

Sibling similarity and relationship quality in Finland

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Abstract: Siblings form the strongest horizontal family tie, which often involves life-long emotional closeness and various forms of support. Similarity is often assumed to strengthen sibling relations, but existing evidence is scarce and mixed. Using data from the Generational Transmissions in Finland surveys collected in 2012, we employ both total and sibling fixed-effect regressions and examine whether sibling similarity is associated with relationship quality in two family generations: an older generation born in 1945–1950, and the generation of their children, born in 1962–1993. We study sibling similarity in gender, age, financial condition, and parenthood status and measure relationship quality by contact frequency, emotional closeness, and provision of practical help. In both generations, being of the same gender was associated with all relationship measures. Age similarity was also associated with more contacts and increased emotional closeness in the younger generation, and differences in parenthood status with increased provision of practical help in the older generation. In most aspects, however, sibling similarity was not associated with relationship quality. While sibling relations tend to be strong in contemporary Finland, this is only partly due to similarity effects.

Key words: Family generations, Finland, fixed-effect regressions, relationship quality, siblings, similarity

Introduction

Most individuals in contemporary Finland and other Western countries grow up with siblings (OECD, 2016; Statistics Finland, 2014), and sibling ties can be among the strongest and most lasting social relationships throughout one's lifetime (Cicirelli, 1995). While adult siblings in Western societies rarely live or work together or support each other financially, they are often important social network members and can provide safety nets for one another (Campbell, Connidis and Davis, 1999). Nevertheless, sibling relations in adulthood remain a relatively little investigated topic in sociology and related disciplines (Greif and Woolley, 2016), as compared to, for instance, the amount of studies on adult children and their parents (e.g., Rossi and Rossi, 1990; Szydluk, 2016).

Sibling relations are shaped by kin altruism, or the tendency to provide more help and support to close genetical relatives compared to more distant relatives or to non-kin (Hughes 1988).

Additionally, siblings often share each other's networks of generational peers, which also include friends and romantic partners (David-Barrett et al., 2016a). Such peer networks build on emotional support, trust, shared humour, and values. These qualities are stressed in relations to both siblings and non-kin friends, so that people may liken their siblings to their close friends, or *vice versa* (Rotkirch et al., 2014).

Peer relations are often characterized by homophily or the principle that similarity breeds attraction (MacPherson, Smith-Lovin and Cook, 2001; Kalmijn 1998). Among friends who are not kin, similarity is known to strengthen social relations on a wide range of traits, from sociodemographic characteristics such as age, ethnicity, gender, education, and occupational status (Hruschka, 2010; MacPherson et al., 2001), to life stage characteristics such as parenthood status (David-Barrett et

al., 2016b), and to individual characteristics such as personality (Laakasuo et al., 2017) and even genetic resemblance (Fowler, Settler and Christakis, 2011). A main explanation for the attraction of similarity in peer networks is that resemblance breeds trust, which in turn facilitates cooperation and exchange (Hruschka, 2010). Given the importance of homophily among peers, one could assume that similarity between siblings also serves to strengthen their relations and increases support provision. On the other hand, one can predict that kin altruism and the psychological attachment typical for close kin will encourage siblings to help each other even if their sociodemographic characteristics differ. Here, we are interested in how sibling similarity is related to relationship strength between adult siblings in contemporary Finland.

Probably the most comprehensive previous study on the topic is by Voorpostel et al. (2007), who investigated how sibling similarity in various sociodemographic indicators related to informal support provision between Dutch adults. Their study found some support for the similarity assumption concerning gender and parenthood status: sister-sister dyads had closer relationships than other sibling dyads, and pairs in which both siblings were childless were closer than were pairs in which one sibling had children and the other did not. Another study using Dutch data (Verbakel and De Graaf, 2004) found that similarity was not associated with contact frequency among siblings. Using small-scale data from the United States, Eriksen and Gerstel (2002) reported that same-gender siblings provided more financial support, and siblings with similar parental status provided more practical help to one another than did sibling pairs with different gender or parenthood statuses. However, in most of the models in their research, similarity was not associated with either increased or decreased help among siblings.

Previous studies have been methodologically limited, because they did not investigate the topic using within-sibling (or sibling fixed-effect) models. Their results may hence stem from differences

between different families, rather than from sibling relations *per se*. To examine associations that are free from variance shared by siblings (i.e., family-related covariates), one should use within-sibling models that exclude between-sibling effects (Carlin et al., 2005). Here, we employ such sibling fixed-effect regression models in order to investigate the association between sibling similarity and relationship strength.

We use nationally representative survey data gathered in 2012 from two family generations of adult Finns: baby boomers (born in 1945–1950) and their adult children (born in 1962–1993). This means that our data includes adults aged 19–67, from young adulthood to old age. The older generation represents the first post-war generation of Finnish ‘baby boomers’, who had higher fertility and hence more siblings than the immediately preceding or subsequent generations. In 2012, the members of the older generation were mostly retired and their children were already living independently (less than 2% of the older generation had dependent children). Their children, the younger generation, were during the data collection in their prime working and childrearing period, the mean age of their youngest child was seven. By studying two different family generations, we can thus investigate sibling relationships during different ages and life stages.

