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Sibling Relationships in Older Adulthood: Links with Loneliness and Well-being

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Abstract

Researchers have documented associations between family relationships and a variety of well-being outcomes. Yet, sibling relationships, the longest lasting relationships in most people's lives, have received very little research attention beyond young adulthood. The goals of the current study were to: provide descriptive information about sibling relationships in later adulthood, investigate predictors of individual differences in sibling relationship quality, and examine associations among sibling relationship quality, loneliness, and well-being in later adulthood. The sample included 608 older adults (329 men, 279 women) who were 64.6 years old ($SD = 4.58$) on average. Participants provided self-report data about their relationships and well-being. Results showed that older adults reported high levels of sibling warmth and low levels of sibling conflict and parental favoritism. Sister-sister pairs had warmer sibling relationships than other gender-compositions. Sibling conflict and parental favoritism were positively associated with symptoms of depression, anxiety, hostility and loneliness. Sibling warmth was negatively associated with loneliness. Loneliness partially mediated the associations between sibling relationship quality and well-being. Results

from this study highlight the importance of sibling relationships in older adults' health and well-being.

Keywords

Siblings; older age; loneliness; well-being; mental health

Researchers working from life course (Elder, 2001), family systems (Cox & Paley, 1997; Fingerman & Bermann, 2000) and attachment (Bowlby, 1980; Cicirelli, 1989) perspectives have documented associations between family relationships and a variety of well-being outcomes. Yet, sibling relationships, the longest lasting relationship in most people's lives, have received less research attention than other family relationships. Recent demographic changes indicate that Americans are living longer, having fewer children, divorcing later in life, and spending more of their lives as widows or widowers (Brown & Lin, 2012; Furstenberg, Hartnett, Kohli & Zissimopoulos, 2015; Sutor, Gilligan & Pillemer, 2016). Given that about 85% of Americans have at least one sibling, these demographic shifts suggest that relationships with brothers and sisters may become increasingly important as Americans age. However, sibling relationships in older adulthood have been understudied compared to other life stages. The goals of this study were: first, to provide descriptive information about the nature of sibling relationships in older adulthood, second, to examine predictors of individual differences in older adults' sibling relationships, and finally, to investigate associations among the quality of sibling relationships, loneliness, and well-being in later life.

Characteristics of Sibling Relationships in Older Adulthood

In childhood and adolescence, most siblings live together and have emotionally intense relationships characterized by high levels of both warmth and conflict (Dunn, 1985; McHale, Updegraff & Whiteman, 2012). In young adulthood, levels of sibling conflict and rivalry are lower and sibling warmth is comparable or higher than in adolescence (Conger & Little, 2010; Jensen, Whiteman & Fingerman, 2018; Milevsky, Smoot, Leh & Ruppe, 2005; Scharf, Shulman & Avigad-Spitz, 2005). Young adult siblings also spend less time together and have less contact than earlier in development (Jensen et al., 2018; Lindell, Campione-Barr, & Killoren, 2015; White, 2001). In midlife, adults may become increasingly involved with their procreative families and careers. The little research available on this developmental period suggests that sibling relationships in midlife are emotionally meaningful although less intense than sibling relationships earlier in the lifespan (Sutor et al., 2016). As individuals move into older adulthood, they may no longer have spouses to rely on, and their adult children may be busy with their own families. Thus, in later adulthood, do sibling relationships fill a role that other family relationships may no longer play? Do warm and supportive sibling relationships help ameliorate stress and loneliness and contribute to improved adjustment? Is sibling conflict in older age linked to adjustment difficulties? Or do brothers and sisters grow apart in later life and have little impact on each other's well-being?

The little research to date on sibling relationships in later adulthood suggests that, in general, older adults report having positive relationships with their siblings (Bedford & Avioli, 2012; Cicirelli, 1995; Connidis, 2010; White, 2001), and brothers and sisters often maintain contact with each other (Connidis & Campbell, 1995; Paul, 1997; Spitze & Trent, 2006). In a large national panel sample of adults aged 16 – 95, contact between siblings declined during early adulthood and remained stable in midlife and later life (White, 2001). In later adulthood, siblings report exchanging both emotional and instrumental support (Campbell, Connidis, & Davies, 1999; Connidis & Campbell, 1995; White, 2001; White & Reidmann, 1992). Giving and receiving help from siblings declined in early adulthood, stabilized in midlife, and increased slightly after age 70 for those with siblings living nearby (White, 2001). In addition, research has shown that older adults often avoid negative interactions and focus on maintaining positive contact with the people they are closest to (Carstensen, Issacowitz & Charles, 1999; Gold, 1987; 1989; Lang & Carstensen; 1994) and tend to have positive global views of family relationships (Winkeler, Filipp & Boil, 2000). Given these findings, we anticipated that the older adults in the current study would report that their relationships with siblings were generally positive and that they would be in regular contact with each other.

