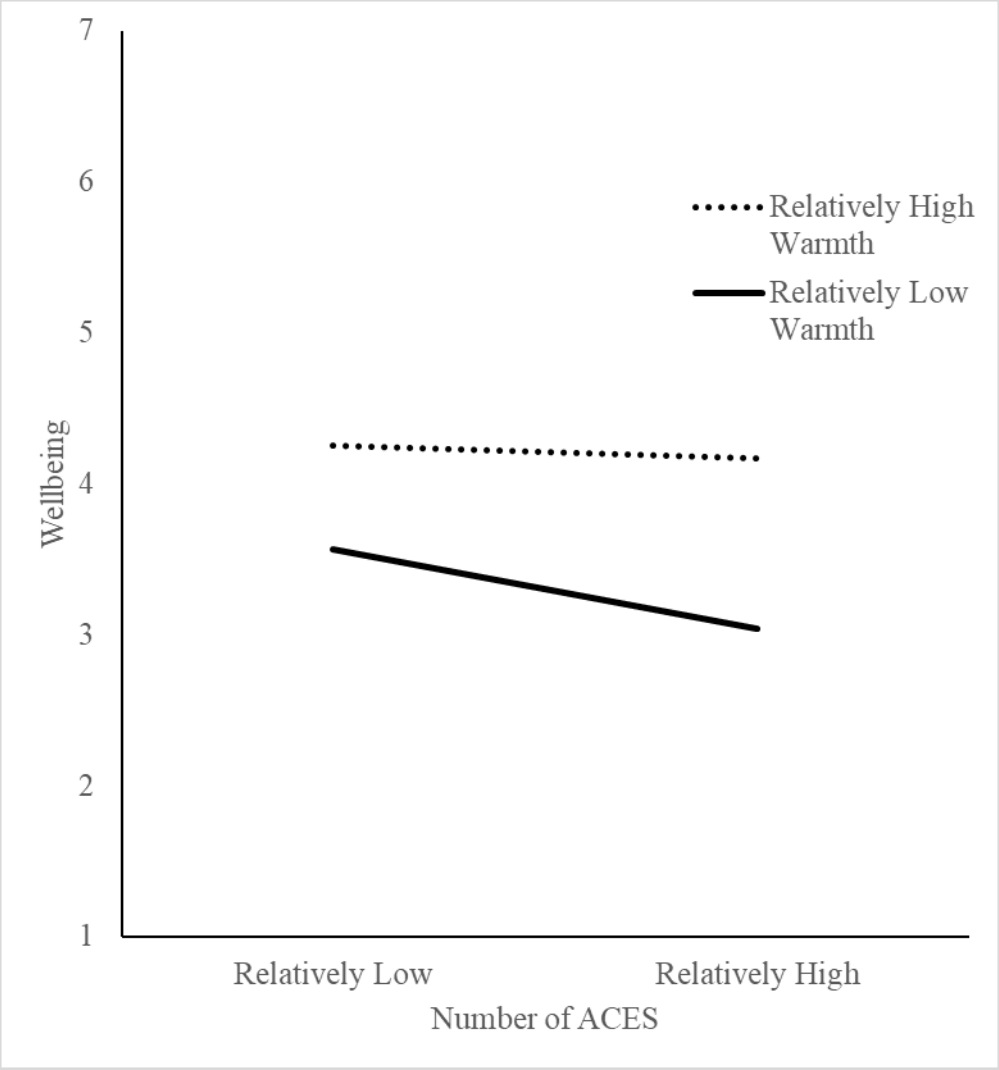


Figure 2

Simple Slope Analysis Examining the Interaction Between ACE-IQ Scores and Conflict