Theoretical background

Previous studies have applied life course, economic, as well as social and evolutionary psychological perspectives in order to investigate relationship quality among siblings. These perspectives highlight partly different relationship dynamics and are in many cases complementary rather than contradictory. A life course perspective stresses the varying need for social contacts and help (e.g., need for practical help) at various points of the life course (e.g., Campbell, Connidis and Davies, 1999; Voorpostel et al., 2009). The economic perspective emphasizes complementarity of

roles and the benefits of exchange within a family dyad (Becker, 1991). Psychological and evolutionary perspectives stress the role of family bonds and of the psychological attachment formed between siblings in early childhood (e.g. Salmon and Hehman, 2014).

According to the life course perspective, there is interdependency between family members, and the lives of individuals in family units are linked (Cox and Paley, 1997; Elder, 1994). Additionally, since lives link with each other, the relationship quality between any two siblings can be related to that among other sibling dyads (Whiteman, McHale and Soli, 2011). Studies have indicated that several demographic and socioeconomic characteristics influence the relationship quality between adult siblings, rendering some dyads closer than other dyads (e.g., Tanskanen and Danielsbacka, 2016; White, 2001). According to the similarity assumption, when siblings are in a similar life course phase (e.g., both siblings have children) or are similar in other ways (e.g., siblings are of the same gender) they are predicted to be emotionally closer to each other compared to less similar dyads. Similar siblings may have more shared interests and feel more connected, whereas increased variation between siblings could indicate a weaker connection (Voorpostel et al., 2007).

Contradictory predictions can be derived from the exchange model, which has roots in economics and is used to explain relationship quality and support among family members (Becker, 1991). The exchange perspective was first developed to explain asymmetric but complementary division of work within marriages (Cherlin, 2001), and later used to hypothesize about sibling relationship quality by Voorpostel and colleagues (2007). The general prediction of the exchange perspective is that individuals with different features and resources can engage in exchange and thus maximize profit (Klein and White, 1996). Sibling dyads with differences create an opportunity to exchange support and resources, hence heterogeneity in sibling dyads should enhance relationship quality more than homogeneity would do.

Relationship quality and sibling similarity indicators

Relationship quality can be measured by several indicators (Berscheid, Snyder, and Omoto, 1989; Weisner, 1993). The frequency, diversity and strength of interactions are understood to jointly contribute to a high-quality relationship (Bercheid, Snyder and Omoto, 1989). Contact frequency is a crucial measure because social bonding is strengthened through interaction (Dunbar and Shultz, 2010). Subjectively perceived emotional closeness is perhaps the single most important indicator of relationship quality, since it correlates positively with other measures such as variety of activities conducted together, levels of trust, commitment, and intimacy (Aron, Aron and Smollan, 1992; Korchmaros and Kenny, 2001). Transfers of help and support within the relationship are also accepted as signs of commitment and altruistic helping. Such transfers can relate to financial help, help with care work (e.g., child care), and practical help (Tanskanen and Danielsbacka, 2018). In this study, we use reports of provided practical help, since financial transfers between siblings are negligible in contemporary Finland, as is provision of care work (with the exception of child care, which was however not a common form of help for most siblings in our data due to its age structure) (Danielsbacka et al., 2013). Here, we use contact frequency, emotional closeness and practical help as indicators. Previous sibling studies suggest that increases in contact, emotional closeness, and provision of help increase relationship quality among siblings (Salmon and Hehman, 2014).

We use four measures of sibling similarities: gender, age, financial condition, and parenthood status. Comparable similarity indicators have been used in previous studies on the topic (e.g., Eriksen and Gerstel, 2002; Voorpostel et al., 2007) and are discussed in detail below, in connection

with the research hypotheses. We formulate hypotheses on associations between sibling similarity and relationship quality based on the similarity and exchange perspectives.

Hypotheses

Gender

According to the similarity perspective, the gender composition of siblings affects relationship quality so that same-gender dyads should be closer than mixed-gender dyads. Thus, sister-sister and brother-brother pairs should have a better relationship quality than pairs that include a sister and a brother. Several studies have shown that sister-sister pairs tend to be closer and provide more support to each other than do other sibling constellations (Pollet and Hoben, 2011). However, other studies report that females provide more support to their siblings than males do, regardless of the sibling's gender (ibid.). This is in contrast with the similarity prediction and could be explained by the kin-keeping role of women. The kin-keeper theory states that for biological, psychological and socio-cultural reasons, women typically interact with relatives more than men do (Bracke et al., 2008; Trivers, 1972; see also Voorpostel et al., 2009).