Predictors of Individual Differences in Older Adults' Sibling Relationships

A variety of factors including structural features of families may be associated with individual differences in older adults' sibling relationships. In numerous studies, and in fact across the life course, sister-sister sibling pairs had closer relationships than brother-brother or brother-sister pairs (Connidis, 1989; Milevsky et al., 2005; White & Riedmann, 1992). In a sample aged 16–95, siblings who were married had lower levels of contact, support, and exchange than siblings who were not married (White, 2001; White & Riedmann, 1992). In contrast, in a sample of young adults assessed at age 25, and again at age 30, there were no effects of marital status on sibling relationship quality (Jensen et al., 2018). Many older adults' parents are deceased. One large panel study of Dutch families found that sibling contact increased after the death of a parent and both contact and conflict increased after the death of a second parent. However, these increases were short lived and over time, siblings whose parents were deceased had lower levels of contact and conflict than siblings whose parents were alive (Kalmijn & Leopold, 2019). In studies of American families, scholars have found that adult siblings had warmer relationships, more contact, and supported one another more when one or both parents were alive compared to siblings whose parents were dead (Khodyakov & Carr, 2009; Spitze & Trent, 2018; White & Reidmann, 1992). In the current study, we tested whether individual differences in sibling relationship quality were predicted by: gender, sibling gender composition, age spacing between siblings, marital status and whether participants' parents were alive or deceased.

In older adulthood when siblings typically live apart from each other, the amount of contact they have may be related to individual differences in their relationships (Conger & Little, 2010; Volkom, 2006). In young adulthood, sibling contact was positively associated with warmth and negatively associated with rivalry (Stocker et al., 1997). And, in the age of increasing options for connection through technology and social media, siblings have multiple opportunities for maintaining contact regardless of proximity (Conger & Little,

2010; Lindell et al., 2015). In the current study, we examined associations between several types of contact and sibling relationship quality.

Associations among Sibling Relationship Quality, Loneliness and Well-being in Older Adulthood

Life course (Antonucci, Akiyama & Takahasi, 2004; Elder, 2001), family systems (Cox & Paley, 1997; Fingerman & Berman, 2000) and adult attachment (Cicirelli, 1989, 1995) theories suggest that sibling relationships are likely to be associated with well-being across the life-span. A central tenet of life course theory is that individual development needs to be considered in the context of socio-historical events and close social relationships that can affect the individual and family. In a complementary fashion, family systems and adult attachment theories examine the links among family interactions and individual well-being. Family systems theory posits that family relationship dynamics are linked across various family subsystems (e.g., there is spillover between the parent-child subsystem and sibling subsystem). Attachment theory, which focuses on the nature of emotional bonds between parent and child (Bowlby, 1980) or between siblings (e.g., Bank & Kahn, 1982; Stewart, 1983), suggests that siblings can provide emotional support and mitigate feelings of loneliness in adulthood and later life (Cicirelli, 1989).

Numerous studies have documented associations between sibling relationship quality and psychological adjustment in childhood, adolescence, and young adulthood. Hostility and conflict between siblings has been linked with internalizing problems such as anxiety and depression as well as with externalizing problems such as risky and antisocial behavior (see Feinberg, Solmeyer & McHale, 2012 & McHale et al., 2012 for reviews). Some research has shown that siblings can act as positive influences and sources of support for one another (Davies, Parry, Boscoe, Martin & Cummings, 2018; Hollifield & Conger, 2014; Jenkins & Smith, 1990). Finally, a large body of work has demonstrated that feelings of rivalry and perceptions of parental favoritism are negatively associated with psychological well-being in childhood, adolescence, and early adulthood (Jensen, Whiteman, Fingerman & Birditt., 2013; Richmond, Stocker, & Rienks, 2005; Young & Ehrenberg, 2007).

To date, few studies have examined the associations between sibling relationship quality and adjustment past young adulthood. However, one study found that for middle-aged women, conflict with siblings was linked to more negative self-concept and more symptoms of psychological distress (Paul, 1997), and a recent study found that tension in sibling relationships was associated with depressive symptoms in middle aged adults (Gilligan et al., 2017). Similarly, in a small sample of 61 to 91 year-olds, perceptions of closeness to a sister were associated with lower levels of depression (Cicirelli, 1989). In addition, research has demonstrated the deleterious impact of parental differential treatment on psychological well-being in adulthood (Davey, Tucker, Fingerman, & Savla, 2009; Peng, Suito, & Gilligan, 2016; Pillemer et al., 2010; Suito, Gilligan, Peng, Jung, & Pillemer, 2015; Suito et al., 2016).

Research has shown that loneliness and social isolation are common among older adults and are linked to both physical health problems and psychological difficulties (Cacioppo,

Hughes, Waite, Hawkey, & Thisted, 2006; Cornwell & Waite, 2009; Hawkey & Cacioppo, 2010; Ong, Uchino, & Wethington, 2015). Loneliness is defined as, “a subjective feeling that accompanies the perception that one’s social needs are not being met by the quantity or especially the quality of one’s social relationships” (Hawkey & Cacioppo, 2010, pg. 1). Loneliness has been conceptualized as an emotional pathway that may connect social isolation, and poor quality relationships to health and well-being difficulties (Ong et al., 2015; Steptoe, Ahankar, Demakakos, & Wardle, 2013). Thus, in the current study, we explored whether poor sibling relationship quality in older adults was associated with higher levels of loneliness, which in turn, would be linked to poor well-being outcomes.