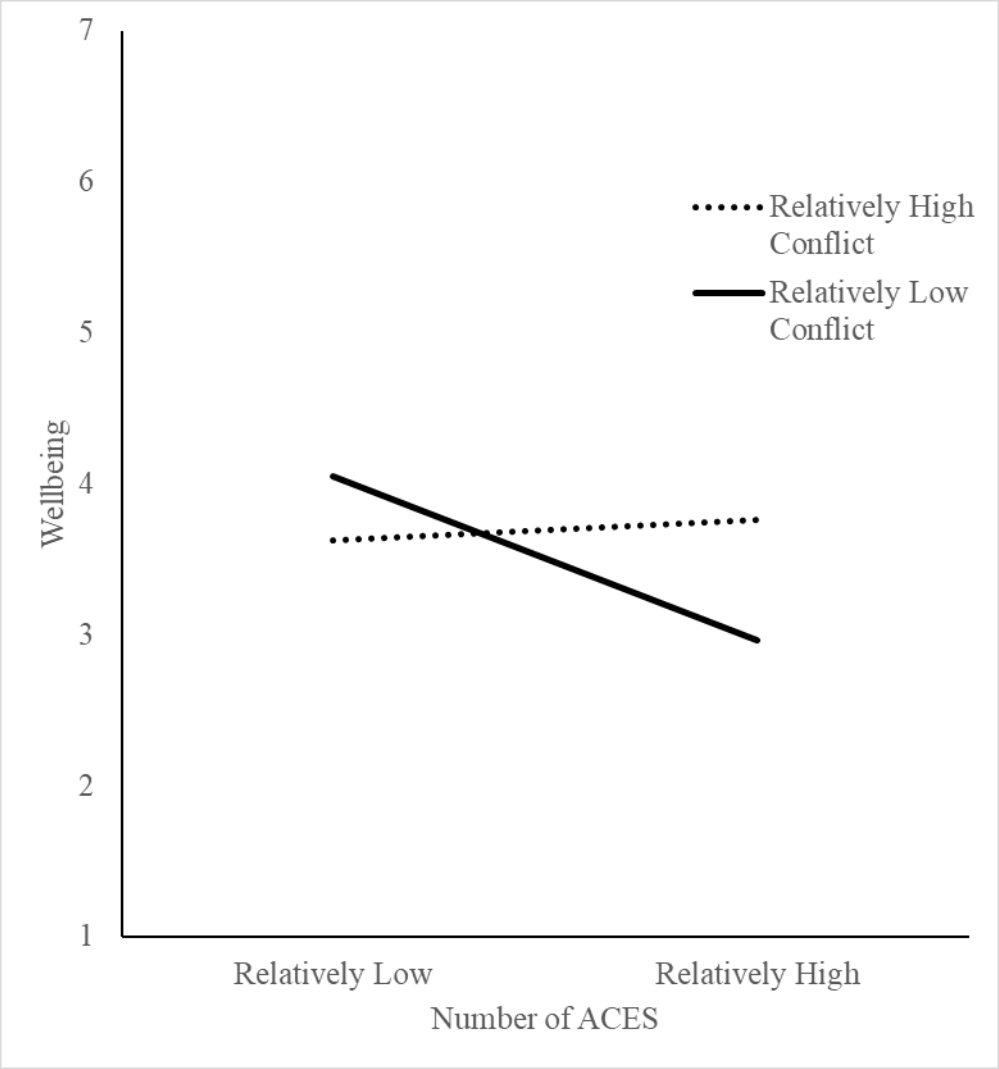


Figure 3

Simple Slope Analysis Examining the Interaction Between ACE-IQ Scores and Rivalry

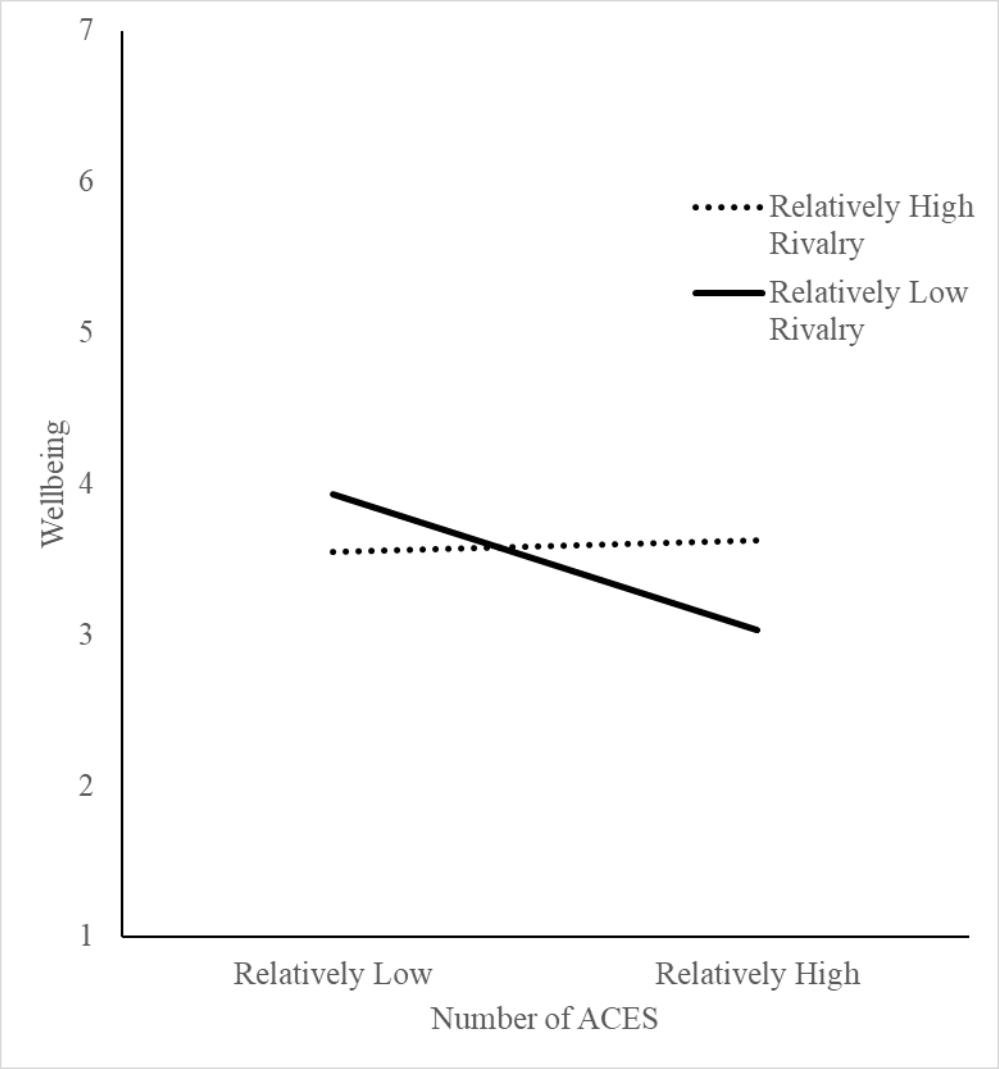
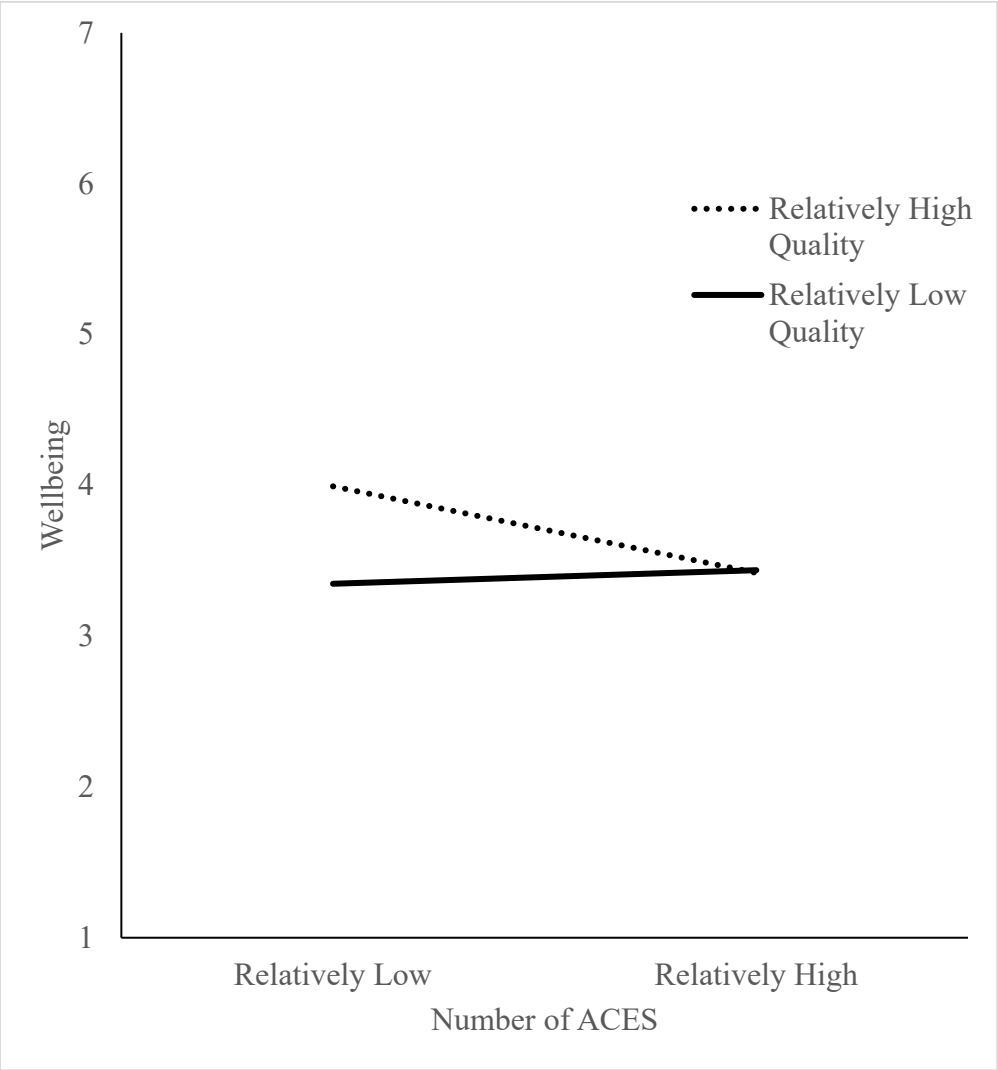