Another prediction concerning support between mixed-gender dyads can be derived from support exchange theory. Females and males tend to provide different types of support to their relatives – for instance, females provide more support related to domestic work, while males provide more support for household maintenance (Liebler and Sandefur, 2002). This type of gender division of labour in informal support may indicate that females need more support from their brothers and males from their sisters, because their respective skills complement each other. If support exchange

between sisters and brothers exists, the relationship quality between mixed-gender pairs should be better than that of same-gender pairs.

Hypotheses about gender similarity. The similarity assumption predicts that same-gender dyads have more contact, emotional closeness, and provide more practical help compared to mixed-gender dyads. In contrast, the exchange model assumes that mixed-gender dyads have more contact, emotional closeness and provide more practical help than same-gender dyads do.

Age difference

Age difference between siblings could be an important factor shaping relationship quality. According to the similarity assumption, when there is a smaller age difference, the relationship between siblings should be closer. In the case of a small age difference, it is more likely that siblings have shared childhood experiences, which could result in an emotionally closer relationship and in more support between siblings during adulthood (Pollet and Hoben, 2011). Moreover, a small age difference increases the probability that siblings are at the same life stage will have more shared interests. Previous studies indicate that as the age difference between siblings increases, contact frequency and emotional closeness tend to decrease (e.g., Pollet, 2007; Tanskanen and Danielsbacka, 2014).

In contrast, according to the exchange perspective, one may predict that siblings with a greater age difference channel more support to each other because they have different resources and thus can benefit from resource exchange, whereas siblings of the same age have similar needs and resources and are less able to engage in support exchange (Szydlik, 2008). For example, in youth older siblings may provide knowledge and advice to the benefit of younger siblings; and later in the life

course, older siblings with poor health receive practical and other support from younger siblings, who are likely to have better physical health (Gold, 1989).

Hypotheses about age similarity. According to the similarity assumption, siblings with a small age difference should have more contact, emotional closeness and practical help. According to the exchange model, a higher age difference between siblings will be related to better relationship quality indicated by contact frequency, emotional closeness, and practical help.

Financial condition

The similarity of financial conditions among siblings may influence their relationship quality because financial condition affects lifestyle and consumption opportunities. Individuals with high incomes can participate in expensive leisure activities and hobbies that are not available to low-income individuals (Katz-Gerro, 2002), while two siblings with low incomes can have similar lifestyles and thus better relationship quality. A better financial condition is also often related to higher level of education and higher levels of social and cultural capital; those with higher social positions tend to have more capital than those with lower positions (Bourdieu, 1986), perhaps leading to closer relations between those with similar positions. A similar financial situation can also create social cohesion that could be expressed through more contacts, emotional closeness and support between siblings.

Exchange theory predicts that individuals with more financial resources will invest these resources in their lower-resource siblings, while individuals with lower status can benefit from the financial support received from their siblings with higher status. Previous studies have shown that individuals with higher socioeconomic standing tend to have more contact with their siblings than their lower-

standing counterparts (e.g., Pollet, 2007). However, financial support from high-income siblings to low-income siblings may not improve relationship quality, but may also increase tensions and hence dilute emotional closeness and contacts. Sibling relations may also be complementary, so that those with better financial conditions can channel monetary resources to their siblings and receive practical help or emotional support in return.

Hypotheses about financial condition similarity. Based on the similarity perspective, sibling dyads with similar condition should have more contact, emotional closeness and practical help, whereas the exchange model predicts the opposite.

Parenthood status

Having a child is one of the most important events during the life course. Previous studies have shown that the presence of common offspring strongly shapes relations also in the extended family (e.g., Danielsbacka et al., 2015; Tanskanen, 2017). Similarity in parenthood status can facilitate the provision of emotional and practical support among adult siblings (Connidis, 2001). Individuals who are parents may have more shared interests with their siblings with children than with their childless siblings (Tanskanen and Danielsbacka, 2017). Siblings who are also parents can provide important advice, knowledge and support to each other. Similarly, childlessness could be associated with better relationship quality in sibling pairs without children, as was indeed the case among Dutch adults (Voorpostel et al., 2009). Thus, similar parental status in sibling dyads (both are childless or both have children) could lead to better relationship quality than in sibling pairs with one parent and one childless individual.

However, different parental status can also render siblings closer to each other, for several reasons. First, the existence of a niece or nephew creates shared reproductive interests between siblings, which can encourage individuals to invest time and resources in their siblings with children (Pollet and Hoben, 2011), and predominantly so among the childless. Childless women tend to invest more time in their nieces and nephews compared to women who are mothers themselves (Pollet et al., 2006; Tanskanen, 2015). Childless individuals may also try to avoid potential social isolation by providing childcare to their siblings (Wenger et al., 2000). From an exchange perspective, sibling pairs with one parent and one childless sibling could have higher relationship quality than siblings with similar parenthood status.