These associations among sibling relationship quality, loneliness and well-being could differ for various subgroups of siblings. For example, previous research has shown that sister-sister pairs have closer relationships than other gender compositions (Connidis, 1989; Connidis & Campbell, 1995), so it is possible that the links between sibling relationships and well-being are stronger for them than for other sibling gender combinations. It is also possible that individuals’ gender, marital status and their parents’ alive or deceased status could influence these associations. Thus, we explored the roles of these variables as moderators of the associations among sibling relationship quality, loneliness and well-being.

In summary, given that Americans are living longer than in previous generations and that sibling relationships may take on increased salience as we age (Uhlenberg, 1996), coupled with the fact that loneliness is linked to poor health and well-being, it is important to learn more about associations between sibling relationships and adjustment in later life. The first aim of this study was to describe characteristics of sibling relationships in later life. We predicted that older adults would report high levels of warmth and low levels of hostility and parental favoritism. The second aim was to examine predictors of individual differences in sibling relationship quality in later life. We expected that sister-sister pairs would have the most positive sibling relationships. We tested the effects of age, age spacing between siblings, number of siblings in the family, marital status, and whether participants’ parents were living or deceased on sibling relationship quality, but we did not make a priori hypotheses about these associations. We predicted that contact between siblings would be associated with more positive and less negative sibling relationships. The final goal was to investigate associations among sibling relationship quality, loneliness, and well-being. We predicted that warmth would be associated with fewer symptoms of depression, anxiety, and hostility and with lower levels of loneliness, and that conflict and parental favoritism would be positively associated with depression, anxiety, and hostility and loneliness. Based on the idea that sibling relationships could provide support and ameliorate loneliness among older adults, we tested a structural equation model in which loneliness mediated the link between sibling relationship quality and well-being. Finally, we examined the moderating roles of gender, sibling dyad gender composition, marital status, and parents’ living status on the hypothesized paths in the SEM.

Method

Sample

The sample included 608 older adults (329 men, 279 women) who participated in the Later Adulthood Study (Wickrama, et al., 2017). These participants were initially recruited for a larger longitudinal study of families in rural Midwestern United States (Conger & Conger, 2002). The subsample used in the current study were all participants in the LAS ($N = 758$) who completed questionnaires about their relationships with a living sibling. Participants were white, were 64.6 years old on average ($SD = 4.58$), had an average of 13.8 years of education ($SD = 2.06$), and the mean household income was \$96,000 ($SD = 97,971$). Five hundred and two participants were married (251 men, 251 women), 35 were widowed (30 men, 5 women), and 61 were divorced (41 men, 20 women). Of the 502 married participants, 406 were married to other participants (i.e., 203 couples). The gender composition of sibling pairs included: 166 brother-brother pairs, 148 older brother-younger sister pairs, 143 older sister-younger brother pairs, and 151 sister-sister pairs. The average age spacing between siblings was 2.97 years ($SD = 2.29$). On average, participants had 3.74 siblings ($SD = 2.36$), 1.41 of whom were still living. Four hundred and ninety participants (80.46%) had both parents deceased, 69 (11.33%) had both parents living, and 50 (8.21%) had one living parent and one deceased parent. Table 1 provides descriptive statistics of all study variables.

Procedure

Consistent with the data collection procedures established in the early years of the larger project (Conger & Conger, 2002), participants were interviewed in their homes and completed questionnaires about their relationship with the living sibling closest in age to them during a two-hour home visit. In cases in which married couples participated, each partner was interviewed and completed questionnaires in a separate room in order to maintain confidentiality. Participants were paid \$110 on average for their participation. Data for this report were collected in 2015. This study received approval from the institutional review board of the University of Georgia.

Measures

Adult Sibling Relationship Questionnaire - very short form.—Participants completed the ASRQ-VSF (Lanthier & Stocker, 2014) about their relationship with the living sibling closest in age to them. The ASRQ-VSF is a shortened version of the 81-item ASRQ (Stocker, Lanthier, & Furman, 1997). (See supplemental Table 1 for a list of ASRQ-VSF items). It consists of 18 items that loaded on three scales: warmth (6 items), conflict (6 items) and parental favoritism (6 items). Warmth and conflict items were rated on 5- point Likert scales that ranged from *1 = hardly at all* to *5 = extremely much*. Parental favoritism items were about perceptions of mothers' and fathers' favoritism toward the participant and his or her sibling. These items were rated on 5- point scales (*1 = participant is usually favored, 2 = participant is sometimes favored, 3 = neither participant nor sibling are favored, 4 = sibling is sometimes favored, and 5 = sibling is usually favored*). Parental favoritism items were recoded as absolute discrepancy scores (*0 = neither sibling is favored, 1 = parent sometimes favors one sibling over the other, and 2 = parent usually favors one sibling over*

the other). Scale scores were created by taking the mean of the 6 items that made up that scale. If participants' parents were deceased, they were asked to make their ratings based on their relationships with parents and siblings, "during your adult years." If participants' parents were alive, they based their ratings on their relationships, "during the last year." (There were no mean differences on parental favoritism scores for participants whose parents were alive compared to those whose parent(s) were deceased.) Warmth, conflict, and parental favoritism scales had adequate variability and were internally consistent: Cronbach alphas were: .93 for Warmth, .88 for Conflict, and .86 for Parental favoritism. Correlations between warmth and conflict and parental favoritism were significant and negative ($r = -.12$ and $r = -.22$ respectively). Conflict and parental favoritism were significantly positively correlated ($r = .23$).

