

**This item is the archived peer-reviewed author-version of:**

Siblings' similarities and dissimilarities : a review of theoretical perspectives and empirical insights

**Reference:**

Her Yu-Chin, Batur Zeynep Zümer, Vergauwen Jorik, Mortelmans Dimitri.- Siblings' similarities and dissimilarities : a review of theoretical perspectives and empirical insights

Journal of family theory & review / National Council on Family Relations [Minneapolis, Minn.] - ISSN 1756-2589 - 13:4(2021), jftr.12436

Full text (Publisher's DOI): <https://doi.org/10.1111/JFTR.12436>

To cite this reference: <https://hdl.handle.net/10067/1820040151162165141>

**Abstract**

Although siblings may differ considerably, the similarities between them, which cannot be neglected, are often an important source of emotional support in one's life and influence one's life course trajectories. In this review on the topic of sibling relationship and cross-sibling effect interactions, we aim to encourage research interest and facilitate knowledge building. We begin our review by highlighting how the parental home may induce differentiation between siblings. Next, we illustrate the theories explaining sibling similarities and differences and discuss the factors that stimulate these. Throughout the review, we do not only highlight the complex mechanisms by which siblings imitate yet differentiate themselves, but also mutually relate to their life courses and education. New understandings of how similarities between siblings can simultaneously act as powerful influences and negative examples are provided.

*Keywords:* cross-sibling effects, life course research, parenting styles, sibling relationships, socialization

## **Siblings' Similarities and Dissimilarities: A Review of Theoretical Perspectives and Empirical Insights**

### **Introduction**

In contemporary society, the role of siblings in life course research has been increasingly acknowledged. A growing body of literature has documented that siblings influence and shape each other in the course of childhood, adolescence, emerging adulthood, and later life (e.g., Cicirelli, 1995; Updegraff et al., 2002). Studies showed that throughout these stages, siblings can influence one another with respect to various life course events, such as first sexual encounter, leaving the parental home, fertility, union formation and partnership dissolution (e.g., Buyukkececi & Leopold, 2020; de Vuijst et al., 2017; Haurin & Mott, 1990; Holdsworth, 2000; Lyngstad & Prskawetz, 2010). Because sibling ties typically last the longest and involve a sense of family belonging, compared with most other family ties, individuals are able to witness and relate to their siblings' life courses longer (Cicirelli, 1991; Connidis, 1992). Unlike parents and children, siblings are often age peers, which makes their relationships more egalitarian and less hierarchical (Connidis, 1992). Given that sibship and friendship can both serve as a source of companionship and emotional support (Updegraff et al., 2002), siblings, as close friends do, also connect and mutually influence one's views on relationships or marriage and other attitudes or life course decisions.

A number of sociodemographic studies have indicated that due to *cross-sibling interaction*, which denotes the reciprocal influence among siblings, siblings often share similarities in life course trajectories (e.g., de Vuijst et al., 2017; Lyngstad & Prskawetz, 2010). However, various studies have demonstrated that siblings may also differ significantly (e.g., Morosow & Kolk, 2019; Whiteman et al., 2007); for instance, due to parental influences (Black et al., 2018). These differences can involve personalities, skill formation, life achievements or failures, and life course events (Connidis, 1992; Feinberg et al., 2012;

Jensen et al., 2015; Whiteman & Christiansen, 2008). In this paper, we first introduce theoretical models on how the parental home and siblings play their influencing role, including the birth order theory, the confluence model, resource dilution, and parental differential treatment. Next, we draw attention to the fact that siblings significantly influence one another and that such influences can steer in two directions, making siblings either similar or dissimilar. We discuss the theories explaining similarities between siblings (i.e., sibling contagion, social learning, and genetic relatedness) and those unravelling the distancing behaviors between siblings (i.e., social comparison and sibling deidentification). Following this, we illustrate the applications of these theories with empirical evidence in the domains of education and life course studies. Finally, we discuss the factors that lead siblings to behave similarly and differently, including siblings' gender composition, age gap, birth order, emotional closeness, and sibship size, in relation to the aforementioned theories. Although most natural siblings spend their childhood and youth together, this may apply less to step- or adopted siblings. In this review, we focus mainly on natural siblings because of their fundamental biological relationship and more intense involvement in one another's life (Cicirelli, 1991; Steinbach & Hank, 2018).

### **Why Are Siblings Different? The Influences of the Parental Home on Siblings**

Most siblings share the same parental (socioeconomic) background, house, neighborhood, family stability, and genes, which all affect their development and later life outcomes, and yet, siblings may still differ considerably (Morosow & Kolk, 2019). This has led scientists to assess why siblings growing up in the same household can be very different. In the parental home context, researchers have distinguished a few aspects relating to differences between children from the same family (Plomin et al., 2001). In this section, we touch upon four main factors explaining sibling differences.

Birth order is central in a theory that is examined extensively by social scientists to reveal the potential mechanisms behind sibling differences. Personality theorist and psychotherapist Adler (1964) stressed the importance of early childhood experiences for future adult development (Eckstein & Kaufman, 2012). He built the birth order theory, demonstrating how the sequence by which children are born into a family influences their personality (Adler, 1928, 1964). The theory highlights that siblings develop different personality traits within the family with the aim of decreasing competition and rivalry for parents' attention and resources (Black et al., 2018; Whiteman, McHale, & Soli, 2011). Adler's birth order theory suggests that first-born children are dethroned by their later-born siblings. Therefore, they seek the favor of their parents. First-borns experience a pressure to make substantial efforts to protect their favorable parent-child relationship, and, by consequence, first-borns tend to show a strong obedience to household rules. Middle-born children, on the other hand, are observed to be more social and act as peacemakers due to their middle position in the family. The youngest children are often considered as irresponsible, unconventional, immature, and dependent because they are the last newcomers in the family (Adler, 1928; Horner et al., 2012; Sulloway, 1999). Sulloway (1996) rephrased this as earlier-born children being expected to act more conservative, whereas later-born ones to be more rebellious. However, empirical evidence addressing the connection between birth order and personality is mixed and appears contingent on several factors. For instance, a study by Dixon et al. (2008) suggested that in families with more than six children, the youngest three children were significantly more extroverted than the oldest. According to Golsteyn and Magnée (2020), older brothers were more agreeable when having a younger sister, as opposed to a younger brother. Bleske-Rechek and Kelley (2014), on their part, did not find birth order having an enduring effect on personality traits.

The confluence model aims to explain differences in the cognitive development of siblings. The model points out that cognition is affected by both birth order and family size (Zajonc & Markus, 1975). The emphasis is on the intellectual environment of the children during the course of their development (Zajonc & Markus, 1975). The intellectual environment is defined as a function of the absolute intellectual levels of all family members, including the newborn family members. The intellectual levels in this theory are not represented by the well-known concept of the IQ but by absolute quantities reflecting each individual's mental maturity (Zajonc et al., 1979). As the family members mature, the intellectual environment changes, and the most substantial changes tend to occur when a new child is born into the family. Families with many young children provide an intellectually immature environment because such large families are assumed to have a larger proportion of individuals with low absolute intelligence (Zajonc & Markus, 1975). Hence, according to the confluence model, first-born children have an advantageous place in the family because the total intellectual level of the family is at its highest when they arrive, whereas the lastborn children are assumed to be the most disadvantaged (Jæger, 2009). While confluence theory has received some attention, it has also rendered criticism. Some researchers investigated its validity and found no empirical support for birth-order effects with respect to cognitive development (Retherford & Sewell, 1991; Steelman & Mercy, 1980; Wichman et al., 2006).