Hypotheses about parenthood status similarity. According to the similarity perspective, siblings with similar parental status should have more contact, emotional closeness and practical help. Based on the exchange model, siblings with different parental status are predicted to have more contact, emotional closeness and practical help.

Potential confounding factors

Several factors could be associated with sibling relationship quality in addition to those of particular interests in this study. It is important to control for these potentially confounding variables to obtain more robust research results. Respondents' age was controlled for since the interaction between siblings first tends to decrease with adulthood (e.g., Eriksen and Gerstel, 2002; Tanskanen and Danielsbacka, 2014). Since some studies indicate that educated individuals have more contact with their siblings than their less-educated counterparts (Pollet, 2007; White, 2001), we controlled for the educational level of respondents in the analyses. Number of siblings was controlled for since sibship size in itself affects dyadic sibling relations (Pollet and Hoben, 2011; Steinbach and Hank,

2018). Previous studies have also consistently shown a larger geographical distance between siblings to be associated with less interaction and lower relationship quality (Pollet, 2007; Tanskanen and Danielsbacka, 2014), thus it is important to control for geographical proximity. Finally, the similarity variables gender, age difference, perceived financial condition, and parenthood status were mutually adjusted in the analyses; their relevance has been discussed above.

Data and methods

We use data from the Generational Transmissions in Finland (Gentrans) project. The aim of Gentrans is to gather information on two generations: the Finnish ‘baby boomer’ generation (born between 1945 and 1950) and their adult children (born between 1962 and 1993). Most previous studies on adult sibling relationships have concentrated on specific age groups, for instance, the elderly (e.g., Dykstra and Knipscheer, 1995; Gold, 1989). However, factors relevant in sibling relationships are likely to vary throughout the lifespan and birth cohorts (Greif and Woolley, 2016). For instance, due to lower fertility younger generations have fewer siblings than older generations (Tanskanen et al., 2016). The implications of being a parent also obviously differ for older adults versus younger adults, who are more likely to have dependent children. We use our data of actual adult family generations to capture potential differences in age, life stage, and/or generational experiences. By studying two linked adult family generations, we can investigate sibling relationships during different life stages and in different cohorts, although we cannot distinguish between the effect of age and generation or cohort due to the cross-sectional nature of our data.

Gentrans survey data were collected in 2012 by Statistics Finland via regular mail. The surveys of the older and younger generations were gathered separately. During the data collection in 2012, respondents from the older generation were approximately 65 years old (between 62 and 67), and

those from the younger generation were mostly in their 20s, 30s and 40s. The older generation's survey had 2,278 respondents, and the younger generation's survey 1,753 respondents (Danielsbacka et al., 2013). In the present analyses, we included respondents with at least one living biological sibling: the data of 1,735 respondents in the older generation and 1,340 respondents in the younger generation. For analysis, the data were reshaped into a long format so that observations represented the siblings of the family of the original respondents, resulting in 2,424 observations of 1,340 unique individuals in the younger and 4,285 observations of 1,735 unique individuals in the older generation.

In the present study, the dependent variables are contact frequency, emotional closeness and practical help, which the respondents reported separately for up to four of their oldest siblings. Relationship quality factors are measured from one side of the sibling dyad only. For contact frequency, the respondents were asked to report how often they have had contact with their siblings personally, by phone or by Internet during the last 12 months on a five-point scale (from 0 = never, to, 4 = daily or several times a week). Emotional closeness was measured by asking respondents how close they feel to their siblings using a five-point scale (from 0 = very distant, to 4 = very close). Regarding practical help, the respondents were asked how often they have given practical help to their sibling in the last 12 months (from 0 = never to 4 = daily or several times a week). Overall, the younger generation reported more sibling contacts, higher levels of emotional closeness, and more provision of practical help than the older generation (all p-values < 0.05). The distributions of dependent variables are presented in Table 1.

< TABLE 1 >

Bivariate correlations of relationship quality indicators show that in both generations, the highest correlations were found between contact frequency and emotional closeness (younger generation: $r = 0.59$; older generation: $r = 0.55$). There were also positive correlations between contact frequency and practical help (younger generation: $r = 0.42$; older generation: $r = 0.30$) and between emotional closeness and practical help (younger generation: $r = 0.30$; older generation: $r = 0.16$). All these associations were statistically significant ($p < 0.05$).

