

See also: Attachment Theory; Psychological; Emotional Inhibition and Health; Personality and Social Behavior; Personality Development and Temperament; Temperament and Human Development

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### Sibling-order Effects

Historically, sibling order has influenced important aspects of social, economic, and political life, and it continues to do so today in many traditional societies. Discriminatory inheritance laws and customs about royal succession that favor firstborns and eldest sons are just two examples. Sibling-order effects have also been documented for a wide variety of behavioral tendencies, although the magnitude and causal interpretation of these effects have been subject to debate. In the Darwinian process of competing for parental favor, siblings often employ strategies that are shaped by their order of birth within the family, and these strategies exert a lasting impact on personality. Radical revolutions are particularly likely to elicit differences in support by birth order. These behavioral patterns appear to be mediated by differences in personality as well as by differing degrees of identification with the family.

#### 1. Social, Economic, and Political Consequences

Many societies—especially in past centuries and in non-Western parts of the world—have engaged in practices that favor one sibling position over another. For example, most traditional societies permit infanticide, especially when a child has a birth defect or when an immediately older infant is still breast-feeding. However, no society condones the killing of the elder of two siblings (Daly and Wilson 1988). An extensive survey of birth order and its relationship to social behavior in 39 non-Western societies found that the birth of a first child typically increases the status of parents and stabilizes the marriage. In addition, firstborns were generally found to receive more elaborate birth ceremonies, were given special privileges, and tended to exert authority over their younger siblings. In most of these 39 societies, firstborns maintained supremacy over their younger siblings even in adulthood. They also gained control of a greater share of parental property than laterborns, were more likely to become head of their local kin group, and tended to exert greater power in relationships with nonfamily members (Rosenblatt and Skoogberg 1974).

Previously, many Western societies employed sibling order as a means of deciding who inherits parental property or assumes political power. Primogeniture (the policy by which the eldest child or son automatically inherits property or political authority) was the most commonly employed mechanism, but other discriminatory inheritance practices have also been employed. For example, secondogeniture involves leaving the bulk of parental property to the second child or second son, and ultimogeniture involves leaving such property to the lastborn or youngest son.

Most variations in inheritance practices by sibling order can be understood by considering the advantages that accrue from such policies, given local economic circumstances (Hrdy and Judge 1993). For example, primogeniture has generally been practiced in societies where wealth is stable and based on limited land, and where talent does not matter much. Leaving the bulk of parental property to a single offspring avoids subdividing estates and hence reducing the social status of the family patronymic—something that was particularly important in past centuries among the landed aristocracy. However, in Renaissance Venice economic fortunes were generally based on speculative commerce rather than ownership of property, and parents typically subdivided their estates equally so as to maximize the chances of having one or more commercially successful offspring (Herlihy 1977). Ultimogeniture is a policy often found in societies that impose high death taxes on property. This inheritance practice has the consequence of maximizing the interval between episodes of taxation, thus reducing the overall tax burden.

Even in societies employing inheritance systems that favor one sibling over others, parents have commonly provided more or less equally for their offspring by requiring the child who inherits the family estate to pay a compensatory amount to each sibling. Primogeniture and related practices did not always mean disinheritance—a common misassumption. In medieval and early modern times, however, primogeniture among the landed aristocracy did mean that some younger sons and daughters faced difficult economic and social prospects. Among the medieval Portuguese nobility, for example, landless younger sons and daughters were significantly less likely to marry and leave surviving offspring (Boone 1986). Younger sons, for example, left 1.6 fewer children than did eldest sons. Younger sons were also nine times more likely than eldest sons to father a child out of wedlock. Because they posed a serious threat to political stability in their own country, younger sons were channeled by the state into expansionist military campaigns in faraway places such as India, where they often died in battle or from disease. Similarly, the Crusades can be seen, in part, as a church-state response to this domestic danger (Duby 1977). The surplus of landless younger daughters in the titled nobility was dealt with by sending them to nunneries.

## 2. Personality

Birth-order differences have long been claimed in the domain of personality, although these claims have remained controversial despite considerable research on this topic. Psychologists have investigated the consequences of birth order ever since Charles Darwin's cousin Francis Galton (1874) reported that eldest sons were overrepresented as members of the Royal Society. After breaking away from Sigmund Freud in 1910 to found a variant school of psychoanalysis, Alfred Adler (1927) focused on birth order in his own attempt to emphasize the importance of social factors in personality development. A secondborn, Adler considered firstborns to be 'power-hungry conservatives.' He characterized middleborns as competitive and lastborns as spoiled and lazy.