The resource dilution model gives an explanation for a negative association between the number of children in a family on the one hand and children's intellectual, socioeconomic, and educational outcomes on the other (Blake, 1981). This theory assumes that parents have limited resources, such as financial means, time, and social capacity (Jæger, 2009) to invest in their children's development and well-being (Workman, 2017). Therefore, the model suggests a negative effect of every additional child on the amount of resources a child can obtain due to families' limitations in the provision of tangible and intangible

resources (Blake, 1985; Gibbs et al., 2016; Riswick & Engelen, 2018; Steelman et al., 2002). Kalmijn and van de Werfhorst (2016) showed that the ways parental resources are diluted and divided among siblings can also be gendered, with boys being favored over girls. In their study on 18 European countries, they found that the number of brothers is more negatively related with the odds of obtaining a college degree than the number of sisters is. This effect is especially stronger in societies with unequal gender climates than it is in gender-egalitarian societies (Kalmijn & van de Werfhorst, 2016).

The last theory addressing the role of the parental home considers differences in the parental treatment of children. This theory spotlights the possibility that children perceive their parents' approach unequal as compared to their siblings (Kowal & Kramer, 1997). McKinney and Renk (2008) have shown that the type of parenting is related to children's emotional adjustment. Siblings who did not receive or perceive equal affection from their parents exhibited more sibling jealousy than their siblings did (Brody, 1998) and tended to experience less self-esteem, more attachment problems, and greater romantic relationship distress in their later life (Rauer & Volling, 2007). Another study that focused on the implications of sibling jealousy during adulthood demonstrated that jealousy is, in turn, positively related to young adults' depressive symptoms and sibling conflict (Hamwey & Whiteman, 2020). Differential parenting can also have a strong gender component. Conrade and Ho (2001) examined gender-of-parent and gender-of-child interactions and revealed that mothers and fathers often use different parenting styles for their children, depending on their gender. In their study, sons, on the one hand, perceived fathers as more likely to use an authoritarian parenting style, whereas mothers as having a more permissive style. Daughters, on the other hand, perceived mothers as more likely to apply an authoritative parenting style. Researchers have increasingly indicated that differential treatment often does not lead to a favorable future development (Meunier et al., 2012; Sheehan & Noller, 2002). Conrade and

Ho (2001) further showed that perceptions of permissive maternal parenting could promote beliefs about “male entitlement,” and perceptions of authoritarian paternal parenting potentially encourage aggressive behavior among teen males. A child’s gender has been shown to affect various aspects of parenting, including the way that parents talk to children (Cervantes & Callanan, 1998), how parents and children play together, the provision of different toys for sons and daughters (Morawska, 2020), and the amount of parent-child time spent (Harris & Morgan, 1991). Gendered parenting is crucial to understand gendered child development and differences between siblings (Mesman & Groeneveld, 2018). Finally, Jenkins et al.’s (2003) research demonstrated that differential parenting is also associated with stressful family environments, marital dissatisfaction, large family size, and single parenthood.

### **Do Siblings Influence Each Other?**

In this section, we do not only uncover the mechanisms by which siblings influence each other to behave more similarly, but also how siblings tend to differentiate. On the one hand, research and theories have shown that siblings often share many similarities, either through contagion and social learning or genetic influence. On the other hand, studies have shown that siblings can implicitly or intentionally diversify themselves, which can be explained by social comparison and deidentification (Adler, 1928; Plomin & Daniels, 1987; Whiteman & Christiansen, 2008; Whiteman, McHale, & Soli, 2011).

### **Theories of Sibling Similarities**

Theories on social interaction highlight that people incorporate the behaviors (e.g., childbearing and sexual behaviors) of other members in society, such as family members, school peers or workplace colleagues (Buyukkececi et al., 2020; Haurin & Mott, 1990; Kotte & Ludwig, 2011). According to Bernardi (2003), a form of social interaction is contagion, often occurring between siblings. When relationships are closely connected, cohesive and



homogeneous, the timing of siblings' life transitions can be interrelated due to contagious influence. With contagion, actions do not necessarily pass on consciously, but also move unconsciously. One's reactions due to emotions, such as a sense of embarrassment, happiness or inadequacy may motivate one to follow others' opinions on appropriate behaviors even when no benefits are at stake (Bernardi, 2003). Indeed, contagion may take place through all kinds of human interactions, and among them, cross-sibling effects are especially vital. Empirical examples of contagion between siblings predominantly stem from fertility research. According to Lyngstad and Prskawetz (2010), Norwegian women's first births are affected by cross-sibling effects, suggesting that a sibling's recent childbirth has an immediate effect on one's own childbirth. In recent work, Buyukkececi et al. (2020) found strong evidence that siblings' fertility had a direct consequence for fertility decisions at the individual level as well.

The second theory that is vital in explaining siblings' influences on life course trajectories is the theory of social learning. Because siblings often grow up together and are bonded closely, they tend to rely on each other's life or family experiences. With such reliability and mental bonding, siblings look after each other and are an influential source of social learning (i.e., role models), consulting one another for information on life course transitions (Balbo & Mills, 2011; Bernardi, 2003; Haurin & Mott, 1990). This is in line with the three requirements of social learning Bandura (1977) proposed: being able to observe and reproduce the behavior, and being motivated to adjust one's behavior following that of the others. In most cases, younger siblings tend to look up to their older siblings and view them as role models, especially when they make on-time and successful life course transitions (Axinn et al., 1994; Conger & Little, 2010). For example, a study demonstrated that individuals are more likely to experience a divorce if an older sibling had made such a decision, as opposed to a younger sibling having encountered one (de Vuijst et al., 2017). In

this case, the fact that individuals tend to follow their older siblings' pathways leads to similarities between them.

Siblings are not only similar because of exposure to each other or similar environments, but also because of shared genetics. Full siblings inherit on average 50% of the same genetic variants from their parents, which increases the likelihood to be genetically predisposed to the same life course-relevant behaviors compared with unrelated individuals (Axinn et al., 1994; Branigan et al., 2013; Lyngstad & Prskawetz, 2010). Genetic studies of sociodemographic behaviors have traditionally used twin- and family-informed designs to infer the influence of genetics. However, in the last decade studies have increasingly used direct measurements of genetic variants and associated them with life course outcomes. For example, years of education is an important indicator of socioeconomic status and has a heritability of 40%, according to a meta-analysis of twin studies (Branigan et al., 2013). Other examples of genetic influences on life course outcomes are the influence on the number of sexual partners one has, for which common genetic variants explain 13% of variance, and the influence on the number of children born, for which 6% of variance is explained by common variants (Barban et al., 2016). Although genes are clearly associated with life course outcomes, the causal mechanisms are less well understood. For example, it is unclear to which degree they represent direct genetic effects and to which degree gene–environment correlation, also referred to as “genetic nurture,” may play a role. Children with higher genetic predisposition toward higher educational attainment tend to be raised in better-off homes and have healthier mothers, suggesting that genes might be an indicator of growing up in a more advantageous environment before and after birth (Armstrong-Carter et al., 2020). At the same time, genetic predictions of educational attainment are also predictive of upward social mobility, even for individuals coming from less advantaged homes (Belsky et al., 2016). Similarly, it is feasible that sibling similarity due to genetic effects may be further

amplified through social contagion. In summary, sibling resemblance may be due to shared genetics and environmental influences, and more research is needed to unpack those causal mechanisms.

