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Chapter two

Brothers and sisters across the life course: Eleven factors shaping relationship quality in adult siblings

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Sibling relationships are unique family ties in humans, not least because they are the longest-lasting social bonds in our species (Cicirelli, 1995). Sibling relationships are also ambivalent by nature, meaning that they include both altruistic help and emotional closeness as well as conflicts and quarrels. Conflicts between siblings are more common in early and late childhood when the competition over parental time, attention and resources is the highest, whereas in adulthood siblings more often provide support and safety nets for one another (Pollet & Hoben, 2011). In the present chapter, we consider the relationships among adult siblings and thus it is relevant to pay most attention to the more affirmative sides of siblinghood such as social and emotional support. With that said, however, the other side of the coin cannot be totally ignored because conflicts and quarrels do not necessarily end when siblings grow up but rather are present also among adult sisters and brothers (Tanskanen et al., 2016). Hence, conflicts tend to be a natural part of sibling ties, potentially having a strong influence on relationship closeness (Salmon & Hehman, 2014). In addition, relationships with siblings in adulthood usually stem from

relationships with siblings in childhood, and thus childhood conditions are an important issue to consider when exploring sibling relationships across the life course.

In social science studies, the intragenerational ties between siblings have often been considered using life course and family solidarity models (e.g. Voorpostel & Bliezner, 2008; White, 2001). Using these perspectives, family scientists have investigated how socio-economic characteristics (e.g. educational level) and family structure factors (e.g. number of siblings and age difference) shape sibling relationships. Although these models have only limited capacity to formulate hypotheses that can be empirically tested, studies that have utilised life-course and solidarity models have provided important information about several factors associated with intragenerational solidarity. Recently, the need and opportunity structures model, which is an extension of the solidarity model, has been used to explain why kin support is unequally distributed across family members (Szydlik, 2016). Although until now the need and opportunity structures model has been mostly used in studies investigating social ties between adult children and older parents, for the most part the same principles are also valid when one studies sibling relationships. The basic idea in this model is that when a person needs more support (e.g. because of financial difficulty or health problems), he or she also receives more help from kin, and when a person has more opportunities to provide support (e.g. because of better financial conditions or improved health), he or she also provides more support for relatives. Factors indicating need and opportunity structures are often the same as those that have also been emphasized in life-course and solidarity models.

Relationship quality with siblings can be approached from the viewpoint of evolutionary theory. The four most important evolutionary theories considering factors associated with sibling

relationship quality are inclusive fitness theory (Hamilton, 1964), parental investment theory (Trivers, 1972), parent-offspring conflict theory (Trivers, 1974) and incest aversion or the Westermarck effect (Westermarck, 1921). Inclusive fitness theory (Hamilton, 1964) states that individuals can increase their fitness indirectly by investing time, support and resources in close relatives with whom they share common genes. According to this theory, "all else being equal", individuals are predicted to provide more support for their more closely related relatives compared to more distantly related relatives or non-relatives. Parental investment theory (Trivers, 1972) argues that by investing in their descendants, parents can increase their inclusive fitness (i.e. the likelihood that their genes spread into future generations). Parental investment theory also acknowledges the differences between genders: because of pregnancy and lactation, females have a greater obligatory investment in their descendants than men do, and because of paternity uncertainty males tend to invest less in their descendants compared to females. This biased parental investment has been shown to shape family ties (Salmon & Shackelford, 2011) and could be the main reason why women rather than men tend to be kin keepers, that is, the ones who maintain contact with relatives (Bracke et al., 2008). According to parent-offspring conflict theory (Trivers, 1974), siblings have tendencies to compete with each other over limited parental resources, and several factors, such as a disadvantaged financial condition, decreased age difference between siblings and unequal parental treatment, can intensify sibling rivalry (Salmon & Hehman, 2014). Lastly, the Westermarck effect can explain how an individual recognizes his or her siblings. According to this effect, physical proximity during early childhood provides an important cue for kinship and thus regulates individuals' behaviour towards siblings in later life (Westermarck, 1921).