Since Adler speculated about birth order and its consequences for personality in 1927, psychologists have conducted more than 2000 studies on the subject. Critics of this extensive literature have argued that most of these studies are inadequately controlled for key covariates, such as social class and sibship size; that studies often conflict; and that birth-order differences in personality and IQ seem to have been overrated (Ernst and Angst 1983). Meta-analysis—a technique for aggregating findings in order to increase statistical power and reliability—suggests a different conclusion. If we consider only those well-designed studies controlling for important background variables that covary with birth order and can introduce spurious cross-correlations, a meta-analytic review reveals consistent birth-order differences for a wide range of personality traits (Sulloway 1995). For instance, firstborns are generally found to be more conscientious than laterborns, a difference that is exemplified by their being more responsible, ambitious, and self-disciplined. In addition, firstborns tend to be more conforming to authority and respectful of parents. Firstborns also tend to have higher IQs than their younger siblings—a reduction of about one IQ point is observed, on average, with each increment in birth rank (Zajonc and Mullally 1997).

These and other birth-order differences in personality can be usefully understood from a Darwinian perspective on family life (Sulloway 1996). Because they share, on average, only half of their genes, siblings will tend to compete unless the benefits of cooperating are greater than twice the costs (Hamilton 1964). In this Darwinian story about sibling competition, birth order does not exert a direct biological influence on personality. For example, there are no genes for being a firstborn or a laterborn. Instead, birth order is best seen as a proxy for various environmental influences, particularly disparities in age, physical size, power, and status within the family. These physical and mental differences lead siblings to pursue alternative strategies in their efforts to maximize parental investment (which includes emotional as well as physical

resources). This perspective on how sibling order shapes personality accords with research in behavioral genetics, which finds that most environmental influences on personality are not shared by siblings and hence belong to the 'nonshared environment' (Plomin and Daniels 1987).

Prior to the twentieth century, half of all children did not survive childhood. Even minor differences in parental favor would have increased an offspring's chances of getting out of childhood alive. Because eldest children have already survived the perilous early years of childhood, they are more likely than younger siblings to reach the age of reproduction and to pass on their parents' genes. Quite simply, a surviving eldest child was generally a better Darwinian bet than a younger child, which is why parents in most traditional societies tend to bias investment, consciously or unconsciously, toward older offspring. An exception to this generalization involves youngest children born toward the end of a woman's reproductive career. These children also tend to be favored, since they cannot be replaced (Salmon and Daly 1998).

Even when parents do not favor one offspring over another, siblings compete to prevent favoritism. Siblings do so, in part, by cultivating family niches that correspond closely with differences in birth order. Firstborns, for example, tend to act as surrogate parents toward their younger siblings, which is a good way of currying parental favor. As a consequence, firstborns tend to be more conservative and parent-identified than their younger siblings, which is one of the most robustly documented findings in the literature. Laterborns cannot compete as effectively as firstborns for this surrogate parent niche, since they cannot baby-sit themselves. As a consequence, laterborns seek alternative family niches that will help them to cultivate parental favor in different ways. To do so, they must often look within themselves for latent talents that can only be discovered through systematic experimentation. Toward this end, laterborns tend to be more open to experience—that is, more imaginative, prone to fantasies, and unconventional—propensities that offer an increased prospect of finding a valued and unoccupied family niche.

In addition to their efforts to cultivate alternative family niches, siblings diverge in personality and interests because they employ differing strategies in dealing with one another. These strategies are similar to those observed in mammalian dominance hierarchies. Because firstborns are physically bigger than their younger siblings, they are more likely to employ physical aggression and intimidation in dealing with rivals. Firstborns are the 'alpha males' of their sibling group, and they generally boss and dominate their younger brothers and sisters. For their own part, laterborns tend to employ low-power strategies to obtain what they want, including pleading, whining, cajoling, humor, social intelligence, and, whenever expedient, appealing to parents for assistance.