Figure 4

Simple Slope Analysis Examining the Interaction Between ACE-IQ Scores and Overall Sibling Relationship Quality



Appendices

Appendix A

Adverse Childhood Experiences – International Questionnaire (ACE-IQ)

RELATIONSHIP WITH PARENTS/GUARDIANS	
When you were growing up, during the first 18 years of your life . . .	
Did your parents/guardians understand your problems and worries?	Always
	Most of the time
	Sometimes
	Rarely
	Never
	Refused
Did your parents/guardians really know what you were doing with your free time when you were not at school or work?	Always
	Most of the time
	Sometimes
	Rarely
	Never
	Refused
How often did your parents/guardians not give you enough food even when they could easily have done so?	Many times
	A few times
	Once
	Never
	Refused
Were your parents/guardians too drunk or intoxicated by drugs to take care of you?	Many times
	A few times
	Once
	Never
	Refused
How often did your parents/guardians not send you to school even when it was available?	Many times
	A few times
	Once
	Never
	Refused
FAMILY ENVIRONMENT	
When you were growing up, during the first 18 years of your life . . .	
Did you live with a household member who was a problem drinker or alcoholic, or misused street or prescription drugs?	Yes
	No
	Refused

Did you live with a household member who was depressed, mentally ill or suicidal?	Yes
	No
	Refused
Did you live with a household member who was ever sent to jail or prison?	Yes
	No
	Refused
Were your parents ever separated or divorced?	Yes
	No
	Not applicable
	Refused
Did your mother, father or guardian die?	Yes
	No
	Don't know / Not sure
	Refused
These next questions are about certain things you may actually have heard or seen IN YOUR HOME. These are things that may have been done to another household member but not necessarily to you. When you were growing up, during the first 18 years of your life . . .	
Did you see or hear a parent or household member in your home being yelled at, screamed at, sworn at, insulted or humiliated?	Many times
	A few times
	Once
	Never
	Refused
Did you see or hear a parent or household member in your home being slapped, kicked, punched or beaten up?	Many times
	A few times
	Once
	Never
	Refused
Did you see or hear a parent or household member in your home being hit or cut with an object, such as a stick (or cane), bottle, club, knife, whip etc.?	Many times
	A few times
	Once
	Never
	Refused
These next questions are about certain things YOU may have experienced. When you were growing up, during the first 18 years of your life . . .	
Did a parent, guardian or other household member yell, scream or swear at you, insult or humiliate you?	Many times
	A few times
	Once