Factors predicting sibling relationship quality

In prior studies, intragenerational solidarity between siblings has been considered in relation to several factors, including contact frequency, practical help and emotional support (e.g. Steinbach & Hank, 2018; Voorpstel & Bliezner, 2008). The intragenerational solidarity model can provide a useful tool for family scientists because it shows the multidimensional nature of sibling relationships. That said, however, it is important to note that different factors of relationship quality also tend to correlate with one another (Tanskanen et al., 2016). For instance, those who have more contact and are emotionally closer to siblings are also likely to provide more support for them. Although we review studies on adult sibling relationships here, several factors regarding family arrangements in childhood and adolescence are acknowledged because the foundation for sibling ties is often created during the early years. In the sections that follow, we will introduce 11 key factors associated with sibling relationship quality.

Gender

According to evolutionary anthropologists, humans are cooperative breeders, meaning that several other people in addition to the children's biological mothers tend to be involved in childrearing (Hrdy, 1999, 2009). They often include the children's older siblings; in particular, older sisters can provide significant support for their mothers and thus reduce the cost of childbearing (Sear & Mace, 2008). When it comes to relationships between adult siblings, gender is one of the most studied variables among family scholars. Based on prior studies, clear gender differences in sibling ties exist in the way that sister-sister sibling pairs have closer relationships with each other and provide more support for one another compared to mixed-gender sibling pairs or brother-brother pairs (e.g. Kersting & Feldhaus, 2016; Voorpostel et al., 2007). Gender-based differences in sibling relationships have been found in different countries, such as Germany, the Netherlands

and Finland, and also with different relationship quality factors, namely contact frequency, emotional closeness and practical help (Pollet, 2007; Steinbach & Hank, 2018; Tanskanen & Danielsbacka, 2014). On the other hand, sister-sister pairs also have more conflicts than other gender constellations, at least when conflicts are indicated by milder disputes and disagreements rather than severe quarrels (e.g. Tanskanen et al., 2016).

Genetic relatedness

Inclusive fitness theory (Hamilton, 1964) predicts that when the degree of genetic relatedness increases, the support between siblings should also increase. As full-siblings share on average 50% of the same genes and half-siblings share 25%, one could predict that full-sibling relationships are closer to one another than half-sibling relationships. Using large-scale and population-based survey data from the Netherlands and Finland, two prior studies tested whether full-siblings report more contact and more emotional support towards each other compared with maternal and paternal half- siblings (Pollet, 2007; Tanskanen & Danielsbacka, 2014). Both studies separated maternal and paternal half-siblings from each other because childhood proximity is likely to shape sibling ties; when the childhood co-residence duration increases, the relationship quality between adult siblings also tends to improve (Tanskanen & Danielsbacka, 2018). In contemporary Western societies, children typically stay with their mothers if their parents separate, meaning that maternal half- siblings have normally grown up in the same household, while paternal half-siblings have not. It was found that both Dutch and Finnish adults had more interaction with full-siblings than maternal or paternal half-siblings (Pollet, 2007; Tanskanen & Danielsbacka, 2014). In addition, a recent study from Germany detected that full-siblings have more contact and report more emotional closeness than half-siblings (Steinbach & Hank, 2018).

Moreover, the German study compared full- siblings to step-siblings (who share 0% of the same genes) and detected better relationships among full-siblings.

The role of genetic relatedness has also been investigated using twin data because these data can provide unique information on sibling ties. Monozygotic (MZ) twins share 100% of the same genes with each other, while dizygotic (DZ) twins share approximately 50% of the same genes, meaning that they are related to each other to a similar extent compared to any other full-siblings. Using survey data from Germany, Neyer (2002) investigated different aspects of relationship quality among older twins. It was detected that MZ twins reported more contact, social support and emotional closeness towards one another compared to DZ twins. Moreover, according to retrospective interviews, it was found that the contact frequency and emotional closeness followed a U-shaped curve, which implies that these two factors decreased after early adulthood and returned to a higher level again during old age. This age effect was similar among both MZ and DZ twins, although compared to DZ twins, MZ twins reported better relationship quality in all ages. In addition, a study conducted in Finland found that compared to DZ twins, MZ twins have more frequent contact (Rose et al., 1990). Lastly, based on evidence from the US, MZ twins engage in more cooperation, provide more support (Segal & Hershberger, 1999), and experience more mutual trust (McGuire et al., 2010) than DZ twins.