Laterborns also tend to form coalitions with one another in an effort to circumvent the physical advantages enjoyed by the firstborn. Middle children are the most inclined to employ diplomatic and cooperative strategies. Some middle children are particularly adept at nonviolent methods of protest. Martin Luther King, Jr., the middle of three children, began his career as a champion of nonviolent reform by interceding in the episodes of merciless teasing that his younger brother inflicted upon their elder sister.

Only children represent a controlled experiment in birth-order research. They have no siblings and therefore experience no sibling rivalry. As a consequence, they are not driven to occupy a particular family niche. Although only children, like other firstborns, are generally ambitious and conform to parental authority, they are intermediate between firstborns and laterborns on most other personality traits. Because age spacing can affect functional sibling order, a firstborn whose next younger sibling is six or more years younger is effectively like an only child. Similarly, large age gaps can make some laterborns into functional firstborns or only children.

That brothers and sisters differ from one another for strategic reasons, rather than randomly, has been shown by studies involving more than one sibling from the same family (Schachter 1982). In one study, firstborns were found to be significantly different in personality and interests from secondborns, who were significantly different from thirdborns. By contrast, the first and third siblings were not as different as adjacent pairs, presumably because of less competition. This process of sibling differentiation has been termed 'deidentification' and extends to relationships with parents. For example, a firstborn child sometimes identifies more strongly with one parent than another. In such cases, the secondborn tends to identify more strongly with the parent that is not already preferred by the firstborn.

The most compelling evidence for birth-order effects in personality comes from studies in which siblings assess each other's personalities (Paulhus et al. 1999, Sulloway 1999). Such within-family designs control for the kinds of spurious correlations that can result from comparing individuals from different family backgrounds. Studies based on such direct sibling comparisons exhibit consistent birth-order effects in the expected direction. When the results are organized according to the Five-Factor Model of personality (Costa and McCrae 1992), firstborns tend to be more conscientious and slightly more neurotic than laterborns, whereas laterborns tend to be more agreeable, extraverted, and open to experience than firstborns.

Although reasonably consistent patterns for birth order and personality are observed according to the Five-Factor Model of personality, findings are significantly heterogeneous for three of the five personality dimensions. For example, firstborns tend to be more assertive than laterborns, which is an in-

indicator of extraversion, but laterborns tend to score higher on most other facets of extraversion, which include being more fun-loving, sociable, and excitement seeking. Similarly, laterborns tend to be more open to experience in the sense of being unconventional, whereas firstborns tend to be more open to experience in the sense of being intellectually oriented. Lastly, firstborns are more neurotic in the sense of being anxious about status, but laterborns are more neurotic in the sense of being more self-conscious.

As measured by direct sibling comparisons within the family, birth-order differences explain about four percent of the variance in personality, less than does gender and substantially more than do age, family size, or social class. In studies controlled for differences in age, sex, social class, and sibship size, siblings are about twice as likely to exhibit traits that are consistent with their sibling positions as to exhibit inconsistent traits. In short, not every laterborn has a laterborn personality (just as some firstborns deviate from the expected trend), but a reasonably consonant pattern is nevertheless present.

One still-unresolved question about birth order and personality is the extent to which within-family patterns of behavior transfer to behavior outside the family of origin. Recent studies suggest that birth-order effects observed in extrafamilial contexts are about one-third to one-half the magnitude of those manifested within the family (Sulloway 1999). Relative to firstborn spouses and roommates, for example, laterborn spouses and roommates are generally perceived to be more agreeable and extraverted, but less conscientious and neurotic. Outside the family of origin, birth-order effects seem to manifest themselves most strongly in intimate living relationships and in dominance hierarchies. These findings are not surprising, since they involve the kind of behavioral contexts in which sibling strategies were originally learned.

### 3. Behavior During Radical Revolutions

Some of the best evidence for sibling differences in behavior outside the family of origin comes from social and intellectual history. During socially radical revolutions, laterborns have generally been more likely than firstborns to question the status quo and to adopt a revolutionary alternative. This difference is observed even after controlling for the fact that laterborns, in past centuries at least, appear to have been more socially liberal than firstborns. As a rule, these effects are very context sensitive. During the Protestant Reformation, for example, laterborns were nine times more likely than firstborns to suffer martyrdom in support of the Reformed faith. (This statistic is corrected for the greater number of laterborns in the general population.) In countries that turned Protestant, such as England, firstborns were five times

more likely than laterborns to suffer martyrdom for their refusal to abandon their allegiance to the Catholic faith. Thus laterborns gave their lives in the service of radical rebellion, whereas firstborns did so in an effort to preserve the waning orthodoxy. There was no generalized tendency, however, for laterborns to become 'martyrs' (Sulloway 1996).