The independent variables are gender, age difference, financial condition and parenthood status constellations. The sibling gender constellation variable included two dyads, 0 = mixed gender and 1 = same gender. We also ran sensitivity analyses comparing sister-sister, mixed, and brother-brother dyads because previous studies indicate that sister-sister pairs may have an especially strong bond (e.g., Pollet and Hoben, 2011; Tanskanen and Danielsbacka, 2014). The age difference between siblings was coded as 0 when it was greater than three years and 1 when the age difference was three years or less, because an age difference of less than three years can be defined as moderate, and such siblings be considered “age peers” (Voorpostel et al., 2007). In the Gentrans surveys, self-perceived financial condition was measured by asking how respondents consider their economic situation on a 4-point scale (from 1 = low-income to 4 = wealthy). The same scale was used to measure respondents’ assessments of the financial conditions of their four oldest siblings. In the analyses, siblings in the same category were treated as having the same financial condition (0 = different condition, 1 = same condition). For sensitivity purpose we also tested whether the results are similar in low-income and wealthy sibling pairs by dividing the variable into three categories (0 = both low-income, 1 = mixed, 2 = both comfortable or wealthy). The comfortable and wealthy classes were combined due to the low number of dyads in which both siblings were “wealthy” (less than 1% in both generations). The parenthood status variable was coded in two classes: 0 = mixed status and 1 = similar status (i.e., both siblings have children or both siblings are childless). We

conducted sensitivity analyses and tested three categories for parenthood status (0 = both are childless, 1 = mixed, 2 = both have children). The findings from sensitivity analyses related to gender, financial condition and parenthood status are presented in the Appendix. Table 1 presents the distributions of independent variables.

Regression analyses were performed controlling for several potential confounding factors (respondents' age, education, number of siblings, and geographical distance between siblings), as discussed above. The four sibling similarity variables (gender, age difference, financial condition, and parenthood status constellations) were mutually adjusted in all models, i.e., they were simultaneously included in the same models.

We used multilevel linear regression models, in which sibling observations were nested within responding persons. We employed total (or random) and within-siblings (or sibling fixed-effect) models. Within-sibling models are designed to reduce omitted variable bias (Carlin et al., 2005) and they consider all confounding variables shared by siblings (i.e., family-related covariates). In practice, sibling fixed-effect regressions are used to investigate effects among participants with two or more siblings by comparing the relationship between the participant and his/her siblings.

Although our dependent variables were not always normally distributed, we did not use logit models due to their limitations (see Mood, 2010 for discussion). However, we conducted several sensitivity analyses using logit models, providing similar results (not shown) to those of the main analyses, and thus concluded that the loss of information was very small. Finally, since some individuals in younger generation belong to the same families (i.e., the data includes respondents who are siblings and children of the older generation), we used Stata's statistical software cluster option to compute the standard errors. This method takes into account the non-independence of responses reported by adult children from the same families.

Results

We now proceed to the results, which are reported for total regression models and sibling fixed-effect models side by side. Results are presented first for the younger and then for the older family generation.

Younger generation

We first studied similarity and relationship quality in the younger generation (see Table 2).

Associations between sibling similarity and contact frequency indicate that same-gender dyads had significantly more contact compared to mixed-gender dyads. Sister-sister dyads had more contact than other gender constellations (Appendix Table 1), and brother-brother dyads had more contact than the mixed group (results not shown in tables). Age similarity was also associated with the level of contact in that similar-sibling dyads had more contact than different dyads (Table 2). Regarding financial condition and parenthood status, in the total regression model, those with similar status had significantly more contact (Table 2). This effect, however, did not appear in the fixed-effect models; only in the case of financial condition similarity was there a marginally significant association.

< TABLE 2 >

Table 2 also presents the results concerning the associations between sibling similarity and emotional closeness. Gender and age resemblance were associated with increased closeness. Sister-sister dyads were emotionally closer than mixed-gender dyads or brother-brother dyads (Appendix

Table 1). Similarity in financial condition was associated with increased closeness in the total model, but this association was only marginally significant in the fixed-effect model (Table 2). Childless-childless dyads reported more emotional closeness than parent-parent dyads (Appendix Table 1).

Associations between sibling similarity and practical help are also presented in Table 2, showing that gender similarity was associated with increased support. Sister-sister dyads and brother-brother dyads provided more help than sister-brother dyads, but there was no difference between sister-sister and brother-brother dyads (Appendix Table 1). Additionally, respondents in brother-brother dyads provided more help than the mixed group (results not shown in tables). There were no significant differences in age, financial condition, or parenthood status resemblance among siblings in the younger generations.

Older generation

Next, we present in results for the older family generation (Table 3). Regarding sibling similarity and contact frequency in the older generation, same-gender dyads had more contact than mixed-gender dyads. Sister-sister dyads had significantly more contact than mixed-gender dyads or brother-brother dyads (Appendix Table 1). According to the total-effect model, dyads with different parenthood status had more contact than similar dyads, but this difference disappeared in the fixed-effect model (Table 3). Childless-childless and parent-childless dyads had more contact than parent-parent dyads had (Appendix Table 1).

< TABLE 3 >

Regarding emotional closeness, same-gender dyads were closer than mixed-gender dyads (Table 3). Sister-sister dyads were emotionally closer than mixed-gender dyads or brother-brother dyads (Appendix Table 1). There were no statistically significant differences in emotional closeness based on sibling age, financial condition or parenthood status similarity.