Sibship size

Prior studies have consistently indicated that the number of siblings is associated with individuals' educational outcomes in that when the number of siblings increases, the educational attainments tend to decrease (e.g. Coleman, 1988; Tanskanen et al., 2016 CCR). As parental

resources are always finite, when there are more children in the household, the parents' opportunity to allocate time and other resources per child is lower compared to households with fewer children (Downey, 1995, 2001). Sibship size could also shape the relationship quality among adult siblings. The number of siblings may matter simply because the more siblings one has, the less one can invest time or other resources in each of them. A two-generational study from Finland found support for the dilution effect; the more siblings younger and older adults have, the less contact they reported per sibling (Tanskanen & Danielsbacka, 2014). Similarly, a Dutch study found that an increased number of siblings is associated with decreased contact frequency (Poortman & Voorpostel, 2009) and, based on a German study, decreased emotional closeness (Kersting & Feldhaus, 2016). Some other studies have not, however, found a correlation between sibship size and contact frequency or emotional closeness (Pollet, 2007; Steinbach & Hank, 2018). Lastly, a German study detected that when the number of siblings increased, conflicts decreased (Steinbach & Hank, 2018), but neither another German study (Kersting & Feldhaus, 2016) nor a Dutch study (Poortman & Voorpostel, 2009) found a similar effect. Hence, one can conclude that prior studies about the association between sibship size and relationship quality have provided mixed results.

Birth order

Since the late 1800s, the impact of birth order on personality and intelligence has attracted attention among scientists and lay people (Damian & Roberts, 2015a; 2015b). During recent decades, there has also been growing interest in whether birth order influences family relationships. According to the neglected middleborn hypothesis, firstborn and lastborn children should report closer family ties than middleborns, but prior studies have provided mixed results.

Using non-representative data on US college students, a set of studies have indeed indicated that middleborns are less family-oriented than other birth orders (Salmon, 1999; Salmon, 2003; Salmon & Daly, 1998). In contrast, two later studies that used large-scale and population-based data from the Netherlands found no support for the neglected middleborn hypothesis, although it was found that compared with laterborns, firstborns reported more frequent contact and better sibling relationship quality (Pollet & Nettle, 2007, 2009). A large-scale and population-based study from Germany subsequently detected that firstborns reported more contact with siblings than laterborns, but a similar effect was not found in the case of emotional closeness (Steinbach & Hank, 2018). Finally, a two-generational and nationally representative study from Finland found no support for birth order differences in sibling contact either among younger or older adults (Tanskanen & Danielsbacka, 2014).

Age difference

Age difference between siblings is an important family structure factor that may shape sibling ties. During childhood and adolescence, a smaller age difference is associated with intensified sibling rivalry because when siblings are of the same age, they will compete over similar parental resources (Salmon & Hehman, 2014; Tanskanen et al., 2016). In addition, during childhood, a small age difference may have detrimental effects on child outcomes, including health problems, delayed development and educational failures (Pollet & Hoben, 2011). Although sibling rivalry is most severe during childhood when parental resources matter the most, it may also exist among adult siblings. According to a two-generational study from Finland, 50% of older and 67% of younger adults report that they have had conflicts with their siblings (Tanskanen et al., 2016).

Whereas during childhood a small age difference between siblings often has negative consequences, in adulthood such a difference could be favourable for sibling relationships. A large age difference between siblings decreases the probability of shared childhood experiences, which in turn could result in less emotional closeness between siblings in adulthood. In line with this argument, findings from the Netherlands indicated that an increased age difference is associated with decreased contact frequency among adult siblings (Pollet, 2007). However, according to a two-generational Finnish study, age difference did not correlate with sibling contacts either among younger or older adults (Tanskanen & Danielsbacka, 2014).

Socioeconomic position

The need and opportunity structures model predicts that when individuals have more opportunities to provide support for kin, the amount of help will also increase (Szydlik, 2016). Based on opportunity structures, one can predict that an improved socioeconomic position is associated with increased opportunities to provide support for siblings. Sibling studies testing the predictions derived from the need and opportunity structures model have been rare, although some studies considering sibling ties have controlled for educational level. Based on a Dutch study, individuals with a higher level of education have more contact with siblings compared to individuals with a lower level of education (Pollet, 2007). A Finnish study found that among older adults a high educational level was associated with increased contact with siblings, but this effect was absent among younger adults (Tanskanen & Danielsbacka, 2014). Lastly, a German study on younger adults found no significant differences in sibling ties according to educational level (Steinbach & Hank, 2018).