Similarly, during the French Revolution firstborn deputies to the National Convention generally voted according to the expectations of their social class, whereas laterborn deputies were more likely to vote in the opposite manner. For this reason, there was only a modest tendency for firstborns and laterborns to vote in a particular manner, since voting was generally influenced by other important considerations that determined what it meant to conform or rebel in a rapidly changing political environment.

In response to radical conceptual changes in science one finds similar differences by birth order. Firstborns tend to be the guardians of what Thomas Kuhn (1970) has called 'normal' science, during which research is guided by the prevailing paradigms of the day. By contrast, laterborns tend to be the outlaws of science, sometimes flaunting its accepted methods and assumptions in the process of attempting radical conceptual change. During the early years of the Copernican revolution, which challenged church doctrine by claiming that the earth rotates around the sun, laterborns were five times more likely than firstborns to endorse this heretical theory. Copernicus himself was the youngest of four children. When Charles Darwin, the fifth of six children, became an evolutionist in the 1830s, he was 10 times more likely to do so than a firstborn. During other notable revolutions in science—including those led by laterborns such as Bacon, Descartes, Hutton, Semmelweis, and Heisenberg, and by occasional firstborns such as Newton and Einstein—younger siblings have typically been twice as likely as firstborns to endorse the new and radical viewpoint. Conversely, when new scientific doctrines, such as vitalism and eugenics, have appealed strongly to social conservatives, firstborns have been more likely than laterborns to pioneer and endorse such novel but ideologically conservative ideas. These birth-order effects typically fade over the course of scientific progress, as conceptual innovations accumulate supporting evidence and eventually convince the scientific majority.

In spite of their predilection for supporting radical innovations, laterborns have no monopoly on scientific truth. They were nine times more likely than firstborns to support Franz Joseph Gall's bogus theory of phrenology, which held that character and personality could be read by means of bumps on the head. In their willingness to question the status quo, laterborns run the risk of error through over-eager rebellion, just as firstborns sometimes err by resisting valid conceptual changes until the mounting evidence can no longer be denied.

During 'normal' science, firstborns possess a slight advantage over laterborns. Being more academically successful, firstborns are more likely than laterborns to become scientists. They also tend to win more Nobel prizes. This finding might seem surprising, but, according to the terms of Nobel's will, Nobel prizes have generally been given for 'discoveries' or creative puzzle solving in science, not for radical conceptual revolutions. Firstborn scientists who have innovated within the system include James Watson and Francis Crick, who together unraveled the structure of DNA, and Jonas Salk, who developed the polio vaccine. Such historical facts highlight another important point, namely, that firstborns and laterborns do not differ in overall levels of 'creativity.' Rather, firstborns and laterborns are preadapted to solving dissimilar kinds of problems by employing disparate kinds of creative strategies.

#### 4. Family Sentiments

The kinds of birth-order effects that are observed during radical historical revolutions may depend as much on differences in 'family sentiments' as they do on personality. As Salmon and Daly (1998) have shown, firstborns (and to a lesser extent lastborns) are more strongly attached to the family system than are middle children. Historically, radical revolutions have tapped differences in family sentiments in two important ways. First, being considerably older than their offspring, parents were more likely to endorse the status quo, given that age is one of the best predictors of the acceptance of new and radical ideas (Hull et al. 1978). For this reason, endorsing a radical revolution has usually meant opposing parental values and authority, something that firstborns (and to a lesser extent lastborns) are less likely to do than are middleborns. Second, most radical revolutions, even in fields such as science, have tended to raise issues that are directly relevant to issues of parental investment and discrimination among offspring, filial loyalty, and overall identification with the family system. During the Reformation, for example, Protestant leaders such as Martin Luther strongly advocated the right to marriage by previously celibate clergymen and nuns, who tended to be younger sons and daughters. These Protestant leaders also advocated the egalitarian principles of partible inheritance, by which property—and even political rule—were subdivided equally among offspring (Fichtner 1989). During the height of the controversies raging over Darwin's theory of evolution, Darwin noted that discriminatory inheritance practices posed a serious impediment to human evolution, remarking to Alfred Russel Wallace: 'But oh, what a scheme is primogeniture for destroying natural selection!' (Sulloway 1996, p. 54).