Associations between sibling similarity and practical help are also presented in Table 3. More help was provided among same-gender dyads than mixed-gender dyads. Moreover, respondents provided more help in sister-sister dyads than in mixed-gender dyads (Appendix Table 1). Low-income dyads provided more help than mixed or wealthy dyads (Appendix Table 1). There was significantly more helping in dyads with mixed parenthood status than in similar parenthood status dyads in this generation (Table 3). Both childless-childless and mixed dyads also reported more help provision than parent-parent dyads (Appendix Table 1).

Summary of results

Table 4 summarizes results of fixed-effect models for both the younger and older generation. We find very little evidence for the exchange hypothesis and some evidence for the similarity hypothesis. In the younger generation, 5 of 12 cases indicated that similarity is correlated with increased contact, closeness or help, while in the majority (7) of cases, no correlations between sibling similarity dimensions and relationship quality indicators were found. In the older generation, similarity is correlated with increased contact, closeness or help provision in 3 of 12 cases. One case presented support for the exchange perspective, so that there was more helping in dyads with mixed parenthood status than in dyads with similar parenthood status. Again, however, in the majority (8) of cases, no correlations between sibling similarity dimensions and relationship quality indicators were detected.

< TABLE 4 >

Conclusions

Siblings are close kin and often part of each other's peer network. While homophily among peers in general is well documented, its role for sibling relations has been little studied, and with mixed results. Here, we investigated whether similarity adds or detracts from sibling relationship quality. Research hypothesis were derived from the similarity and exchange perspectives. Sibling similarity was measured by gender, age, financial condition, and parenthood status while relationship quality was measured by contact frequency, emotional closeness, and practical help. Our data represented linked family generations in Finland, one consisting of working-age adults and one of retired elderly. Overall, results were quite similar for both generations, with some interesting exceptions discussed below.

Strong support was found for the effect of gender similarity on relationship quality. In both generations, same-gender dyads had more contact, provided more practical help and were emotionally closer than mixed-gender dyads. These findings are uncontroversial and in line with several previous results – for instance, Eriksen and Gerstel (2002) reported that same-gender sibling dyads helped each other more than mixed-gender dyads did. We also found that sister-sister dyads generally had better relationship quality than all other gender constellations, in agreement with previous studies showing that females invest more in social relations and kin-keeping compared to males (e.g., Pollet, 2007; Tanskanen and Danielsbacka, 2014; Voorpostel et al., 2007).

Results based on age similarity between siblings were mixed. In the younger generation, siblings with an age difference of less than three years were more often in contact with each other, suggesting a continuity of early childhood constellations and psychological attachment bonds. Moreover, similar-aged dyads were emotionally closer with each other than different-aged dyads in the younger generation. However, age similarity was not associated with increased relationship quality in the older generation. These findings may reflect the greater importance of siblings in young adulthood and during family formation and childbearing years, as opposed to middle age and old age (cf. Kalmijn, 2012). An investigation of phone call duration found that of all age groups, men and women in their 30s make the longest calls to a same-sex sibling or friend, highlighting the need for emotional support and advice from close peers at this stage of life (David-Barrett et al., 2016).

In the older generation, similarity in parenthood status was associated with less provision of practical help. This is the one notable finding in our data supporting the exchange perspective. It fits with previous research showing that childless older adults are more likely than parents to have contacts with their nieces and nephews (Pollet et al., 2006; Tanskanen, 2015; Wenger et al., 2000). Social network studies also show that the relative importance of relatives in an individual's network tends to increase with age (Wrzus et al., 2013). It may also reflect a greater need for social support among the childless, who tend to be little educated and socially deprived in contemporary Finland (Rotkirch and Miettinen, 2017). The direction of practical support among older siblings with and without children would merit a separate investigation. Please also note that our data does not allow us to distinguish between effects of chronological age, life stage, and sociological generation.

Overall, sibling similarity is differently related to different measures of relationship quality.

Similarity tends to influence contact frequency and emotional closeness, which serve as proxies for

overall relationship quality (Greif and Woolley, 2016; Dunbar and Schultz, 2010). The moderate support for sibling similarity effect reported here is partly in line with the previous study by Voorpostel and colleagues (2007). However, our results do partly contradict their findings, which detected little overall support for the similarity assumption, and slightly more support for the exchange perspective than for the similarity perspective.

To our knowledge, the present study is the first to employ sibling fixed-effect models when analysing sibling similarity and relationship quality. In fixed-effect regression models, all family-related covariates shared by siblings are controlled for, increasing the robustness of the results. Using this method, we investigated the effects among participants with two or more siblings. In some cases, research findings lost their statistical significance when analysed with the more robust, fixed-effect method. However, since the regression coefficients remained similar in both cases, the loss of significance is likely related only to decreased statistical power. Results were overall very similar in most of the random-effect and fixed-effect models. This useful result also suggests that having one or several siblings does not cause major differences in the associations between similarity and relation quality.