	Never
	Refused
Did a parent, guardian or other household member threaten to, or actually, abandon you or throw you out of the house?	Many times
	A few times
	Once
	Never
	Refused
Did a parent, guardian or other household member spank, slap, kick, punch or beat you up?	Many times
	A few times
	Once
	Never
	Refused
Did a parent, guardian or other household member hit or cut you with an object, such as a stick (or cane), bottle, club, knife, whip etc?	Many times
	A few times
	Once
	Never
	Refused
Did someone touch or fondle you in a sexual way when you did not want them to?	Many times
	A few times
	Once
	Never
	Refused
Did someone make you touch their body in a sexual way when you did not want them to?	Many times
	A few times
	Once
	Never
	Refused
Did someone attempt oral, anal, or vaginal intercourse with you when you did not want them to?	Many times
	A few times
	Once
	Never
	Refused
Did someone actually have oral, anal, or vaginal intercourse with you when you did not want them to?	Many times
	A few times
	Once
	Never
	Refused
PEER VIOLENCE	

These next questions are about BEING BULLIED when you were growing up. Bullying is when a young person or group of young people say or do bad and unpleasant things to another young person. It is also bullying when a young person is teased a lot in an unpleasant way or when a young person is left out of things on purpose. It is not bullying when two young people of about the same strength or power argue or fight or when teasing is done in a friendly and fun way. When you were growing up, during the first 18 years of your life . . .	
How often were you bullied?	Many times
	A few times
	Once
	Never *(Go to Q.V3)*
	Refused
How were you bullied most often?	I was hit, kicked, pushed, shoved around, or locked indoors
	I was made fun of because of my race, nationality or colour
	I was made fun of because of my religion
	I was made fun of with sexual jokes, comments, or gestures
	I was left out of activities on purpose or completely ignored
	I was made fun of because of how my body or face looked
	I was bullied in some other way
	Refused
This next question is about PHYSICAL FIGHTS. A physical fight occurs when two young people of about the same strength or power choose to fight each other. When you were growing up, during the first 18 years of your life . . .	
How often were you in a physical fight?	Many times
	A few times
	Once
	Never
	Refused
WITNESSING COMMUNITY VIOLENCE	
These next questions are about how often, when you were a child, YOU may have seen or heard certain things in your NEIGHBOURHOOD OR COMMUNITY (not in your home or on TV, movies, or the radio). When you were growing up, during the first 18 years of your life . . .	
Did you see or hear someone being beaten up in real life?	Many times
	A few times
	Once

	Never
	Refused
Did you see or hear someone being stabbed or shot in real life?	Many times
	A few times
	Once
	Never
	Refused
Did you see or hear someone being threatened with a knife or gun in real life?	Many times
	A few times
	Once
	Never
	Refused
EXPOSURE TO WAR/COLLECTIVE VIOLENCE	
These questions are about whether YOU did or did not experience any of the following events when you were a child. The events are all to do with collective violence, including wars, terrorism, political or ethnic conflicts, genocide, repression, disappearances, torture and organized violent crime such as banditry and gang warfare. When you were growing up, during the first 18 years of your life . . .	
Were you forced to go and live in another place due to any of these events?	Many times
	A few times
	Once
	Never
	Refused
Did you experience the deliberate destruction of your home due to any of these events?	Many times
	A few times
	Once
	Never
	Refused
Were you beaten up by soldiers, police, militia, or gangs?	Many times
	A few times
	Once
	Never
	Refused
Was a family member or friend killed or beaten up by soldiers, police, militia, or gangs?	Many times
	A few times
	Once
	Never
	Refused

Appendix B

Adult Sibling Relationship Questionnaire - Short (ASRQ-S)

Please respond to the following questions about the sibling who has had the most impact on your life. **This should be the SAME sibling you chose to provide information about earlier in this study.** Rate each of the items on a scale from strongly disagree to strongly agree. Try to answer each question as quickly and accurately as you can. Answer the questions as your relationship is now, not how it was in the past, nor how you think it might be in the future.	
I talk to this sibling about things that are important to me. [W]	Strongly disagree
	Disagree
	Somewhat disagree
	Neither agree nor disagree
	Somewhat agree
	Agree
	Strongly agree
This sibling talks to me about things that are important to him or her. [W]	Strongly disagree
	Disagree
	Somewhat disagree
	Neither agree nor disagree
	Somewhat agree
	Agree
	Strongly agree
This sibling and I frequently argue with each other. [C]	Strongly disagree
	Disagree
	Somewhat disagree
	Neither agree nor disagree
	Somewhat agree
	Agree
	Strongly agree
I irritate this sibling. [C]	Strongly disagree
	Disagree
	Somewhat disagree
	Neither agree nor disagree
	Somewhat agree
	Agree
	Strongly agree
This sibling irritates me. [C]	Strongly disagree

	Disagree
	Somewhat disagree
	Neither agree nor disagree
	Somewhat agree
	Agree
	Strongly agree
I think our mother favors one of us more than the other. [R]	Strongly disagree
	Disagree
	Somewhat disagree
	Neither agree nor disagree
	Somewhat agree
	Agree
	Strongly agree
My sibling thinks our mother favors one of use more than the other. [R]	Strongly disagree
	Disagree
	Somewhat disagree
	Neither agree nor disagree
	Somewhat agree
	Agree
	Strongly agree
This sibling tries to cheer me up when I am feeling down. [W]	Strongly disagree
	Disagree
	Somewhat disagree
	Neither agree nor disagree
	Somewhat agree
	Agree
	Strongly agree
I try to cheer this sibling up when he or she is feeling down. [W]	Strongly disagree
	Disagree
	Somewhat disagree
	Neither agree nor disagree
	Somewhat agree
	Agree
	Strongly agree
I dominate this sibling. [C]	Strongly disagree
	Disagree
	Somewhat disagree
	Neither agree nor disagree
	Somewhat agree
	Agree