Because the ASRQ-VSF had not previously been used for older adults, we conducted a Confirmatory Factor Analysis to examine the factor structure. Results supported the predicted factor structure with three independent factors: warmth, conflict, and parental favoritism (see Supplemental materials, Figure S1). The model fit the data adequately (CFI = .90, SRMR = .06). Because many of the participants were married to each other, robust standard errors were calculated using a sandwich estimator to account for clustering effects using the "CLUSTERING IS" command in Mplus (Muthén & Muthén, 1998–2015). In this procedure, individual level variances are corrected for cluster level (here couple level) variances. This method has been used extensively throughout sample survey literature and has been shown to be unbiased for clustered data regardless of setting (Williams, 2000). All factor loadings in both the first and second order factors were significant ($p < .001$). Second order indicators were relatively well balanced, with no standardized loading absolute value below .35 or above .64.

Contact between Siblings.—Contact between siblings was measured by two questions: "During the past 12 months, how often did you see this sister or brother in person?" and "During the past 12 months, how often have you had contact with this sister or brother by phone, email, text, Facebook / other social media, by video chat (like Skype or Facetime) or by writing letters?" Both items were answered using 6-point Likert scales that ranged from $1 = \text{every day}$ to $6 = \text{never}$. The inter-item correlation for the two items was $r = .62$, $p < .001$. Each item was reverse scored so that high scores indicated more contact. The mean of the two items made up the contact score. The scale was internally consistent, Cronbach alpha = .76.

Loneliness.—Participants completed the 20 item UCLA Loneliness Scale, version 3 (Russell, 1996). Sample items include: "How often do you feel that no one knows you well?" and "How often do you feel there are people you can turn to?" Items were reverse coded when necessary such that higher scores indicated greater loneliness. Responses range from $1 = (\text{never})$ to $4 = (\text{often})$. Items were summed and divided by 20 to create a total score. The scale was internally consistent, Cronbach alpha = .92.

Well-being.—Participants reported on symptoms of depression, anxiety, and hostility on the Symptom Checklist-90-Revised (*SCL-90-R*) (Derogatis, 1983). Participants indicated their degree of discomfort regarding adjustment problems on a scale of 0 = (*not at all*) to 4 =

(*extremely*) during the past week. Example items include: “feeling blue” and “low in energy or slowed down” (depression); “nervousness or shakiness inside” and “feeling tense or keyed up” (anxiety); and “temper outbursts you cannot control” and “having urges to beat, injure, or harm someone” (hostility). Items corresponding to each subscale were averaged together to create scale scores of depression, anxiety, and hostility. The 13-item depression subscale was internally consistent ($\alpha = .89$), as was the 10-item anxiety subscale ($\alpha = .86$), and the 6-item hostility subscale ($\alpha = .65$).

Family Structure and Control Variables.—Participants’ reported their gender, their sibling’s gender, their age and their sibling’s age, number of siblings in the family, marital status, whether their parents were alive or deceased, years of education, and household income. Sibling gender dyad composition was a 4-level categorical variable in which 1 = brother-brother dyad, 2 = older brother-younger sister dyad, 3 = older sister-younger brother dyad, and 4 = sister-sister dyad. Age spacing between siblings was represented by the absolute difference between the two siblings’ ages. Marital status was coded as: 1 = married, 2 = widowed or divorced. Parents’ alive / deceased status was coded as: 1 = both parents alive, 2 = one parent alive and one parent deceased, 3 = both parents deceased. Household income was calculated as (business income - business expenses) + (income from employment) + (farm income - farm losses) + (income from other sources). Therefore, some participants had negative incomes if they lost money in business or farming.

Results

Characteristics of Sibling Relationships in Older Adulthood

Means, associations, and MANOVAs reported below were conducted using Stata 14.2 (StataCorp, 2015). The mean level of warmth in the sibling relationship was 2.75 ($SD = 1.11$) on a 5-point Likert scale. The average level of conflict was lower than the mean level of warmth, 1.32 ($SD = 0.56$) on a 5-point Likert scale. Reports of conflict were highly skewed toward “no conflict.” The mean level of parental favoritism was also relatively low, 0.59 ($SD = 0.59$) on a scale that ranged from 0 – 2. The average amount of contact between siblings was 2.72 ($SD = 1.07$), which fell about mid-way between “once a week” and “more than once a week” but was less than “every day.”