Our study has some limitations. Although sibling fixed-effect regressions in theory control for all unobserved family characteristics shared by siblings, there are aspects of family life that siblings may experience differently, and could be not controlled for in the models. Moreover, relationship quality was measured from only one side of the sibling pair, and the other side of the pair may have different perceptions of said relationship. Unfortunately, the data contained no information on the health, personality, education, or partnership status of the respondents' siblings, and these potentially important similarity measures were missing from our analyses. It is also possible that some deeper underlying trait causes similarity among the variables investigated here, for instance so

that similarity in personality traits leads to similarities in financial condition or in parenthood status, but such complex pathways are beyond the scope of the current study. Due to the cross-sectional structure of the data, we could not investigate longitudinal changes in sibling relationship quality or how changes in sibling similarity shape their relationship over time.

Our study enhances our understanding of within-generational kin ties – an understudied topic, compared to the huge interest in cross-generational ties (Greif and Woolley, 2016). Due to current demographic trends, including growing life expectancy and falling fertility, sibling relations are likely to become even more influential and intense in the future. Growing proportions of Europeans remain childless throughout their lives, and their potential helpers in old age are likely to include their siblings. As we have shown here, sibling solidarity in contemporary Finland remains strong, and is only partly due to social or demographic similarities in the life situations of siblings.

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Table 1. Descriptive statistics

	Younger generation				Older generation			
	Total no.	No. Of individuals	%	Mean (SD)	Total no.	No. Of individuals	%	Mean (SD)
Respondent's age	2,424	1,340		36.1 (5.88)	4,285	1,735		64.5 (1.65)
Respondent's education								
Primary or lower secondary level	89	44	3.3		1,400	533	32.7	
Upper secondary level	1,064	577	43.1		2,156	883	50.3	
Lower degree level tertiary education	649	368	27.5		261	121	6.1	
Higher degree level tertiary education or doctorate education	622	351	26.2		468	198	10.9	
Respondent's number of siblings	2,424	1,340		2.67 (1.93)	4,285	1,735		4.45 (2.41)
Gender similarity of sibling pairs								
Same gender	1,214	897	50.1		2,199	1,319	51.3	
Mixed gender	1,210	878	49.9		2,086	1,306	48.7	
Age similarity of sibling pairs								
Similar age	819	713	33.8		1,684	1,153	39.3	
Different age	1,605	1,022	66.2		2,601	1,425	60.7	
Financial condition similarity of sibling pairs								
Similar condition	1,031	751	42.5		1,650	964	38.5	
Different condition	1,393	932	57.5		2,635	1,343	61.5	
Parenthood status similarity of sibling pairs								
Similar status	1,449	972	59.2		3,307	1,510	77.2	
Different status	975	736	40.2		978	654	22.8	
Geographical distance between siblings								
Less than 1 km	46	43	1.9		101	86	2.4	
1-5 km	164	153	6.8		383	300	8.9	
5-24 km	643	466	26.5		828	600	19.3	
25-100 km	467	363	19.3		891	595	20.8	
100-500 km	829	564	34.2		1,603	919	37.4	
More than 500 km	275	213	11.3		479	327	11.2	

Contact frequency with sibling	2,424	1,340	2.15 (1.09)	4,285	1,735	1.72 (1.00)
Emotional closeness to sibling	2,424	1,340	3.81 (0.98)	4,285	1,735	3.66 (0.90)
Practical help to sibling	2,424	1,340	0.53 (0.65)	4,285	1,735	0.15 (0.44)

Notes. Total no. = Number of total person-observations; No. of individuals = Number of unique individuals;
SD = Overall standard deviation. Contact frequency, emotional closeness and practical help variables range is 0–4.

Table 2. Younger generation: Association between sibling similarity and relationship quality (total and within-sibling regression models)

	Contact frequency			
	Total		Within-sibling	
	β	SE	β	SE
Gender similarity	0.50***	0.04	0.45***	0.05
Age similarity	0.12**	0.04	0.14**	0.05
Financial condition similarity	0.14**	0.04	0.10	0.05
Parenthood status similarity	0.09*	0.04	0.07	0.05

	Emotional closeness			
	Total		Within-sibling	
	β	SE	β	SE
Gender similarity	0.30***	0.04	0.27***	0.05
Age similarity	0.13**	0.04	0.13**	0.05
Financial condition similarity	0.10**	0.04	0.10	0.05
Parenthood status similarity	0.05	0.04	0.06	0.05

	Provision of practical help			
	Total		Within-sibling	
	β	SE	β	SE
Gender similarity	0.09***	0.02	0.10**	0.03
Age similarity	0.03	0.02	0.03	0.03
Financial condition similarity	0.02	0.02	-0.01	0.03
Parenthood status similarity	-0.01	0.03	-0.02	0.03

Notes. Reference categories: gender similarity = mixed gender, age similarity = different age, financial condition similarity = different condition, parenthood status similarity = different status;

n = 2,424 person-observations of 1,340 unique individuals.