	Strongly agree
This sibling dominates me. [C]	Strongly disagree
	Disagree
	Somewhat disagree
	Neither agree nor disagree
	Somewhat agree
	Agree
	Strongly agree
I think our father favors one of us more than the other. [R]	Strongly disagree
	Disagree
	Somewhat disagree
	Neither agree nor disagree
	Somewhat agree
	Agree
	Strongly agree
This sibling thinks our father favors one of us more than the other. [R]	Strongly disagree
	Disagree
	Somewhat disagree
	Neither agree nor disagree
	Somewhat agree
	Agree
	Strongly agree
This sibling knows a lot about me. [W]	Strongly disagree
	Disagree
	Somewhat disagree
	Neither agree nor disagree
	Somewhat agree
	Agree
	Strongly agree
I know a lot about this sibling. [W]	Strongly disagree
	Disagree
	Somewhat disagree
	Neither agree nor disagree
	Somewhat agree
	Agree
	Strongly agree
I discuss my feelings or personal issues with this sibling. [W]	Strongly disagree
	Disagree
	Somewhat disagree
	Neither agree nor disagree

	Somewhat agree
	Agree
	Strongly agree
This sibling discusses his or her feelings or personal issues with me. [W]	Strongly disagree
	Disagree
	Somewhat disagree
	Neither agree nor disagree
	Somewhat agree
	Agree
	Strongly agree
This sibling criticizes me often. [C]	Strongly disagree
	Disagree
	Somewhat disagree
	Neither agree nor disagree
	Somewhat agree
	Agree
	Strongly agree
I criticize this sibling often. [C]	Strongly disagree
	Disagree
	Somewhat disagree
	Neither agree nor disagree
	Somewhat agree
	Agree
	Strongly agree
This sibling often does things to make me mad. [C]	Strongly disagree
	Disagree
	Somewhat disagree
	Neither agree nor disagree
	Somewhat agree
	Agree
	Strongly agree
I often do things to make this sibling mad. [C]	Strongly disagree
	Disagree
	Somewhat disagree
	Neither agree nor disagree
	Somewhat agree
	Agree
	Strongly agree
This sibling thinks our mother supports one of us more than the other. [R]	Strongly disagree
	Disagree

	Somewhat disagree
	Neither agree nor disagree
	Somewhat agree
	Agree
	Strongly agree
I think our mother supports one of us more than the other. [R]	Strongly disagree
	Disagree
	Somewhat disagree
	Neither agree nor disagree
	Somewhat agree
	Agree
	Strongly agree
I can count on this sibling to be supportive when I am feeling stressed. [W]	Strongly disagree
	Disagree
	Somewhat disagree
	Neither agree nor disagree
	Somewhat agree
	Agree
	Strongly agree
This sibling can count on me to be supportive when he or she is feeling stressed. [W]	Strongly disagree
	Disagree
	Somewhat disagree
	Neither agree nor disagree
	Somewhat agree
	Agree
	Strongly agree
This sibling is bossy with me. [C]	Strongly disagree
	Disagree
	Somewhat disagree
	Neither agree nor disagree
	Somewhat agree
	Agree
	Strongly agree
I am bossy with this sibling. [C]	Strongly disagree
	Disagree
	Somewhat disagree
	Neither agree nor disagree
	Somewhat agree
	Agree
	Strongly agree

This sibling thinks our father supports one of us more than the other. [R]	Strongly disagree
	Disagree
	Somewhat disagree
	Neither agree nor disagree
	Somewhat agree
	Agree
	Strongly agree
I think our father supports one of us more than the other. [R]	Strongly disagree
	Disagree
	Somewhat disagree
	Neither agree nor disagree
	Somewhat agree
	Agree
	Strongly agree
I know a lot about this sibling's relationships. [W]	Strongly disagree
	Disagree
	Somewhat disagree
	Neither agree nor disagree
	Somewhat agree
	Agree
	Strongly agree
This sibling knows a lot about my relationships. [W]	Strongly disagree
	Disagree
	Somewhat disagree
	Neither agree nor disagree
	Somewhat agree
	Agree
	Strongly agree
I really understand this sibling. [W]	Strongly disagree
	Disagree
	Somewhat disagree
	Neither agree nor disagree
	Somewhat agree
	Agree
	Strongly agree
This sibling really understands me. [W]	Strongly disagree
	Disagree
	Somewhat disagree
	Neither agree nor disagree
	Somewhat agree

	Agree
	Strongly agree
This sibling often disagrees with me about things. [C]	Strongly disagree
	Disagree
	Somewhat disagree
	Neither agree nor disagree
	Somewhat agree
	Agree
	Strongly agree
I often disagree with this sibling about things. [C]	Strongly disagree
	Disagree
	Somewhat disagree
	Neither agree nor disagree
	Somewhat agree
	Agree
	Strongly agree
This sibling often puts me down. [C]	Strongly disagree
	Disagree
	Somewhat disagree
	Neither agree nor disagree
	Somewhat agree
	Agree
	Strongly agree
I often put this sibling down. [C]	Strongly disagree
	Disagree
	Somewhat disagree
	Neither agree nor disagree
	Somewhat agree
	Agree
	Strongly agree
This sibling thinks or mother is closer one of us compared to the other. [R]	Strongly disagree
	Disagree
	Somewhat disagree
	Neither agree nor disagree
	Somewhat agree
	Agree
	Strongly agree
I think our mother is closer to one of us compared to the other. [R]	Strongly disagree
	Disagree
	Somewhat disagree