When it comes to need structures, one can assume that when the socioeconomic position is lower, there is also more need for support from siblings. Based on a study from the Netherlands, lower educated individuals did not receive more support from siblings compared to their higher educated counterparts (Voorpostel et al., 2008). Among older and younger Finns, the financial situation of siblings was not correlated with contact frequency, emotional closeness or practical help (Tanskanen & Rotkirch, 2018). These findings provided no support for the predictions derived from the need structures model.

Geographical proximity

When individuals live nearby, they also have more opportunities for contact and mutual support than when they live far away. Hence, it is no surprise that one of the most robust findings in studies of kin relationships is that when geographical distance increases, interaction between individuals decreases. For instance, using large-scale survey data from Germany, a recent study found that geographical proximity was associated with relationship quality among full- and half-siblings (Steinbach & Hank, 2018). Similar results have also been found in studies using data from the Netherlands (Pollet, 2007) and Finland (Tanskanen & Danielsbacka, 2014). Based on findings from the US, long geographical distance tends to reduce interaction between siblings regardless of the degree of relatedness (White & Riedmann, 1992a; 1992b). That said, however, a study based on data on German and Dutch university students detected that when the residential distance between kin increased, individuals were more willing to travel to meet genetically closer relatives than more distant relatives (Pollet et al., 2014). This finding indicates that geographical proximity may shape sibling ties according to degree of relatedness.

Childhood co-residence duration

According to the inclusive fitness perspective, individuals have a natural tendency to prefer their close relatives over more distant relatives or non-relatives (Hamilton, 1964). To preferentially favour close relatives over other individuals, people should, however, firstly recognize to whom they are related. As genes do not directly detect other genes, people should use different cues, which help to assess whether they are genetically related to another individual. Evolutionary scholars have argued that childhood co-residence duration is one of the key kin detection cues among human siblings because living in the same household during early childhood serves as a valid cue of actual relatedness (Lieberman et al., 2007; Westermarck, 1921). Based on this perspective, childhood co-residence can be predicted to regulate adult sibling ties in that those who have lived with their siblings during childhood also have closer relationships with them in adulthood compared to those who have not co-resided with siblings in childhood.

Prior studies have provided support for this prediction. For instance, a study based on non-representative data on US college students detected that childhood co-residence is a strong predictor of sibling support (Bressan et al., 2009). Moreover, analysing cross-cultural but non-representative data from Argentina, Belgium, California, Dominica and Hawaii, another study found that when co-residence duration increased, individuals' willingness to provide support for their siblings also increased (Sznycer et al., 2016). Lastly, using a population-based survey from Germany, it was found that increased childhood co-residence duration is associated with increased contact frequency and emotional closeness with siblings among younger and middle-aged adults (Tanskanen & Danielsbacka, 2018).

Maternal perinatal association

In addition to childhood co-residence duration, maternal perinatal association (i.e. an individual sees his or her mother taking care of a newborn baby) could be an important kin detection mechanism (Lieberman et al., 2007). Maternal perinatal association tends to be a valid cue for kin recognition because a woman who nurtures and breastfeeds a newborn infant is most probably this infant's biological mother. As maternal perinatal association helps to detect a biological mother and infant, individuals can also use it as a cue for sibling recognition; if an individual's mother nurtures and breastfeeds a newborn baby, this baby is most likely that individual's sibling. Although maternal perinatal association could be the single most important kin detection cue in human siblings, it can only be used by older siblings, meaning that younger sibling should use other kin recognition cues, such as co-residence duration during childhood (Lieberman & Billingsley, 2016).

To date, only a small number of studies have tested whether maternal perinatal association correlates with improved relationship quality among adult siblings. Using a non-representative sample of US college students, it was found that maternal perinatal association correlates with both improved willingness to provide costly help and actual support directed towards sibling (Lieberman et al., 2007). This study was subsequently replicated with similar results using non-representative samples gathered from Argentina, Belgium, California, Dominica and Hawaii (Sznycer et al., 2016). Moreover, both aforementioned studies found that maternal perinatal association is a more valid cue for sibling detection than childhood co-residence

durations (Lieberman et al., 2007; Sznycer et al., 2016). Lastly, based on the US study, maternal perinatal association corresponds to 14 years of co-residence duration (Lieberman et al., 2007).