### **Sibling Influences on Dissimilarities**

Festinger (1954) introduced the theory of social comparison, which indicates that people seek out information about other people's lives, feelings, or abilities and then evaluate their own (Titus, 1980). Individuals are inclined to change their behaviors or attitudes to conform to others from the same social groups or those they consider similar to them (Lyngstad & Prskawetz, 2010). Jensen et al. (2015) suggested that due to the nature of their relationship, siblings have the dispositional tendency to compare themselves to each other. This tendency toward social comparison also plays a role in siblings' emotional and relational development. Specifically, strong intrafamilial social comparison may not only be linked to warmer sibling relationships, but also to conflict between siblings and depressive symptoms (Jensen et al., 2015). Studies by Feinberg et al. (2012) and Whiteman, McHale and Soli (2011) underscore the driving force of siblings with respect to one's school performance, success in romance and a variety of life course decisions. Comparison between siblings has an important role in motivating one to behave similarly to and differently from others. On the one hand, social comparison of siblings can be related to the modelling of siblings' behaviors and attitudes, leading to similarities. On the other hand, when siblings want to avoid future sibling comparison, they develop dissimilarities (Jensen et al., 2015; Whiteman et al., 2014).

The latter mechanism of the comparison theory is coined sibling deidentification, which highlights the differences in behaviors between siblings. Sibling deidentification theory's rivalry-defense hypothesis suggests that siblings may consciously or unconsciously take different or opposite life courses and pathways to be distinguished from their siblings, reducing comparison and rivalry, and/or to establish their particular identities within the

family (Schachter et al., 1976; Whiteman et al., 2007). Given that identifying with or imitating siblings may exacerbate sibling competition, especially when seeking the same goals and achievements, siblings are likely to develop intentionally different personal qualities and choose different niches. By building such a defense mechanism, they may reach a more harmonious and less conflictual relationships with their siblings (Sulloway, 1996; Whiteman, McHale, & Soli, 2011). Thus, sibling companionship and a warmer sibling relationship are created through sibling deidentification, as part of social comparison, implying that siblings avoiding competition may improve their relationship quality and those siblings might form an important source of companionship.

The deidentification process may also align with associations between birth order and personality traits, which involve that siblings develop different traits to decrease comparison and competition. For example, later-born children strategically developing more sociable and unconventional features to attract parental resources (Black et al., 2018; Sulloway, 1996). From the aforementioned studies, we learn that while behavioral geneticists have highlighted that differences between siblings primarily occur because of non-shared genes and non-shared environments, they may also emerge due to comparison and deidentification (Whiteman et al., 2007).

### **Major Fields of Investigation: Life Course Trajectories and Educational Attainment**

In this section, we first discuss different siblings' influences on educational attainment, and subsequently a variety of life course transitions. Education is included in this review alongside life course events for several reasons. Firstly, education marks an individual's achieved status, rendering lifelong consequences, including life course decisions. A higher attainment may also open a smoother path through life for individuals, improving the available resources at their disposal (Mirowsky & Ross, 2007; Ross & Wu, 1996). Moreover, education is an important factor in explaining sibling behavior (de Vuijst et al.,

2017; Lyngstad & Prskawetz, 2010). Scholars suggested that siblings' impact on an individual's educational attainment can be important, together with the parents' educational attainment and occupational position (van Eijck & de Graaf, 1995). Although studies investigating whether and how siblings resemble in education have yielded mixed results, it is evident that due to genes, environment and mutual influences, sibling similarities exist in educational attainment (Hauser & Wong, 1989; van Eijck, 1997). At the same time, Bauer and Gang (2001) showed that sibling rivalry also exists as regards educational attainment, because of household resource competition.

When it comes to life course transitions and family formation, the traditional sequence is the following: leaving the parental home, entering a partnership, childbearing, experiencing a breakup and retirement. However, since the end of last century, the order of these transitions has not been fixed, and postponement and variation of events prevail (Arnett, 2014). For example, cohabiting or having a romantic or sexual relationship are often favored over entering a marriage nowadays (Sassler, 2010). Due to the gradual uncertainties in life course trajectories, it is important to understand to what extent siblings play a role in determining whether and when life course events take place. Although research focusing on the link between siblings and independent living seems scarce, one study in the Spanish and British context demonstrated that having a sibling increases the chance of leaving the parental home at a given age compared with being an only child (Holdsworth, 2000). In terms of partnership formation, research has shown that not only the odds of getting married are related among high school peers (Åberg, 2003), but also siblings tend to be connected in terms of both romantic attitudes and behavior (Haurin & Mott, 1990; Killoren & Roach, 2014). With respect to marriage, research indicated that the probability of getting married increases following a sibling's wedding (Buyukkececi & Leopold, 2020).

The presence of siblings also plays an important role in a person's views and attitudes regarding family and fertility decisions. Morosow and Kolk (2019) showed that individuals who had siblings might have developed more family-oriented preferences, but the reasons for this could differ, depending on birth order. On the one hand, for older siblings, a high degree of family orientation can result from having a more caretaking role toward younger siblings. On the other hand, younger siblings are accustomed to a larger family from birth. Regarding fertility, several studies support the idea of sibling contagion (Balbo & Mills, 2011; Kuziemko, 2006; Lyngstad & Prskawetz, 2010). For example, Balbo and Mills (2011) demonstrated that an individual has a greater probability of realizing fertility intentions when a sibling has a child under 12 years old. This indicates that a sibling's recent childbearing experience may facilitate or intensify a person's motivation to have a child, which can be explained by the fact that having the opportunity to observe and learn from a sibling's experience overcomes uncertainty when anticipating the transition to a new life course stage (Balbo & Mills, 2011).

Furthermore, not only does the divorce of an individual's parents increase the own risk of getting a divorce (Wolfinger, 2016), but influence from a sibling with regard to divorce is also possible. However, to our knowledge, so far there are only two studies that have truly focused on addressing cross-sibling divorce effects. Whereas de Vuijst et al. (2017) emphasized that having a sibling experiencing a divorce increases an individual's probability of getting divorced, Buyukkececi and Leopold (2020) showed that cross-sibling effects are not limited to the same life course event but observable across events. For instance, the risk of an individual getting divorced decreased after a sibling got married. Following the same logic, the chance of entering a marriage also declined if an individual had a recently divorced sibling.

### **Understanding the Factors That Drive Siblings to Behave Similarly and Differently**

After understanding the theories explaining siblings' similar and dissimilar behaviors and their manifestations in life course trajectories and education, it is important to highlight the factors reported in the literature that make siblings act similarly and differently.

Interestingly, studies have focused predominantly on the similarities between siblings, rather than the differences. In the following, we pay attention to these factors in combination with the theories discussed earlier.

### **An Individual's and Their Sibling's Gender**

First and foremost, we examine siblings' gender composition. Gender similarity, as several studies acknowledged, leads to more sibling imitation or distinction. Whereas Conley and Glauber (2008) demonstrated that school performance does not vary by siblings' gender composition, Benin and Johnson (1984) showed that male dyads influence each other more than other combinations. Regarding family formation trajectories, Raab et al. (2014) showed that compared with opposite-gender siblings, same-gender siblings are more similar. Wood and Inman (1993) also highlighted that sister-sister dyads may influence each other's life courses more than siblings in other gender combinations due to stronger emotional bonds. Moreover, Killoren and Roach (2014) indicated that although women also communicate issues about sexual and romantic relationships with brothers and parents, they do so more frequently and feel much more comfortable doing so with sisters. In terms of role models, siblings are also more likely to look up to one another when they have the same gender (Trim et al., 2006). According to Tucker et al. (1997), compared with their older brothers, adolescent girls are more likely to view their older sisters as confidants and mentors, receiving more advice and experiencing greater influences from the sisters. This supports the social learning theory that individuals tend to imitate others who are similar (Bandura, 1977). In other words, same-gender siblings are inclined to influence each other more through both the mechanisms of social learning and sibling contagion.