	Neither agree nor disagree
	Somewhat agree
	Agree
	Strongly agree
I discuss important personal decisions with this sibling. [W]	Strongly disagree
	Disagree
	Somewhat disagree
	Neither agree nor disagree
	Somewhat agree
	Agree
	Strongly agree
This sibling discusses important personal decisions with me. [W]	Strongly disagree
	Disagree
	Somewhat disagree
	Neither agree nor disagree
	Somewhat agree
	Agree
	Strongly agree
This sibling acts in superior ways to me. [C]	Strongly disagree
	Disagree
	Somewhat disagree
	Neither agree nor disagree
	Somewhat agree
	Agree
	Strongly agree
I act in superior ways to this sibling. [C]	Strongly disagree
	Disagree
	Somewhat disagree
	Neither agree nor disagree
	Somewhat agree
	Agree
	Strongly agree
This sibling thinks our father is closer to one of us compared to the other. [R]	Strongly disagree
	Disagree
	Somewhat disagree
	Neither agree nor disagree
	Somewhat agree
	Agree
	Strongly agree
	Strongly disagree

I think our father is closer to one of us compared to the other. [R]	Disagree
	Somewhat disagree
	Neither agree nor disagree
	Somewhat agree
	Agree
	Strongly agree
I know a lot about this sibling's ideas. [W]	Strongly disagree
	Disagree
	Somewhat disagree
	Neither agree nor disagree
	Somewhat agree
	Agree
	Strongly agree
This sibling knows a lot about my ideas. [W]	Strongly disagree
	Disagree
	Somewhat disagree
	Neither agree nor disagree
	Somewhat agree
	Agree
	Strongly agree

Note: [W] *denotes a Warmth item;* [C] *denotes a Conflict item; and* [R] *denotes a Rivalry item.*

Appendix C

Mental Health Continnuum – Short Form (MHC-SF)

Please answer the following questions about how you have been feeling during the past month. During the past month, how often did you feel . . .	
happy?	Never
	Once or twice
	About once a week
	2–3 times a week
	Almost every day
	Every day
interested in life?	Never
	Once or twice
	About once a week
	2–3 times a week
	Almost every day
	Every day
satisfied with life?	Never
	Once or twice
	About once a week
	2–3 times a week
	Almost every day
	Every day
that you had something important to contribute to society?	Never
	Once or twice
	About once a week
	2–3 times a week
	Almost every day
	Every day
that you belonged to a community (like a social group, or your neighborhood)?	Never
	Once or twice
	About once a week
	2–3 times a week
	Almost every day
	Every day
that our society is a good place, or is becoming a better place, for all people?	Never
	Once or twice
	About once a week

	2–3 times a week
	Almost every day
	Every day
that people are basically good?	Never
	Once or twice
	About once a week
	2–3 times a week
	Almost every day
	Every day
that the way our society works makes sense to you?	Never
	Once or twice
	About once a week
	2–3 times a week
	Almost every day
	Every day
that you liked most parts of your personality?	Never
	Once or twice
	About once a week
	2–3 times a week
	Almost every day
	Every day
good at managing the responsibilities of your daily life?	Never
	Once or twice
	About once a week
	2–3 times a week
	Almost every day
	Every day
that you had war and trusting relationships with others?	Never
	Once or twice
	About once a week
	2–3 times a week
	Almost every day
	Every day
that you had experiences that challenged you to grow and become a better person?	Never
	Once or twice
	About once a week
	2–3 times a week
	Almost every day
	Every day

confident to think or express your own ideas and opinions?	Never
	Once or twice
	About once a week
	2–3 times a week
	Almost every day
	Every day
that your life has a sense of direction or meaning to it?	Never
	Once or twice
	About once a week
	2–3 times a week
	Almost every day
	Every day

Appendix D

Institutional Review Board Approval

February 18, 2022

Sarah Mattila
[redacted]

Re: Protocol #21-058, *Does the Quality of Sibling Relationships Moderate the Negative Impact of Adverse Childhood Experiences (ACEs) on Wellbeing in Adulthood?*

Dear Ms. Mattila:

The IRB has reviewed the materials regarding your study, referenced above, and has determined that it meets the criteria for the Exempt from Review category under Federal Regulation 45CFR46. Your protocol is approved as exempt research, and therefore requires no further oversight by the IRB. We appreciate your thorough treatment of the issues raised and your timely response.

If you wish to modify your study, including the addition of data collection sites, it will be necessary to obtain IRB approval prior to implementing the modification. If any adverse events occur, please notify the IRB immediately.

Please contact our office if you have any questions. We wish you success with your project!

Sincerely,

Jennifer Bradley, PhD., RN, AHN-BC, BCC

Jennifer Bradley, PhD., RN, AHN-BC, BCC
Vice Chair, Institutional Review Board
Xavier University

JB/sb

Appendix E

Demographic Questionnaire

1. Your current age (in years): _____

2. Your assigned sex at birth:
    a. Male
    b. Female
    c. Prefer not to respond

3. Your current gender identity:
    a. Male
    b. Female
    c. Transgender male to female
    d. Transgender female to male
    e. Gender non-conforming
    f. Do not identify as female, male, or transgender
    g. Write in: _____
    h. Prefer not to respond

4. Your race/ethnicity (please mark all that apply):
    a. American Indian
    b. Asian
    c. Black/African American
    d. Hispanic American or Latinx
    e. Native Hawaiian or Pacific Islander
    f. White/European American
    g. Write in: _____
    h. Prefer not to respond

5. Do you have any living siblings (i.e., full, half, step, adopted, foster)?
    a. Yes
    b. No*

**Skip-logic: If no, participants are directed to end of survey message about not meeting the study's inclusion criteria.*

Appendix F

Statement of Failure to Meet Inclusion Criteria

Unfortunately, you do not qualify for the study. Please do not submit the HIT because it will be rejected. Thank you for your time.