Predictors of Individual Differences in Older Adults’ Sibling Relationships

We produced a MANOVA (not shown) to examine the associations between the independent variable, sibling gender composition, and three dependent variables, sibling warmth, conflict, and parental favoritism. (Sibling gender composition had four levels: 1 = brother-brother, 2 = older brother-younger sister, 3 = older sister-younger brother, and 4 = sister-sister). F -tests for conflict and parental favoritism were not significant. The global F -statistic for warmth was significant ($F = 16.55$, $df = 3, 632$, $p < .001$). Post-hoc analysis showed that sister-sister sibling pairs had higher levels of warmth in their relationships than all other sibling gender combinations. No other sibling pair comparison was significant. Mean sibling warmth for brother-brother, older sister-younger brother, older brother-younger sister, and sister-sister dyads were 2.46 (1.05), 2.66 (1.05), 2.64 (1.08), and 3.26 (1.09) respectively (standard deviations in parentheses).

Participants' age was negatively correlated with parental favoritism, and there was a positive correlation between age spacing between siblings and parental favoritism. Women reported warmer sibling relationships than men (see Table 2). There were no significant effects of marital status (married vs. widowed or divorced) or number of siblings in the family on sibling relationship quality. We produced another MANOVA (not shown) examining the association between the independent variable, parents' living status (1 = both parents alive, 2 = one parent alive and one parent deceased, 3 = both parents deceased) and the dependent variables: sibling warmth, conflict, and parental favoritism. Parents' living status was not linked to scores on conflict or parental favoritism. The global F -test for warmth was significant ($F = 5.57$, $df = 3, 602$, $p < .01$). Post-hoc tests indicated that participants with both parents living reported greater warmth in their sibling relationships than participants with one living parent and participants with both parents deceased. Mean sibling warmth for respondents with both parents living, one living parent, and both parents deceased were 3.07 (1.05), 2.42 (1.03), and 2.74 (1.11) respectively (standard deviations in parentheses).

Results from correlational analyses indicated that the amount of contact between siblings was positively associated with warmth and negatively associated with parental favoritism (see Table 2).

Associations among Sibling Relationship Quality, Loneliness, and Well-being

As expected, sibling conflict and parental favoritism were positively correlated with measures of loneliness and symptoms of depression, anxiety, and hostility. Sibling warmth was negatively associated with loneliness and was not associated with measures of well-being. Loneliness was positively correlated with symptoms of depression, anxiety, and hostility. (See Table 2).

For the next step in the analyses, we tested a structural equation model (SEM) using Mplus 7.4 (Muthén & Muthén, 1998–2015). Because many of the participants were married to each other, robust standard errors were calculated using a sandwich estimator to account for clustering effects (as described earlier). Results from the SEM analysis (shown in Figure 1) in which loneliness partially mediated the association between sibling relationship quality and wellbeing outcomes showed that the model provided an adequate fit to the data ($\chi^2 (37, N = 608) = 104.63$, $p < .001$, CFI = .94, RMSEA = .06). Gender, age, marital status, years of education, and household income were entered as controls in this model. None of the control paths were significant with two exceptions; being married was associated with less loneliness ($\beta = -.16$, $p < .001$), and education was negatively associated with loneliness ($\beta = -.11$, $p < .01$). We also tested a model including a number of additional controls (not shown), including sibling dyad gender composition, age spacing between siblings, contact, and parental living status. This model with additional controls produced nearly identical results as the original model (no standardized estimate changed by more than .05 and pattern of significance was the same). Results from the trimmed model are presented below.

Each of the three sibling relationship scales loaded significantly on the latent factor, sibling relationship quality (warmth = .33, conflict = $-.37$, and parental favoritism = $-.63$), and each of the three indicators of well-being loaded significantly on the latent factor, well-being (Depression = .93, anxiety = .78, and hostility = .67). Sibling relationship quality was

significantly associated with loneliness ($\beta = -.23, p < .01$), and loneliness was significantly associated with well-being ($\beta = .58, p < .001$). These associations represent medium and large effects respectively (Cohen, 1988). The path between sibling relationship quality and well-being was significant ($\beta = -.29, p < .05$) when associations with loneliness were held to zero (i.e., a direct model with no mediator). This unmediated association was a medium effect size (Cohen, 1988). This path became nonsignificant ($\beta = -.15, p = .053$) when loneliness was included in the model as a mediator. These paths were near to Cohen's medium effect size. Because we would not expect indirect effects to have a normal distribution, we used a bootstrapping procedure to estimate 95% confidence intervals for the indirect effect estimate without using normal theory (Bollen & Stine, 1990). In this procedure, 1000 resamples were drawn to construct a bootstrap distribution. This distribution was corrected for bias, and the confidence interval was constructed using the quartiles from this distribution. The indirect path from sibling relationship quality to well-being mediated by loneliness was significant ($\beta = -.14, p < .001$; unstandardized 95% CI [-5.13 - -1.01]) and explained 47.06% (specific indirect effect / total effect) of the total association between sibling relationship quality and well-being.

To assess potential moderators of the associations described above, we conducted a series of group difference tests (not shown) in Mplus (Muthén & Muthén, 1998–2015). We estimated a model with parameters fixed to be the same for both groups and a model with parameters for hypothesized regression paths freed between groups for each moderator. If the χ^2 value was significantly lower in the second model, that is evidence that the models differed by group (Dimitrov, 2010). We began by comparing men and women. The model with freed parameters did not significantly improve on the model with fixed parameters ($\chi^2 = 107(3), p > .05$). Thus, there was no evidence that the associations above varied by gender. We also compared sister-sister dyads to all other gender compositions and found no significant differences between these groups ($\chi^2 = 6.11(3), p > .05$). In addition, there were no significant differences between respondents with both parents living versus all other respondents ($\chi^2 = 1.17(3), p > .05$). Finally, we compared married to unmarried respondents and found a significant difference between these groups ($\chi^2 = 12.25(3), p < .01$). However, Wald tests comparing parameter estimates for married and unmarried participants showed no significant differences in individual paths at the .05 level (Cohen, Cohen, West, & Aiken, 2003).