Importantly, sibling social comparison and deidentification are also most evident when siblings belong to the same gender (Jensen et al., 2015; Whiteman & Christiansen, 2008; Whiteman et al., 2007). Whereas Gibbons and Buunk (1999) and Jensen et al. (2015) indicated that women are more likely to compare themselves to their siblings in general, same-gender siblings might be even more sensitive to comparison and competition (Whiteman, McHale, & Soli, 2011).

### **Age Gap Between Siblings**

According to Sulloway (1999), siblings might have a more similar personality when they are close in age. The effect of birth order appears contingent on age gap as siblings do not compete for parents' resources when age differences are substantial. Based on the resource dilution theory, wider age spacing between offspring allows parents to spread the investment of their resources over time, improving children's educational outcomes. However, in the Hungarian context, van Eijck and de Graaf (1995) found that a smaller age gap between siblings also allows resource pooling and economies of scale, leading to more optimal educational performances.

In terms of how the age gap predicts siblings' similarities and dissimilarities in life courses, alike siblings' gender composition, the age spacing between siblings may yield both positive and negative influences on siblings' similarities. On the one hand, as Kuziemko (2006) indicated, fertility contagion is especially strong when the age gap between siblings is small.. Similarly, siblings are more likely to be role models when the age gap between them is smaller (Bernardi, 2003; Whiteman & Christiansen, 2008). On the other hand, being close in age encourages comparison and deidentification between siblings as well, leading to dissimilarities in life courses (Jensen et al., 2015; Noller et al., 2008; Schachter et al., 1976; Whiteman & Christiansen, 2008; Whiteman et al., 2007).

### **Birth Order Among Siblings**



So far, theories of sibling contagion and social learning seem to share similar factors regarding the sibling influential process. However, social learning theory differs from contagion as it emphasizes that younger siblings tend to learn from the older siblings' behaviors. Older siblings who make an on-time and successful transition to independent living may serve as role models for siblings who are still living with their parents, motivating the younger siblings to follow the same path (Conger & Little, 2010). Likewise, Axinn et al. (1994) argued that older siblings may serve as "silent behavioral examples" to their younger brothers and sisters (p. 68), independent of their shared socioeconomic status and environment. Older siblings can sometimes act as negative role models. For example, East (1996) indicated that compared to younger siblings of never-pregnant teenagers, younger sisters of pregnant and parenting adolescents consider school and career less important, are less inclined to disapprove teenage childbearing and engage in more problematic behavior. In addition, Wang et al. (2019) showed that younger siblings have a higher chance of being unsuccessful and hanging out with peers who do not engage at school if their older sibling affiliates more with disengaged peers.

Regarding sibling comparison, research showed that younger siblings are more inclined to compare themselves to an older sibling than vice versa (Jensen et al., 2015). Such comparison potentially affects children's mental well-being, with stronger repercussions in case that siblings are close in age, due to the higher intensity of comparison (Feinberg et al., 2000; Noller et al., 2008). Schachter et al. (1976) demonstrated that sibling deidentification is most apparent between first- and second-born descendants. This research also reported that consecutive pairs of siblings (first-born and second-born, second-born and third-born, etc.), compared with jump pairs (e.g. first-born and third-born), exhibit higher levels of deidentification. Reduced comparison due to large age gaps could help to explain less

deidentification between jump pairs (Schachter et al., 1976), echoing Sulloway's (1999) argument that the influence of birth order weakens for larger age gaps.

### **Relationship Closeness Between Siblings**

Before discussing how relationship closeness impacts siblings' similarities and dissimilarities, it is important to note that sibling intimacy and conflict may change over the life course. In particular, Whiteman, McHale and Crouter (2011) found a decrease in sibling conflict and an increase in sibling intimacy in the year following a first-born's transition to independent living. In other words, sibling relationships often improve when there is a certain distance between them. Moreover, sibling relationships are also more likely to be better when parental favoritism is absent (Boll et al., 2003). Although having one or two siblings, compared to having no siblings, may enhance an individual's well-being, there is no such effect when having three or more siblings (Moor & Komter, 2012). The latter can be explained in terms of crowdedness, which is discussed in the next section. Nevertheless, siblings' emotional closeness, including a sense of shared experience, trust, and enjoyment of sibling bonds, is an important factor that encourages social contact, companionship and, in turn, children's well-being (Bernardi, 2003; Lee et al., 1990).

With regard to the implications of poor sibling relationships, research has shown that when a relationship is rivalrous, the influence on life course decisions steers in two opposite directions. On the one hand, due to competitive and jealous feelings, siblings might want to mimic each other's behaviors even more (East, 1998), which echoes social comparison. On the other hand, individuals might intend to act differently to deidentify themselves from their siblings, have less competition, and promote a more peaceful relationship, corresponding to sibling deidentification theory (Schachter et al., 1976; Whiteman, McHale, & Soli, 2011). Overall, warmer sibling relationships are more frequent when siblings are more similar in terms of demographic characteristics and are, in turn, positively associated with sibling

similarities in life course decisions. At the same time, sibling deidentification, which originated from social comparison theory but disentangles comparison and rivalry, might facilitate sibling companionship as well.

### **Sibship Size**

Based on the notion of resource dilution, children from larger families may receive less material as well as non-material resources (Blake, 1989), negatively affecting their intellectual and educational outcomes (Steelman et al., 2002). Because of the limited amount of love and resources received, children from such families are more inclined to leave the parental home early (Mitchell et al., 1989). Tippet and Wolke (2015) uncovered that having a higher number of siblings increases the risk of experiencing sibling aggression (e.g., sibling bullying), implying that sibship size is positively associated with poor sibling relationships. Hence, poor sibling relationship effects tend to be manifested more frequently in large families. This can be an additional explanation of children leaving the parental home at younger ages in case of larger sibship sizes. With respect to fertility, Morosow and Kolk (2019) provided empirical evidence that first-born children show higher numbers of child births, especially when they have more siblings.

### **Discussion and Conclusion**

In this review, we first illustrated and explained why the parental home context could serve as an important origin of sibling competition and comparison. We then discussed how siblings compete and compare, trying to strategically distinguish their personality from the others. However, distinct siblings may still act a source of companionship. Sibling contagion, in contrast, facilitates similarity between siblings. Interestingly, siblings who are similar in terms of demographic characteristics (e.g., same gender or small age gap) may, on the one hand, achieve sibling resemblance in life event decisions (e.g., Raab et al., 2014), and on the other hand, differentiate themselves to avoid comparison (Whiteman & Christiansen, 2008).

Whereas harmonious relationships often lead to similarities (Lee et al., 1990), hostile relationships may stimulate siblings to act either similarly or differently due to the comparison process (East, 1998; Whiteman, McHale, & Soli, 2011). Besides that one factor can lead to opposite influences, some factors can be more powerful when viewed together. For example, a girl having a close sibling relationship with a slightly older sister is likely to experience an amplified resemblance with this sister.

Importantly, we have featured two kinds of comparison. In the context of the parental home, children witness their parents' treatment of each child and are tempted to make comparisons with their siblings' treatment. If they observe parental differential treatment or gendered resource distribution, feelings of jealousy and unfairness might emerge among disfavored siblings. The other type of comparison considers more individual events or performances, such as comparing one's performance at school and success in life course transitions. In this, parental resources are less involved. Although both types of comparison may lead to sibling deidentification (e.g., one sibling adjusts his or her life course decisions, relative to that of a sibling's), the former comparison may play a role in fair treatment between siblings.