Appendix G

Informed Consent

The Project
You are being asked to participate in a study conducted by Sarah Mattila, M.A. through Xavier University. The purpose of the study is to examine childhood experiences and sibling relationships. If you agree to participate in this study, you will be asked to provide some information about yourself (e.g., your ethnicity, gender, age), answer some questions about your childhood, and evaluate your relationship with a sibling. Your participation in this study should take approximately 15 minutes to complete. Some questions in the study may be distressing (i.e., cause negative emotions); however, this distress is not expected to exceed what individuals may experience in their daily life. Nonetheless, a list of free, nationally accessible emotional support resources will be provided at the end of the study. There are no direct benefits from participating in the study, but participation will help the researcher understand more about childhood experiences and sibling relationships. If you choose to participate, and you complete the whole study and pass quality assurance checks, **you will be compensated for your time (i.e., $1.25).**

Nature and Purpose of the Project
This study examines childhood experience and sibling relationships. If you agree to participate in this study, you will be asked to provide some information about yourself (e.g., your ethnicity, gender, age), answer some questions about your childhood, and evaluate your relationship with a sibling. The study should take approximately 15 minutes to complete.

Why You Were Invited to Take Part
You are invited to take part in the study because you are registered to complete tasks on MTurk, are at least 18 years of age or older, you have a sibling, you reside in the U.S., and you have at least a 90 HIT approval rate with a minimum of 50 HITs competed.

Anticipated Discomforts/Risks
You may experience emotional distress in response to some of the survey questions; however, this distress is not expected to exceed what you might experience in daily life. Also, a list of free, nationally accessible emotional support resources will be provided at the end of the study.

Benefits
Although there are no direct benefits from taking part in the study, your participation will help the researcher understand more about sibling relationships.

Confidentiality/Anonymity
Participation is voluntary. No personally identifying information is requested beyond your MTurk worker ID. After payments are processed and before data are analyzed, your MTurk worker ID will be removed from all copies of the data file. The highest security/anonymization setting will set in Qualtrics guaranteeing that IP addresses and other potential identifiers, such as geo-location, will not be collected. The anonymous data from this study will be stored securely on the researchers' password-protected computers and may be posted to an online repository and shared publicly with other researchers to adhere to best practices in scientific transparency. Data

without personal identifiers may be retained indefinitely and used for other purposes beyond those described in this consent document.

Compensation
You will receive $1.25 for your participation. Monetary compensation is only earned by participants who complete the study in its entirety and pass all relevant quality checks, including Qualtrics's bot detection feature. This feature is used to detect potential non-human, computerized responses (e.g., bots). If your responses are flagged as possibly fraudulent, they will be further reviewed by the investigator. Based on that review, and identification of fraudulent responding, you may not be compensated.

If you would like a copy of this form, you may print this screen or request a copy from the investigators using the contact information provided.

Your participation in this study is completely voluntary. Refusal to participate in this study will have NO EFFECT ON ANY FUTURE SERVICES you may be entitled to from the University. You are FREE TO WITHDRAW FROM THE STUDY AT ANY TIME WITHOUT PENALTY. If you withdraw from the study, you should not submit the HIT because you will not be compensated. **If you fail a quality assurance item, you will receive a message notifying you that you have failed a quality assurance item and that you should not submit the HIT because you will not be compensated.**

If you have any questions or concerns about this study, please feel free to contact the investigator (Sarah Mattila, mattilas@xavier.edu) or the faculty member supervising this project (Dr. Tammy Sonnentag, Ph.D., sonnentagt@xavier.edu, (513) 745-3469). If you have questions about your rights as a research participant, you may contact Xavier University’s Institutional Review Board by phone at (513) 745-2870 or by email at irb@xavier.edu.

Appendix H

Participant Sibling Demographics Questionnaire

This questionnaire is concerned with your relationship with one of your siblings. If you have more than one sibling, please choose the sibling who has had the most impact on your life and complete the following items based on that sibling.

1. Sibling's current age (in years): _____

2. Sibling's gender:
    a. Male
    b. Female
    c. Non-binary
    d. Preferred gender identity: _____
    e. Prefer Not to Respond

3. Sibling's race/ethnicity:
    a. American Indian
    b. Asian
    c. Black
    d. Caucasian
    e. Hispanic
    f. Multi-racial/Multi-ethnic
    g. Preferred racial/ethnic identity: _____
    h. Prefer Not to Respond

4. Sibling type:
    a. Full sibling (e.g., full biological brother/sister, twin, triplet)
    b. Half sibling
    c. Adopted sibling
    d. Step sibling
    e. Foster sibling
    f. Other (please describe): _____

5. How far does this sibling live from you?
    a. Same city
    b. < 100 miles away
    c. Between 100–200 miles away
    d. Between 200–500 miles away
    e. Between 500–1000 miles away
    f. More than 1000 miles away

6. How much do you and this sibling see each other?
    a. Never

   b. Once every few years
   c. Once a year
   d. A few times a year
   e. Every month
   f. Every week
   g. Every day

7. How often do you and this sibling speak (including on the phone or via text message)?
   a. Never
   b. Once every few years
   c. Once a year
   d. A few times a year
   e. Every month
   f. Every week
   g. Every day

8. How many siblings do you have in total? _____

Appendix I

Debriefing Statement

Thank you for participating in this study. The study you just completed examines sibling relationship quality and how it affects wellbeing in adulthood. We hope that by conducting this study, we can develop a better understanding of those effects, especially in the context of a history of childhood adversity.

Please keep the purpose of this study confidential and do not disclose any information about this study to other potential participants.