Discussion

Americans are living longer than in previous generations (Bedford & Avioli, 2012; Furstenberg et al., 2015). Thus, the sibling relationship, the longest lasting relationship for most people, may become increasingly relevant for older adults and may be linked to their well-being. Key findings from our study are as follows. Sibling relationships among older adults were characterized by high levels of warmth and low levels of conflict and parental favoritism. Some family structural variables (gender, sibling gender composition, age, age spacing between siblings, and parents' living status) were associated with individual differences in dimensions of sibling relationship quality. Sibling conflict and parental favoritism were positively associated with symptoms of depression, anxiety, hostility, and loneliness. Sibling warmth was negatively correlated with loneliness. Loneliness partially

mediated the association between sibling relationship quality and older adults' well-being. Implications of these findings as well as suggestions for future research are presented in the following sections.

Characteristics of Sibling Relationships in Older Adulthood

Participants' reports of warmth were about mid-level on the 5-point warmth scale, and they reported low levels of conflict in their relationships with brothers and sisters. These levels of conflict were lower than typically found in childhood, adolescence, and young adulthood (Furman & Buhrmester, 1985; McHale et al, 2012; Stocker et al., 1997). Previous research has noted that older adults, compared to middle aged adults, tend to have a global positive bias toward family members (Winkeler et al., 2000). Thus, they may rate their sibling relationships more favorably than during earlier stages of development. It may also be the case that in later adulthood, rather than simply having a 'rose tinted' view of family relationships, siblings no longer engage in much conflict, or they choose to avoid negative interactions. It should be noted that participants rated their relationship with the living sibling closest in age to them, not with the sibling they felt closest to emotionally. Thus, one would expect a range in the quality of these relationships, yet these older adults rated their sibling relationships as more positive than negative.

Participants' reports of parental favoritism were also quite low, although they were similar to levels reported by young adults (Stocker et al., 1997). Many of the participants had one or both parents who were deceased, yet there were no significant differences between the amount of parental favoritism reported by those whose parents were alive or deceased. Research on sibling relationships in young adulthood and midlife has shown that it is common for adults in these developmental stages to perceive favoritism (or differential treatment) by their parents (Jensen et al., 2013; Peng et al., 2016; Pillemer et al., 2010, Suitor et al., 2015, 2016). Taken together, this pattern of findings suggests that even in later life, and regardless of whether parents are alive or deceased, adult children are sensitive to perceived differences in parental favoritism.

Participants were in contact with each other in a variety of ways such as in person, over the phone, or on social media between once a week and several times a week, on average. These findings align with previous research that indicates that older adult siblings often maintain regular contact with each other (Connidis & Campbell, 1995; Paul, 1997; Spitze & Trent, 2006). The current data were collected in 2015, and contact was greater than the once or twice a month that was reported by White (2001) and may be due in part to increases in social media and cell phone use since White's data were collected.

Predictors of Individual Differences in Older Adults' Sibling Relationships

Individual differences in sibling relationship quality were predicted by several family structure variables. Women reported more warmth than men, and similar to findings from other developmental periods, sister-sister pairs had warmer relationships than all other gender combinations (Connidis, 1989; Milevsky et. al., 2005; White & Riedmann, 1992). These findings are consistent with previous research that suggests that women tend to be the "kin-keepers" of families and more relational than men (Gilligan, 1982; Salari & Zhang,

2006). Age was negatively correlated with parental favoritism, indicating that with increasing age, older adults reported less parental favoritism. This finding is consistent with other research that has shown that perceptions of negative aspects of family relationships tend to decrease as adults age (Charles & Carstensen, 2008). Interestingly, greater age spacing between siblings was associated with higher levels of parental favoritism. This finding is somewhat counterintuitive given that widely spaced siblings should have fewer similarities or issues that might promote sensitivity to parental favoritism. Participants were in the “young-old” age group; 90% were between ages 59 and 70 and most were married and still working. It will be important for future research to examine the impact of age and age-spacing across a wider range of later adulthood, particularly in later stages of older age when retirement and spousal illness or death are more common.

The number of siblings in the family was not significantly associated with the quality of the sibling relationship. Also, marital status was not associated with the quality of the sibling relationship. This finding did not support previous results that older adults who are unmarried were closer to their siblings than married individuals (Campbell et al., 1999; White, 2001; White & Riedmann, 1992). Whether participants’ parents were alive or deceased was not associated with reports of parental favoritism but was significantly associated with sibling warmth. Participants with both parents alive had warmer sibling relationships than those with one or both parents deceased. These results suggest that parents may play a kinkeeping role for their adult children that might contribute to higher levels of warmth among siblings with living parents than deceased parents (Kalmijn & Leopold, 2019).