Nevertheless, similarities between siblings may be a double-edged sword. When siblings are similar in terms of age spacing and gender, they are more likely to serve as a source of companionship compared to sibling pairs belonging to the opposite gender and have a distanced age gap. For those siblings, spending time together and sharing thoughts with each other may be more common, as they tend to be more emotionally close (Lee et al., 1990; Tucker et al., 1997). Because of the similarities, siblings show a higher tendency to imitate each other more in life course events. However, similarities between siblings may also lead to sibling negativity as resembling siblings are inclined to make comparisons (Jensen et al., 2015). Such comparisons promote conflictual sibling relationships and might

have negative implications for mental health. Sibling comparison, in contrast, often results in a deidentification process as well, leading to warm sibling relationships instead. In a similar vein, siblings who are not as similar might not be as attached and might also experience a lower risk of sibling comparison or deidentification.

Given that we are not able to discuss all aspects of sibling effects in this review, we will introduce some avenues of possible future research. First of all, despite that the focus of this review was on natural siblings, it is worthwhile to note that half siblings may differ in their sibling (dis)similarities and influences in many regards. For example, Steinbach and Hank (2018) showed that adult full siblings are emotionally closer, but simultaneously have more conflicts. van den Berg et al. (2021) found that children living in stepfamilies are more likely to experience trajectories such as early home leaving and early union formation, in case they have a distant or conflicted stepchild–stepparent relationship. Future research could enrich our insights in the extent to which and how full, half or non-biological siblings show comparability in terms of sibling influences. Secondly, sibling (dis)similarities can also manifest in other fields. For example, existing literature suggested that siblings are more likely to be related in criminal behavior, specifically those who are closely spaced (Van de Rakt et al., 2009). In addition, siblings tend to be more distant when they differ in terms of sexual orientation (i.e., hetero- and homosexuality) or in the case of siblings with mental disabilities (Kaminsky & Dewey, 2001; Perales & Plage, 2020). Future studies could investigate these topics from different angles or uncover sibling (dis)similarities in other domains.

Lastly, gaining insight in cultural differences on sibling influence and (dis)similarities is also an important avenue. According to previous research, family ties in central and northern European and north American countries are weaker than in southern European countries (Mönkediek & Bras, 2014; Reher, 1998). Hence, southern European siblings are

expected to be emotionally closer and expose stronger mutual influences. Available evidence also indicated that while European and north American sibling relationships are characterized by independence and autonomy, Asian cultures emphasize sibling interdependence, older siblings' care-taking role, and the need for younger siblings to respect older siblings more (Markus & Kitayama, 1991; Nuckolls, 1993). Additionally, family bonds and sibling relationships may also vary depending on ethnic and cultural factors within countries. For example, Wu et al. (2018) reported that compared to European American first-borns, Asian American first-borns are surrounded by a stronger sense of family responsibility and are more obliged to take care of both their parents and younger siblings, which creates culturally specific stress and family conflicts experienced by Asian American first-borns. Furthermore, Whiteman et al. (2010) found that positive sibling relationships are linked to social learning both among African American and white American sibling dyads. Nevertheless, sibling deidentification tends to vary depending on sibling gender composition and does not support earlier empirical findings. Given those traces of cultural differences in sibling relationships, future researchers should draw more attention on sibling dynamics and their influence on one another cross-culturally.

To conclude, family relationships are highly diversified, reflecting that sibling relationships can also be far more complex than expected (Mortelmans et al., 2016). On the one hand, solidarity and stability between siblings may exist, whereas on the other hand, changes and inequalities in sibling relationships are also observed. Because sibling relationships can be affected by their parental home, their life courses and a variety of sibling characteristics, sibling companionship is not a given and can evolve over time, which, in turn, plays a role in explaining sibling (dis)similarities. It is important for parents to be aware that not only their unequal treatment can lead to poor relationships between their children, but also siblings may influence one another in different ways. Moreover, individuals might want

to consider the diverse influences their siblings have throughout the life course decisions. Finally, several mechanisms underlying sibling (dis)similarities regarding life events can occur simultaneously. As a result, to explain sibling (dis)similarities in life course transitions, it is important to understand the diverse mechanisms of sibling relationships and influences and how they might operate together.

### References

- Åberg, Y. (2003). *Social interactions: Studies of contextual effects and endogenous processes*. Stockholm University.
- Adler, A. (1928). Characteristics of the first, second, and third child. *Children*, 3(5), 14.
- Adler, A. (1964). *Problems of neurosis*. Harper Torchbooks.
- Armstrong-Carter, E., Trejo, S., Hill, L. J., Crossley, K. L., Mason, D., & Domingue, B. W. (2020). The earliest origins of genetic nurture: The prenatal environment mediates the association between maternal genetics and child development. *Psychological Science*, 31(7), 781-791. <https://doi.org/10.1177/0956797620917209>
- Arnett, J. J. (2014). *Emerging adulthood: The winding road from the late teens through the twenties*. Oxford University Press.
- Axinn, W. G., Clarkberg, M. E., & Thornton, A. (1994). Family influences on family size preferences. *Demography*, 31(1), 65-79. <https://doi.org/10.2307/2061908>
- Balbo, N., & Mills, M. (2011). The influence of the family network on the realisation of fertility intentions. *Vienna yearbook of population research*, 9, 179-205. <https://doi.org/10.1553/populationyearbook2011s187>
- Bandura, A. (1977). *Social learning theory*. Prentice Hall.
- Barban, N., Jansen, R., De Vlaming, R., Vaez, A., Mandemakers, J. J., Tropf, F. C., Shen, X., Wilson, J. F., Chasman, D. I., & Nolte, I. M. (2016). Genome-wide analysis identifies 12 loci influencing human reproductive behavior. *Nature Genetics*, 48(12), 1462-1472. <https://doi.org/10.1038/ng.3698>
- Bauer, T., & Gang, I. (2001). Sibling rivalry in educational attainment: The German case. *Labour*, 15(2), 237-255. <https://doi.org/10.1111/1467-9914.00163>
- Belsky, D. W., Moffitt, T. E., Corcoran, D. L., Domingue, B., Harrington, H., Hogan, S., Houts, R., Ramrakha, S., Sugden, K., Williams, B. S., Poulton, R., & Caspi, A.