We understand that the nature of some of the questions/items in this study may be sensitive and evoke distress. **If you experienced any emotional distress as a result of completing this study, please utilize the free, nationally accessible emotional support resources available here: https://www.apa.org/helpcenter/crisis**

If you have any questions or concerns about this study, or if you wish to inquire about the results of this study, you may contact the researcher, Sarah Mattila, at mattilas@xavier.edu, or the professor supervising this study, Dr. Tammy Sonnentag, at sonnentagt@xavier.edu. If you have questions about your rights as a research participant, you may contact Xavier University's Institutional Review Board at (513) 745-2870 or irb@xavier.edu.

Thank you for your participation!

Please see below for your completion code for this study. Then enter the completion code in the HIT that directed you to this survey.

Appendix J

Link to Emotional Support Resources

https://www.apa.org/helpcenter/crisis

COVID-19 resources for psychologists, health-care workers and the public. Visit Resources Page »

AMERICAN PSYCHOLOGICAL ASSOCIATION

MEMBERSTOPICSPUBLICATIONS & DATABASESPSYCHOLOGY HELP CENTERNEWS & EVENTSSCIENCEEDUCATIONCAREERS ABOUT APA

Crisis Hotlines and Resources

Need to talk to someone? Specialists are available for confidential telephone counseling.

National Suicide Prevention Lifeline
(800) 273-8255

National Suicide Prevention Lifeline (Spanish)
(888) 628-9454

National Suicide Prevention Lifeline (Options for Deaf and Hard of Hearing)
(800) 799-4889

Crisis Text Line
Text HELLO to 741741

National Domestic Violence Hotline
(800) 799-7233

Veterans Crisis Line
(800) 273-8255

National Graduate Student Crisis Hotline
(877) 472-8457

National Sexual Assault Hotline
(800) 656-4673

Child Abuse Hotline
(800) 422-4453

CDC National HIV & AIDS Hotline
(800) 342-2437

Alcoholics Anonymous
(202) 966-9165

Narcotics Anonymous
(800) 549-4670

Gamblers Anonymous
(855) 222-5542

Find a psychologist near you for longer-term help

Alabama (https://www.alapsych.org/page/Find

Alaska (https://www.ak-pa.org/find-a-psychologist/#!directory)

Alberta (https://www.psychologistsassociatic

Arizona (https://azpa.org/directory.php)

Arkansas (https://arpapsych.org/directory.php)

Kentucky (https://www.kpa.org/psychological-services-locatorial-services-locator#/)

Louisiana (https://locator.apa.org/results3/1/lou

Maine (https://mepa.org/practitioners/)

Manitoba (https://mpa.ca/find-psychologist/)

Ohio (https://ohpsych.org/search/custom.c id=4247)

Oklahoma (http://okpsych.org/resources/find-psychologist/)

Ontario (https://www.psych.on.ca/Utilities/Fin a-psychologist.aspx)

Oregon (https://www.opa.org/find-a-psychologist)

Summary

Title: Does the Quality of Sibling Relationships Moderate the Negative Impact of Adverse Childhood Experiences (ACEs) on Wellbeing in Adulthood?

Problem: Over the past two decades, public health research has seen a growing focus on understanding the developmental impact of childhood abuse, neglect, and trauma—collectively referred to as Adverse Childhood Experiences (ACEs). This research has demonstrated that ACEs are associated with significant and prolonged physical and mental health problems (Campbell et al., 2016; Felitti et al., 1998; Gilbert et al., 2015; Greif Green et al., 2010; Horwitz et al., 2001; Mersky et al., 2013), demanding investigation into factors that may mitigate such poor outcomes. One potential factor that may attenuate the negative impact of ACEs on individuals' mental health is social support, which is believed to enhance cognitive and emotional processing of the adverse experience and promote psychological adaptivity (Cohen & Wills, 1985; Thoits, 1986). An important source of social support is sibling relationships (Furman & Buhrmester, 1985; Goetting, 1986; Lempers & Clark-Lempers, 1992; Scholte et al., 2001; Wellman & Wortley, 1989), yet no research has examined if quality sibling relationships buffer the negative effects of ACEs on individuals' wellbeing. Therefore, the purpose of the current study is to examine if the quality of sibling relationships may moderate the negative impact of ACEs on wellbeing in adulthood.

Method: Participants for this study were 18 years of age or older and reported having a living sibling (n = 439; M_{age} = 35.06, SD = 11.20). The participants completed a series of measures assessing their childhood experiences, sibling relationships across the lifespan, and adulthood mental health. Participants provided demographic information about their age, gender, and race/ethnicity, as well information about their sibling (i.e., age, gender, and type [e.g., half sibling]). Participants with multiple siblings were asked to complete the study thinking about the sibling who has had the most impact on their lives. The researcher obtained informed consent prior to data collection. Multiple regression analyses were conducted to determine whether overall sibling relationship quality and/or the individual components that comprise it would attenuate the negative impact of ACEs on wellbeing in adulthood. Post hoc simple slope analyses were used to probe any significant interactions from the regressions.

Findings: Results revealed that that sibling relationships characterized by higher warmth—and, interestingly, higher conflict and rivalry—attenuated the negative impact of ACEs on wellbeing in adulthood. It was also demonstrated that higher ACE-IQ scores predicted lower wellbeing when participants' overall sibling relationship was characterized by relatively high but not low quality.

Implications: The results of the current study contribute meaningfully to the sibling relationship literature by suggesting that sibling relationships are nuanced and may not be best measured by unidimensional treatment of the constructs that characterize it (i.e., low conflict may not always increase quality). Future research is recommended to consider the nuances of conflict and rivalry in the context of sibling relationships, and to expand the conceptualization of sibling relationship quality accordingly. This will help determine whether sibling relationship quality is a factor that can mitigate the negative impact of ACEs on wellbeing.