Covariates: Respondent's age, education, number of siblings, gender similarity, age similarity, financial condition similarity, parenthood status similarity and geographical distance between siblings.

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

Table 3. Older generation: Association between sibling similarity and relationship quality (total and within-sibling regression models)

	Contact frequency			
	Total		Within-sibling	
	β	SE	β	SE
Gender similarity	0.39***	0.03	0.40***	0.03
Age similarity	0.04	0.03	0.06	0.03
Financial condition similarity	0.05	0.03	0.04	0.04
Parenthood status similarity	-0.14***	0.03	-0.06	0.04

	Emotional closeness			
	Total		Within-sibling	
	β	SE	β	SE
Gender similarity	0.23***	0.02	0.24***	0.03
Age similarity	0.004	0.02	0.01	0.03
Financial condition similarity	0.001	0.03	-0.03	0.03
Parenthood status similarity	-0.02	0.03	0.01	0.04

	Provision of practical help			
	Total		Within-sibling	
	β	SE	β	SE
Gender similarity	0.04**	0.01	0.04**	0.01
Age similarity	-0.01	0.01	-0.01	0.01
Financial condition similarity	0.02	0.01	0.02	0.02
Parenthood status similarity	-0.07***	0.02	-0.06**	0.02

Notes. Reference categories: gender similarity = mixed gender, age similarity = different age, financial condition similarity = different condition, parenthood status similarity = different status;

n = 4,285 person-observations of 1,735 unique individuals.

Covariates: Respondent's age, education, number of siblings, gender similarity, age similarity, financial condition similarity, parenthood status similarity and geographical distance between siblings.

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

Table 4. Summary of results for sibling similarity and relationship quality in younger and older generations

	Gender similarity		Age similarity		Financial condition similarity		Parenthood status similarity	
	Younger	Older	Younger	Older	Younger	Older	Younger	Older
Contact frequencies	SIMIL	SIMIL	SIMIL	no	no	no	no	no
Emotional closeness	SIMIL	SIMIL	SIMIL	no	no	no	no	no
Practical help	SIMIL	SIMIL	no	no	no	no	no	DIFF

Notes. SIMIL = similarity correlates with increased contact, closeness or help;

DIFF = similarity correlates with decreased contact, closeness or help;

no = No statistically significant associations.

Results from sibling fixed-effect models.

Appendix Table 1. Association between sibling similarity and relationship quality (within-sibling regression models)

	Contact frequency			
	Younger generation		Older generation	
	β	SE	β	SE
Gender similarity				
Sister-sister dyad	ref		ref	
Mixed dyad	-0.61***	0.07	-0.64***	0.04
Brother-brother dyad	-0.46***	0.10	-0.55***	0.06
Financial condition similarity				
Low-income dyad	ref		ref	
Mixed dyad	-0.18	0.10	-0.04	0.06
Wealthy dyad	-0.04	0.17	0.03	0.10
Parenthood status similarity				
Parent dyad	ref		ref	
Mixed dyad	-0.05	0.06	0.12*	0.05
Childless dyad	0.04	0.10	0.31**	0.12
	Emotional closeness			
	Younger generation		Older generation	
	β	SE	β	SE
Gender similarity				
Sister-sister dyad	ref		ref	
Mixed dyad	-0.43***	0.06	-0.43***	0.03
Brother-brother dyad	-0.46***	0.09	-0.44***	0.05
Financial condition similarity				
Low-income dyad	ref		ref	
Mixed dyad	-0.03	0.11	0.03	0.05
Wealthy dyad	0.10	0.16	0.07	0.09
Parenthood status similarity				
Parent dyad	ref		ref	
Mixed dyad	0.03	0.06	0.02	0.04

Childless dyad	0.23*	0.12	0.17	0.10
Provision of practical help				
	Younger generation		Older generation	
	β	SE	β	SE
Gender similarity				
Sister-sister dyad	ref		ref	
Mixed dyad	-0.09*	0.04	-0.06**	0.02
Brother-brother dyad	0.004	0.06	-0.04	0.03
Financial condition similarity				
Low-income dyad	ref		ref	
Mixed dyad	0.09	0.06	-0.06*	0.03
Wealthy dyad	0.08	0.09	-0.13**	0.05
Parenthood status similarity				
Parent dyad	ref		ref	
Mixed dyad	0.01	0.04	0.11***	0.02
Childless dyad	-0.01	0.07	0.33***	0.05

Notes. Younger generation: n = 2,424 person-observations of 1,340 unique individuals.

Older generation: n = 4,285 person-observations of 1,735 unique individuals.

Covariates: Respondent's age, education, number of siblings, gender similarity, age similarity, financial condition similarity, parenthood status similarity and geographical distance between siblings.

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