Consistent with results from an earlier study with young adult siblings (Stocker et al., 1997), we found that frequency of contact between siblings was positively associated with warmth and negatively associated with parental favoritism. As the role of technology and social media grows and as older Americans become more facile with these forms of communication, the opportunity to exchange information and support with siblings who do not live close by may increase. Moreover, recent research suggests that the type of technological communication (i.e., synchronous, in real time such as texting and talking vs. asynchronous, not in real time such as email and Facebook) may be differentially associated with sibling relationship quality (Lindell et al, 2015). In addition, in older adulthood, one sibling may adopt new technology (e.g. texting) and another may not, thus creating the potential for less personal communication. These issues deserve further study.

Associations among Sibling Relationship Quality, Loneliness, and Well-being

As predicted, the quality of older adults’ sibling relationships was associated with their well-being. Conflict and parental favoritism were positively associated with depression, anxiety, and hostility symptoms. However, sibling warmth was not significantly associated with adjustment outcomes. These results are similar to those found at younger developmental stages in that there tend to be stronger ties between the negative aspects than the positive features of sibling relationships and psychological adjustment (Feinberg et al., 2012; McHale et al., 2012). The fact that older adults’ perceptions of parental favoritism was the highest loading scale on the sibling relationship factor and was associated with poorer

adjustment is noteworthy because one might predict that at this late stage of development, adults would no longer be sensitive to perceived inequities in parental behavior, from either earlier in adulthood or currently. However, the associations between parental favoritism and adjustment were consistent with findings from studies that range across childhood, adolescence, young adulthood and midlife (Jensen et al., 2013; McHale et al., 2012; Peng et al., 2016; Pillemer et al., 2010; Sutor et al., 2015) and suggest that issues having to do with parental favoritism continue to be at play in older adulthood

Given that levels of loneliness are high in older adults and that numerous studies have found connections between loneliness and poor physical and mental health in older adults (see Cacioppo et al., 2018; Cornwell & Waite, 2009; Hawkey & Cacioppo, 2010; Steptoe et al., 2013), we examined loneliness as a mediator between older adult sibling relationship quality and well-being. Results from a SEM analysis showed that loneliness partially mediated this association; thus, future research could investigate the role of loneliness as a mechanism that connects family relationships and well-being. For example, do poor quality relationships contribute to feelings of loneliness, which in turn contribute to low well-being, or is the direction of influence the reverse? In addition, it would be interesting to study older adults' sibling relationships in conjunction with other close relationships. Do sibling relationships have a unique role in relation to older adults' loneliness and well-being or could another relationship substitute for the sibling relationship?

Moderation analyses showed that there were no significant differences in results from the SEM between men and women, sister-sister dyads and all other sibling gender compositions, and respondents with both parents living vs. those with one or both parents deceased. There was a significant difference in the fit of the SEM for married and unmarried participants, but follow-up tests showed no significant differences in individual paths for married and unmarried participants. This deserves further study because the nature of associations among sibling relationships, loneliness, and well-being may vary for those with and without spouses.

In addition to the contributions of this research, there are several limitations. The sample consisted of white adults from the Midwest; thus results may not generalize to other ethnic groups. However, previous findings from this sample have been replicated across other more diverse samples such as African American (R. D. Conger et al., 2002), Mexican American (Parke et al., 2005), and Finnish families (Solantaus, Leinonen, & Punamaki, 2004), giving us greater confidence in the generalizability of our results. Specific to studies with siblings, previous research has shown that "familism" (one's sense of family obligation) contributes to the nature of adolescent sibling relationships in Mexican Origin families (Updegraff, McHale, Whiteman, Thayer & Delgado, 2005). Clearly, research is needed on older adult sibling relationships in a variety of ethnic groups and cultural settings. There were several measurement issues that could have affected our findings. First, data were based on one sibling's self-reports. Future research should include both siblings' perspectives and incorporate other methodologies, such as observations. Second, because the ASRQ-VSF was not designed for older adults, there could be other dimensions of the sibling relationship in later life that our measure did not capture. Third, the ASRQ-VSF assessed parental favoritism on an absolute scale, results could have differed if the direction of parental

favoritism has been measured. Finally, these data were from one point in time; longitudinal research is needed to examine both the direction of associations among sibling relationships, loneliness, and well-being, as well as how these associations change or remain stable across adult development.

Results from this study have several implications for policy and practice. As our population ages, policy makers should attend to the role that sibling relationships play in older adults' health and well-being. Furthermore, professionals working with families in applied settings might design interventions that decrease sibling conflict and perceptions of parental favoritism as well as promote sibling relationships as sources of companionship and support for older adults. Moreover, the relationships between siblings in midlife should be considered as many adult siblings will need to cooperate in managing their aging parents' health and well-being.