- (2016). The Genetics of Success: How Single-Nucleotide Polymorphisms Associated With Educational Attainment Relate to Life-Course Development. *Psychological Science*, 27(7), 957-972. <https://doi.org/10.1177/0956797616643070>
- Benin, M. H., & Johnson, D. R. (1984). Sibling Similarities in Educational Attainment: A Comparison of Like-Sex and Cross-Sex Sibling Pairs. *Sociology of Education*, 57(1), 11-21. <https://doi.org/10.2307/2112464>
- Bernardi, L. (2003). Channels of social influence on reproduction. *Population Research and Policy Review*, 22(5-6), 527-555.  
<https://doi.org/10.1023/b:Popu.0000020892.15221.44>
- Black, S. E., Grönqvist, E., & Öckert, B. (2018). Born to lead? The effect of birth order on noncognitive abilities. *Review of Economics and Statistics*, 100(2), 274-286.  
[https://doi.org/10.1162/rest\\_a\\_00690](https://doi.org/10.1162/rest_a_00690)
- Blake, J. (1981). Family size and the quality of children. *Demography*, 18(4), 421-442.  
<https://doi.org/10.2307/2060941>
- Blake, J. (1985). Number of siblings and educational mobility. *American Sociological Review*, 84-94. <https://doi.org/10.2307/2095342>
- Blake, J. (1989). *Family size and achievement* (Vol. 3). Univ of California Press.
- Bleske-Rechek, A., & Kelley, J. A. (2014). Birth order and personality: A within-family test using independent self-reports from both firstborn and laterborn siblings. *Personality and Individual Differences*, 56, 15-18. <https://doi.org/10.1016/j.paid.2013.08.011>
- Boll, T., Ferring, D., & Filipp, S.-H. (2003). Perceived Parental Differential Treatment in Middle Adulthood: Curvilinear Relations With Individuals' Experienced Relationship Quality to Sibling and Parents. *Journal of Family Psychology*, 17(4), 472.  
<https://doi.org/10.1037/0893-3200.17.4.472>

- Branigan, A. R., McCallum, K. J., & Freese, J. (2013). Variation in the heritability of educational attainment: An international meta-analysis. *Social Forces*, 92(1), 109-140. <https://doi.org/10.1093/sf/sot076>
- Brody, G. H. (1998). Sibling relationship quality: Its causes and consequences. *Annual review of psychology*, 49(1), 1-24. <https://doi.org/10.1146/annurev.psych.49.1.1>
- Buyukkececi, Z., & Leopold, T. (2020). Sibling influence on family formation: A study of social interaction effects on fertility, marriage, and divorce. *Advances in life course research*, 100359. <https://doi.org/10.1016/j.alcr.2020.100359>
- Buyukkececi, Z., Leopold, T., van Gaalen, R., & Engelhardt, H. (2020). Family, firms, and fertility: A study of social interaction effects. *Demography*, 57(1), 243-266. <https://doi.org/10.1007/s13524-019-00841-y>
- Cervantes, C. A., & Callanan, M. A. (1998). Labels and explanations in mother-child emotion talk: Age and gender differentiation. *Developmental Psychology*, 34(1), 88. <https://doi.org/10.1037/0012-1649.34.1.88>
- Cicirelli, V. G. (1991). Sibling relationships in adulthood. *Marriage & Family Review*, 16(3-4), 291-310. [https://doi.org/10.1300/J002v16n03\\_05](https://doi.org/10.1300/J002v16n03_05)
- Cicirelli, V. G. (1995). *Sibling relationships across the life span*. Springer. <https://doi.org/10.1007/978-1-4757-6509-0>
- Conger, K. J., & Little, W. M. (2010). Sibling Relationships during the Transition to Adulthood. *Child Dev Perspect*, 4(2), 87-94. <https://doi.org/10.1111/j.1750-8606.2010.00123.x>
- Conley, D., & Glauber, R. (2008). All in the family?: Family composition, resources, and sibling similarity in socioeconomic status. *Research in Social Stratification and Mobility*, 26(4), 297-306. <https://doi.org/10.1016/j.rssm.2008.08.003>

Connidis, I. A. (1992). Life Transitions and the Adult Sibling Tie - A Qualitative Study.

*Journal of Marriage and the Family*, 54(4), 972-982. <https://doi.org/10.2307/353176>

Conrade, G., & Ho, R. (2001). Differential parenting styles for fathers and mothers.

*Australian Journal of Psychology*, 53(1), 29-35.

<https://doi.org/10.1080/00049530108255119>

de Vuijst, E., Poortman, A., Das, M., & van Gaalen, R. (2017). Cross-sibling effects on divorce in the Netherlands. *Advances in life course research*, 34, 1-9.

<https://doi.org/10.1016/j.alcr.2017.06.003>

Dixon, M. M., Reyes, C. J., Leppert, M. F., & Pappas, L. M. (2008). Personality and birth order in large families. *Personality and Individual Differences*, 44(1), 119-128.

<https://doi.org/10.1016/j.paid.2007.07.015>

East, P. L. (1996). Do adolescent pregnancy and childbearing affect younger siblings? *Family Planning Perspectives*, 148-153.

<https://doi.org/10.2307/2136190>

East, P. L. (1998). Impact of adolescent childbearing on families and younger sibling: Effects that increase younger siblings' risk for early pregnancy. *Applied Developmental Science*, 2(2), 62-74.

[https://doi.org/10.1207/s1532480xads0202\\_1](https://doi.org/10.1207/s1532480xads0202_1)

Eckstein, D., & Kaufman, J. A. (2012). The role of birth order in personality: An enduring intellectual legacy of Alfred Adler. *Journal of individual Psychology*, 68(1), 60-74.

Feinberg, M. E., Neiderhiser, J. M., Simmens, S., Reiss, D., & Hetherington, E. M. (2000).

Sibling comparison of differential parental treatment in adolescence: Gender, self-esteem, and emotionality as mediators of the parenting-adjustment association. *Child development*, 71(6), 1611-1628.

<https://doi.org/10.1111/1467-8624.00252>

Feinberg, M. E., Solmeyer, A. R., & McHale, S. M. (2012). The third rail of family systems:

Sibling relationships, mental and behavioral health, and preventive intervention in

- childhood and adolescence. *Clinical child and family psychology review*, 15(1), 43-57. <https://doi.org/10.1007/s10567-011-0104-5>
- Festinger, L. (1954). A theory of social comparison processes. *Human Relations*, 7(2), 117-140. <https://doi.org/10.1177/001872675400700202>
- Gibbons, F. X., & Buunk, B. P. (1999). Individual differences in social comparison: development of a scale of social comparison orientation. *Journal of Personality and Social Psychology*, 76(1), 129. <https://doi.org/10.1037//0022-3514.76.1.129>
- Gibbs, B. G., Workman, J., & Downey, D. B. (2016). The (conditional) resource dilution model: State-and community-level modifications. *Demography*, 53(3), 723-748. <https://doi.org/10.1007/s13524-016-0471-0>
- Golsteyn, B. H. H., & Magnée, C. A. J. (2020). Does sibling gender affect personality traits? *Economics of Education Review*, 77, 102016. <https://doi.org/10.1016/j.econedurev.2020.102016>
- Hamwey, M. K., & Whiteman, S. D. (2020). Jealousy Links Comparisons with Siblings to Adjustment among Emerging Adults. *Family Relations*. <https://doi.org/10.1111/fare.12428>
- Harris, K. M., & Morgan, S. P. (1991). Fathers, sons, and daughters: Differential paternal involvement in parenting. *Journal of Marriage and the Family*, 531-544. <https://doi.org/10.2307/352730>
- Haurin, R. J., & Mott, F. L. (1990). Adolescent sexual activity in the family context: the impact of older siblings. *Demography*, 27(4), 537-557. <https://doi.org/10.2307/2061569>
- Hauser, R. M., & Wong, R. S. (1989). Sibling resemblance and intersibling effects in educational attainment. *Sociology of Education*, 149-171. <https://doi.org/10.2307/2112864>