Unequal parental treatment

By the age of three, children begin to be sensitive to disparities in parental treatment between them and their siblings, start to actively monitor the relationships between their siblings and their parents, and to notice whether parental treatment is unequally distributed across siblings (Dunn & Munn, 1985). Unequal parental treatment may have several negative consequences for children. For example, differential parental treatment has been found to be associated with increased behavioural problems (Coldwell, Pike & Dunn, 2008; Reiss et al., 1995). Moreover, there is some evidence indicating that unfair parental treatment experienced in childhood may even increase delinquency in adolescence (Scholte, Engels, de Kemp, Harakeh & Overbeek, 2007). Lastly, unequal parental treatment tends to be associated with sibling relationship quality in childhood and adolescence (Brody, Stoneman & McCoy, 1992; Brody, Stoneman, McCoy & Forehand, 1992).

In addition, unequal parental treatment experienced in childhood may remain in an individual's mind for a long time and have an influence on sibling relationship quality in adulthood. Based on a sample of over one thousand middle-aged adults from Germany, it was found that when parents had treated their descendants equally, sibling relationship quality was also better, while unequal parental treatment was associated with poorer relationship quality (Boll et al., 2003). Similarly, using a large-scale sample of younger and middle-aged adults from Finland, it was found that perceived unequal parental treatment shapes relationship quality in siblings

(Danielsbacka & Tanskanen, 2014). Based on the Finnish study, the perceived unequal parental treatment also mediates the effect of relatedness in sibling ties. When differential parental treatment was taken into account, the difference between full- and maternal half-siblings disappeared in that there was no significant difference in emotional closeness between these two groups.

Parenthood status

Studies considering *intergenerational* relationships have indicated that the presence of a third generation is associated with improved relationship quality between adult children and parents (Danielsbacka et al., 2015; Fischer, 1983), although it is not clear whether this association is causal (Tanskanen, 2017). The inclusive fitness perspective states that the existence of siblings' children increases the shared reproductive interests between siblings, which may also encourage individuals to provide support for their siblings with dependent children (Hughes, 1988). However, studies investigating whether parenthood status shapes sibling ties are scarce.

Using cross-sectional data on younger and middle-aged adults from Finland, it was investigated whether parenthood status is associated with relationship quality in siblings (Tanskanen & Danielsbacka, 2017). Relationship quality was indicated by three factors, namely contact frequency, emotional closeness and degree of conflict. It was detected that women with children had more contact with sisters with children compared with childless women with childless sisters. Men with children with childless sisters had more contact than childless men with childless sisters. However, childless men with brothers with children had less contact than childless men with childless brothers. These findings indicate that the existence of a child may

improve matrilineal kin ties more than patrilineal ones. This finding is also in line with *inter*generational studies, which have considered relationship quality between adult children and parents (Danielsbacka et al., 2015; Fischer, 1983).

Discussion

This chapter highlighted 11 factors predicting relationship quality among adult siblings, namely gender, genetic relatedness, sibship size, birth order, age difference, socioeconomic position, geographical proximity, childhood co-residence duration, maternal perinatal association, parental unequal treatment and parenthood status. Although different factors predicting sibling relationship quality have been presented as separate items above, many of them may overlap. For instance, the birth order effect found in some studies indicating that first-born individuals report closer sibling ties compared to later born individuals may sometimes be due to maternal perinatal association instead of birth order. In addition, the finding that paternal half-siblings have a disadvantaged position compared to full- and maternal half-siblings is most probably based on the childhood co-residence duration: full- and maternal half-siblings typically share a childhood home, while paternal half-siblings usually do not. Hence, it is important to create research set-ups that facilitate consideration of the factors that really produce the effect. Obviously, high-quality data including several key factors predicting sibling relationship quality is needed in order to do this.

Adult sibling relationships are ambivalent, including both mutual support and conflicts. Interestingly, the same factors that tend to increase contact, emotional closeness and help are also often associated with conflict and quarrels. Accumulating evidence indicates that altruistic and emotionally close sibling ties may not be less conflict-prone in comparison (Salmon & Hehman, 2015). That said, however, the relative importance of support and conflict varies by age

in that the number of conflicts tends to decrease over the life course, and adult siblings typically provide an important resource for one another (Pollet & Hoben, 2011). Overall, sibling ties remain strong in adulthood and are related to several key factors, many of which have their roots in early childhood and adolescence.

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