In conclusion, results from the current study increase our understanding of sibling relationships in later adulthood and provide directions for future research. Demographic changes in the United States indicate that Americans are living longer, having fewer children, divorcing later in life, and spending more time as widows and widowers than in previous generations (Brown & Lin, 2012; Furstenberg et al., 2015; Sutor et al., 2016). Moreover, loneliness is high among aging Americans and is linked to poor mental and physical health (Cacioppo et al., 2006; Cornwell & Waite, 2009). In later life, sibling relationships may become increasingly important as sources of support and may mitigate feelings of loneliness and contribute to well-being.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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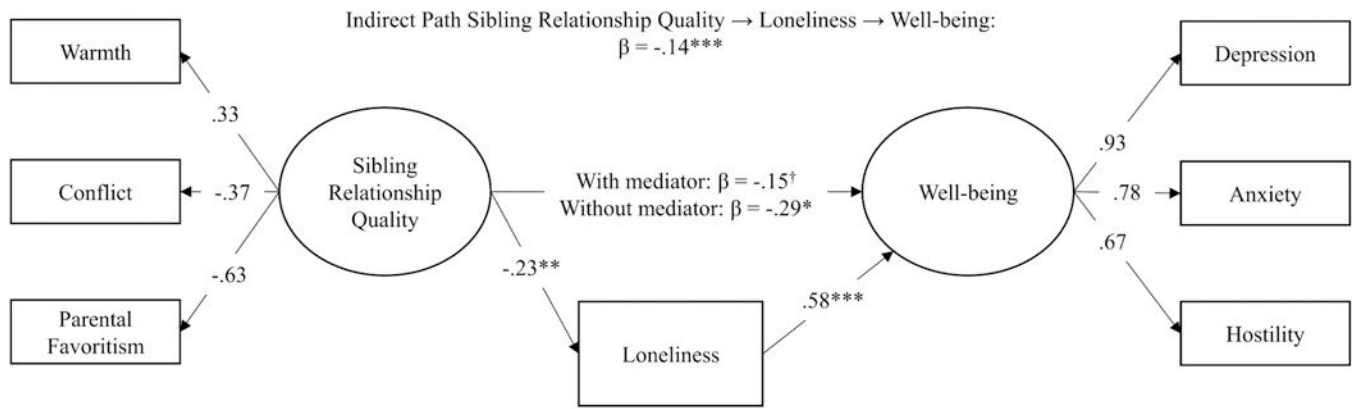


Figure 1. Structural Equation Model: Associations Among Sibling Relationship Quality, Loneliness and Well-being

Note: N = 608; $\chi^2 = 104.63(37)***$; RMSEA = .06, CFI = .94; †p < .10, **p < .01, ***p < .001, two-tailed p-tests; standardized estimates shown, all controls used for all endogenous variables.

Table 1.

Descriptive Statistics of Study Variables

Subscale	Mean	SD	α	Range
Warmth	2.75	1.11	0.93	1 – 5
Conflict	1.32	0.56	0.88	1 – 5
Parental Favoritism	0.59	0.59	0.86	0 – 2
Loneliness	1.71	0.50	0.92	1 – 3.6
Depression	19.37	6.69	0.89	13 – 50
Anxiety	12.12	3.38	0.86	10 – 32
Hostility	7.25	1.63	0.65	6 – 21
Contact	2.72	1.07	0.76	1 – 6
Age	64.56	4.58		42 – 83
Age Spacing	2.97	2.29		0 – 15
Gender (1=Female)	0.46	0.50		0 – 1
Number of Siblings	3.74	2.36		1 – 13
Marital Status (1=Married)	0.83	0.38		0 – 1
Years of Education	13.82	2.06		8 – 20
Household Income (in 1000s)	96.06	97.91		–662 – 623

Note: N = 608.

Table 2.

Zero Order Correlations of Study Variables (N = 608)

I	Warmth	1.0																		
II	Conflict	-.12**	1.0																	
III	Parental Favoritism	-.22***	.23***	1.0																
IV	Loneliness	-.09*	.09*	.15***	1.0															
V	Depression	-.03	.16***	.18***	.59***	1.0														
VI	Anxiety	.03	.13**	.14***	.40***	.72***	1.0													
VII	Hostility	-.02	.14***	.15***	.39***	.61***	.59***	1.0												
VIII	Contact	.54***	.03	-.18***	-.01	.02	.02	.02	1.0											
IX	Age	-.03	-.04	-.08*	.01	-.05	-.08	-.05	-.01	1.0										
X	Age Spacing	-.04	-.07	.08*	-.09*	-.04	-.05	-.01	.00	0.0	1.0									
XI	Gender (1=Female)	.18***	-.01	.04	-.05	.04	.03	.02	.16***	-.18***	.00	1.0								
XII	Number of Siblings	.02	.00	-.05	.12**	.02	.06	.05	.03	-.04	-.22***	-.06	1.0							
XIII	Marital Status (1=Married)	-.03	.00	-.05	-.18***	-.06	-.01	.04	-.02	.01	.02	.17***	-.01	1.0						
XIV	Years of Education	.03	-.06	-.03	-.12**	-.10*	-.14***	-.09*	-.06	.09*	.01	-.06	-.16***	-.03	1.0					
XV	Household Income	-.07	-.06	-.05	-.12**	-.08	-.05	-.02	-.07	-.07	.05	.05	-.02	.22***	.26	1.0				
	I		II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	XIII	XIV	XV				

Note:
 * p<.05,
 ** p<.01,
 *** p<.001.