- Holdsworth, C. (2000). Leaving Home in Britain and Spain. *European Sociological Review*, 16(2), 201-222. <https://doi.org/10.1093/esr/16.2.201>
- Horner, P., Andrade, F., Delva, J., Grogan-Kaylor, A., & Castillo, M. (2012). The Relationship of Birth Order and Gender with Academic Standing and Substance Use Among Youth in Latin America. *Journal of individual psychology (1998)*, 68(1), 19-37.
- Jæger, M. M. (2009). Sibship size and educational attainment. A joint test of the confluence model and the resource dilution hypothesis. *Research in Social Stratification and Mobility*, 27(1), 1-12. <https://doi.org/10.1016/j.rssm.2009.01.002>
- Jenkins, J. M., Rasbash, J., & O'Connor, T. G. (2003). The role of the shared family context in differential parenting. *Developmental Psychology*, 39(1), 99. <https://doi.org/10.1037/0012-1649.39.1.99>
- Jensen, A. C., Pond, A. M., & Padilla-Walker, L. M. (2015). Why can't I be more like my brother? The role and correlates of sibling social comparison orientation. *Journal of youth and adolescence*, 44(11), 2067-2078. <https://doi.org/10.1007/s10964-015-0327-8>
- Kalmijn, M., & van de Werfhorst, H. G. (2016). Sibship size and gendered resource dilution in different societal contexts. *PLoS One*, 11(8), e0160953. <https://doi.org/10.1371/journal.pone.0160953>
- Kaminsky, L., & Dewey, D. (2001). Siblings Relationships of Children with Autism. *Journal of Autism and Developmental Disorders*, 31(4), 399-410. <https://doi.org/10.1023/A:1010664603039>
- Killoren, S. E., & Roach, A. L. (2014). Sibling conversations about dating and sexuality: Sisters as confidants, sources of support, and mentors. *Family Relations*, 63(2), 232-243. <https://doi.org/10.1111/fare.12057>

- Kotte, M., & Ludwig, V. (2011). Intergenerational transmission of fertility intentions and behaviour in Germany: The role of contagion. *Vienna yearbook of population research*, 9, 207-226. <https://doi.org/10.1553/populationyearbook2011s207>
- Kowal, A., & Kramer, L. (1997). Children's understanding of parental differential treatment. *Child Development*, 68(1), 113-126.
- Kuziemko, I. (2006). *Is having babies contagious? Estimating fertility peer effects between siblings* [Unpublished manuscript]. Graduate Business School, Columbia Business School, New York, NY.
- Lee, T. R., Mancini, J. A., & Maxwell, J. W. (1990). Sibling Relationships in Adulthood: Contact Patterns and Motivations. *Journal of Marriage and Family*, 52(2), 431-440. <https://doi.org/10.2307/353037>
- Lyngstad, T. H., & Prskawetz, A. (2010). Do siblings' fertility decisions influence each other? *Demography*, 47(4), 923-934. <https://doi.org/10.1007/BF03213733>
- Markus, H. R., & Kitayama, S. (1991). Culture and the self: Implications for cognition, emotion, and motivation. *Psychological review*, 98(2), 224. <https://doi.org/10.1037/0033-295X.98.2.224>
- McKinney, C., & Renk, K. (2008). Differential parenting between mothers and fathers: Implications for late adolescents. *Journal of family issues*, 29(6), 806-827. <https://doi.org/10.1177/0192513X07311222>
- Mesman, J., & Groeneveld, M. G. (2018). Gendered parenting in early childhood: Subtle but unmistakable if you know where to look. *Child Development Perspectives*, 12(1), 22-27.
- Meunier, J. C., Wade, M., & Jenkins, J. M. (2012). Mothers' differential parenting and children's behavioural outcomes: Exploring the moderating role of family and social

context. *Infant and Child Development*, 21(1), 107-133.

<https://doi.org/10.1002/icd.763>

Mirowsky, J., & Ross, C. E. (2007). Life course trajectories of perceived control and their relationship to education. *American Journal of Sociology*, 112(5), 1339-1382.

<https://doi.org/10.1086/511800>

Mitchell, B. A., Wister, A. V., & Burch, T. K. (1989). The family environment and leaving the parental home. *Journal of Marriage and the Family*, 605-613.

<https://doi.org/10.2307/352160>

Mönkediek, B., & Bras, H. (2014). Strong and weak family ties revisited: Reconsidering European family structures from a network perspective. *The History of the Family*, 19(2), 235-259. <https://doi.org/10.1080/1081602X.2014.897246>

Moor, N., & Komter, A. (2012). Family ties and depressive mood in Eastern and Western Europe. *Demographic Research*, 27, 201-232.

<https://doi.org/10.4054/DemRes.2012.27.8>

Morawska, A. (2020). The effects of gendered parenting on child development outcomes: a systematic review. *Clinical child and family psychology review*, 23(4), 553-576.

<https://doi.org/10.1080/17405629.2020.1865144>

Morosow, K., & Kolk, M. (2019). How does birth order and number of siblings affect fertility? A within-family comparison using Swedish register data. *European Journal of Population*, 1-37. <https://doi.org/10.1007/s10680-019-09525-0>

Mortelmans, D., Matthijs, K., Alofs, E., & Segaert, B. (2016). Introduction: A view through the family kaleidoscope. In D. Mortelmans, K. Matthijs, E. Alofs, & B. Segaert (Eds.), *Changing family dynamics and demographic evolution: The family kaleidoscope* (pp. 1-10). Edward Elgar Publishing.

<https://doi.org/10.4337/9781785364983>

- Noller, P., Conway, S., & Blakeley-Smith, A. (2008). Sibling relationships in adolescent and young adult twin and nontwin siblings: Managing competition and comparison. In J. P. Forgas & J. Fitness (Eds.), *Social relationships: Cognitive, affective, and motivational processes* (pp. 235-252). Psychology Press.  
<https://doi.org/10.4324/9780203888124>
- Nuckolls, C. W. (1993). *Siblings in South Asia: Brothers and sisters in cultural context*. Guilford Press.
- Perales, F., & Plage, S. (2020). Sexual orientation, geographic proximity, and contact frequency between adult siblings. *Journal of Marriage and Family*, 82(5), 1444-1460.  
<https://doi.org/10.1111/jomf.12669>
- Plomin, R., Asbury, K., & Dunn, J. (2001). Why are children in the same family so different? Nonshared environment a decade later. *The Canadian Journal of Psychiatry*, 46(3), 225-233. <https://doi.org/10.1177/070674370104600302>
- Plomin, R., & Daniels, D. (1987). Why are children in the same family so different from one another? *Behavioral and brain Sciences*, 10(1), 1-16.  
<https://doi.org/10.1017/S0140525X00055941>
- Raab, M., Fasang, A. E., Karhula, A., & Erola, J. (2014). Sibling similarity in family formation. *Demography*, 51(6), 2127-2154. <https://doi.org/10.1007/s13524-014-0341-6>
- Rauer, A. J., & Volling, B. L. (2007). Differential parenting and sibling jealousy: Developmental correlates of young adults' romantic relationships. *Personal Relationships*, 14(4), 495-511. <https://doi.org/10.1111/j.1475-6811.2007.00168.x>
- Reher, D. S. (1998). Family ties in Western Europe: persistent contrasts. *Population and development review*, 203-234. <https://doi.org/10.2307/2807972>



Retherford, R. D., & Sewell, W. H. (1991). Birth order and intelligence: Further tests of the confluence model. *American Sociological Review*, 141-158.

<https://doi.org/10.2307/2095775>

Riswick, T., & Engelen, T. (2018). Siblings and life transitions: investigating the resource dilution hypothesis across historical contexts and outcomes. *The History of the Family*, 23(4), 521-532. <https://doi.org/10.1080/1081602X.2018.1532309>

Ross, C. E., & Wu, C.-L. (1996). Education, age, and the cumulative advantage in health. *Journal of health and social behavior*, 104-120. <https://doi.org/10.2307/2137234>

Sassler, S. (2010). Partnering across the life course: Sex, relationships, and mate selection. *Journal of Marriage and Family*, 72(3), 557-575. <https://doi.org/10.1111/j.1741-3737.2010.00718.x>

Schachter, F. F., Shore, E., Feldman-Rotman, S., Marquis, R. E., & Campbell, S. (1976). Sibling deidentification. *Developmental Psychology*, 12(5), 418. <https://doi.org/10.1037/0012-1649.12.5.418>

Sheehan, G., & Noller, P. (2002). Adolescent's perceptions of differential parenting: Links with attachment style and adolescent adjustment. *Personal Relationships*, 9(2), 173-190. <https://doi.org/10.1111/1475-6811.00011>

Steelman, L. C., & Mercy, J. A. (1980). Unconfounding the confluence model: A test of sibship size and birth-order effects on intelligence. *American Sociological Review*, 571-582. <https://doi.org/10.2307/2095009>

Steelman, L. C., Powell, B., Werum, R., & Carter, S. (2002). Reconsidering the effects of sibling configuration: Recent advances and challenges. *Annual Review of Sociology*, 28(1), 243-269. <https://doi.org/10.1146/annurev.soc.28.111301.093304>

- Steinbach, A., & Hank, K. (2018). Full-, Half-, and Step-Sibling Relations in Young and Middle Adulthood. *Journal of family issues*, 39(9), 2639-2658.  
<https://doi.org/10.1177/0192513x18757829>
- Sulloway, F. J. (1996). *Born to rebel: Birth order, family dynamics, and creative lives*. Pantheon Books.
- Sulloway, F. J. (1999). Birth order. *Encyclopedia of creativity*, 1, 189-202.  
<http://www.sulloway.org/BirthOrder-Sulloway-1999a.pdf>
- Tippett, N., & Wolke, D. (2015). Aggression between siblings: Associations with the home environment and peer bullying. *Aggressive behavior*, 41(1), 14-24.  
<https://doi.org/10.1002/ab.21557>
- Titus, S. L. (1980). A Function of Friendship - Social Comparisons as a Frame of Reference for Marriage. *Human Relations*, 33(6), 409-431.  
<https://doi.org/10.1177/001872678003300605>
- Trim, R. S., Leuthe, E., & Chassin, L. (2006). Sibling influence on alcohol use in a young adult, high-risk sample. *Journal of studies on alcohol*, 67(3), 391-398.  
<https://doi.org/10.15288/jsa.2006.67.391>
- Tucker, C. J., Barber, B. L., & Eccles, J. S. (1997). Advice about life plans and personal problems in late adolescent sibling relationships. *Journal of youth and adolescence*, 26(1), 63-76. <https://doi.org/10.1023/A:1024540228946>
- Updegraff, K. A., McHale, S. M., & Crouter, A. C. (2002). Adolescents' sibling relationship and friendship experiences: Developmental patterns and relationship linkages. *Social Development*, 11(2), 182-204. <https://doi.org/10.1111/1467-9507.00194>
- Van de Rakt, M., Nieuwbeerta, P., & Apel, R. (2009). Association of criminal convictions between family members: Effects of siblings, fathers and mothers. *Criminal Behaviour and Mental Health*, 19(2), 94-108. <https://doi.org/10.1002/cbm.715>

- van den Berg, L., Kalmijn, M., & Leopold, T. (2021). Stepfamily Effects on Early Home-Leaving: The Role of Conflict and Closeness. *Journal of Marriage and Family*, 83(2), 305-321. <https://doi.org/10.1111/jomf.12700>
- van Eijck, K. (1997). The impact of family background and educational attainment on cultural consumption: A sibling analysis. *Poetics*, 25(4), 195-224. [https://doi.org/10.1016/S0304-422X\(97\)00017-X](https://doi.org/10.1016/S0304-422X(97)00017-X)
- van Eijck, K., & de Graaf, P. M. (1995). The effects of family structure on the educational attainment of siblings in Hungary. *European Sociological Review*, 11(3), 273-292.
- Wang, M.-T., Degol, J. L., & Amemiya, J. L. (2019). Older Siblings as Academic Socialization Agents for Younger Siblings: Developmental Pathways across Adolescence. *Journal of youth and adolescence*, 48(6), 1218-1233. <https://doi.org/10.1007/s10964-019-01005-2>
- Whiteman, S. D., Bernard, J. M. B., & McHale, S. M. (2010). The nature and correlates of sibling influence in two-parent African American families. *Journal of Marriage and Family*, 72(2), 267-281. <https://doi.org/10.1111/j.1741-3737.2010.00698.x>
- Whiteman, S. D., & Christiansen, A. (2008). Processes of sibling influence in adolescence: Individual and family correlates. *Family Relations*, 57(1), 24-34. <https://doi.org/10.1111/j.1741-3729.2007.00480.x>
- Whiteman, S. D., Jensen, A. C., & Maggs, J. L. (2014). Similarities and differences in adolescent siblings' alcohol-related attitudes, use, and delinquency: Evidence for convergent and divergent influence processes. *Journal of youth and adolescence*, 43(5), 687-697. <https://doi.org/10.1007/s10964-013-9971-z>
- Whiteman, S. D., McHale, S. M., & Crouter, A. C. (2007). Competing processes of sibling influence: Observational learning and sibling deidentification. *Social Development*, 16(4), 642-661. <https://doi.org/10.1111/j.1467-9507.2007.00409.x>

- Whiteman, S. D., McHale, S. M., & Crouter, A. C. (2011). Family relationships from adolescence to early adulthood: Changes in the family system following firstborns' leaving home. *Journal of Research on Adolescence*, 21(2), 461-474.  
<https://doi.org/10.1111/j.1532-7795.2010.00683.x>
- Whiteman, S. D., McHale, S. M., & Soli, A. (2011). Theoretical Perspectives on Sibling Relationships. *Journal Family Theory & Review*, 3(2), 124-139.  
<https://doi.org/10.1111/j.1756-2589.2011.00087.x>
- Wichman, A. L., Rodgers, J. L., & MacCallum, R. C. (2006). A multilevel approach to the relationship between birth order and intelligence. *Personality and Social Psychology Bulletin*, 32(1), 117-127. <https://doi.org/10.1177/0146167205279581>
- Wolfinger, N. H. (2016). Beyond the Intergenerational Transmission of Divorce. *Journal of Family Issues*, 21(8), 1061-1086. <https://doi.org/10.1177/019251300021008006>
- Wood, J. T., & Inman, C. C. (1993). In a different mode: Masculine styles of communicating closeness. *Journal of Applied Communication Research*, 21(3), 279-295.  
<https://doi.org/10.1080/00909889309365372>
- Workman, J. (2017). Sibling additions, resource dilution, and cognitive development during early childhood. *Journal of Marriage and Family*, 79(2), 462-474.  
<https://doi.org/10.1111/jomf.12350>
- Wu, K., Kim, J. H., Nagata, D. K., & Kim, S. I. (2018). Perception of sibling relationships and birth order among Asian American and European American emerging adults. *Journal of family issues*, 39(13), 3641-3663.  
<https://doi.org/10.1177/0192513X18783465>
- Zajonc, R. B., & Markus, G. B. (1975). Birth order and intellectual development. *Psychological review*, 82(1), 74. <https://doi.org/10.1037/h0076229>

Zajonc, R. B., Markus, H., & Markus, G. B. (1979). The birth order puzzle. *Journal of Personality and Social Psychology*, 37(8), 1325. <https://doi.org/10.1037/0022-3514.37.8.1325>