Even when radical ideology does not play a central role in conceptual change, and when discriminatory

inheritance systems are also not a factor, differences in identification with the family can impact on social and political attitudes. As Salmon (1998) has shown experimentally, political speeches appeal differentially to individuals by birth order depending on whether kinship terms are included in the speech. Firstborns and lastborns are more likely to react positively to speeches that employ kinship terms such as 'brother' and 'sister,' whereas middle children prefer speeches that employ references to 'friends.' To the extent that radical social movements make use of kinship terms, which they often do, birth-order differences in family sentiments will tend to influence how siblings react to radical change.

#### 5. Conclusion

In past centuries birth order and functional sibling order have influenced such diverse social and political phenomena as royal succession, expansionist military campaigns, religious wars and crusades, geographic exploration, and inheritance laws. Even today, birth order and family niches more generally are among the environmental sources of personality because they cause siblings to experience the family environment in dissimilar ways. In particular, birth order introduces the need for differing strategies in dealing with sibling rivals as part of the universal quest for parental favor. This is a Darwinian story, albeit one with a marked environmental twist. Although siblings appear to be hard-wired to compete for parental favor, the specific niche in which they have grown up determines the particular strategies they adopt within their own family. Finally, because birth order and family niches underlie differences in family sentiments, including filial loyalty and self-conceptions about family identity, the family has historically supplied a powerful engine for revolutionary change.

*See also:* Family, Anthropology of; Family as Institution; Family Processes; Family Size Preferences; Family Systems and the Preferred Sex of Children; Galton, Sir Francis (1822–1911); Personality Development in Childhood; Property: Legal Aspects of Intergenerational Transmission; Sibling Relationships, Psychology of

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## Sibling Relationships, Psychology of

Siblings—brothers and sisters—have a key place in legends, history and literature throughout the world, from the era of the Egyptians and Greeks onward. The great majority of children (around 80 percent in Europe and the USA) grow up with siblings, and for most individuals their relationships with their siblings are the longest-lasting in their lives. Scientific study of the psychology of siblings is relatively recent, but is fast-growing, centering chiefly on studies of childhood and adolescence. The scientific interest of siblings lies, in particular, in the following domains: the nature and the potential influence of siblings on each other's development and adjustment, the illuminating per-

spective the study of siblings provides on developmental issues, and the challenge that siblings present to our understanding of how families influence development—why siblings differ notably in personality and adjustment even though they grow up within the same family, the significance of their shared and separate family experiences, and their genetic relatedness.

### 1. The Term 'Siblings'

This term is usually applied to 'full' siblings, brothers and sisters who are the offspring of the same mother and father, and share 50 percent of their genes; however, with the changes in family structure during the later decades of the twentieth century, increasing numbers of children have relationships with 'half siblings,' children with whom they share one biological parent, and 'step-siblings,' children who are unrelated biologically.

### 2. The Nature of Sibling Relationships

#### 2.1 Characteristics of the Relationship

The relationship between siblings is one that is characterized by distinctive emotional power and intimacy from infancy onward. It is a relationship that offers children unique opportunities for learning about self and other, with considerable potential for affecting children's well-being, intimately linked as it is with each child's relationship with the parents. Clinicians and family systems theorists have, from early in the twentieth century, expressed interest in the part siblings play in family relationships, and in the adjustment of individuals. However, until the 1980s there was relatively little systematic research on siblings (with the notable exception of the classic studies of birth order by Koch 1954). In the 1980s and 1990s, research interest broadened greatly to include the investigation of sibling developmental influences, sources of individual differences between siblings, and links between family relationships (Boer and Dunn 1990, Brody 1996).

Individual differences in how siblings get along with each other are very marked from early infancy; siblings' feelings range from extreme hostility and rivalry to affection and support, are often ambivalent, and are expressed uninhibitedly. The relationship is also notable for its intimacy: siblings know each other very well, and this can be a source of both support and conflict. These characteristics increase the potential of the relationship for developmental influence. Because of the emotional intensity and familiarity of their relationships, the study of siblings provides an illuminating window on what children understand about each other, which has challenged and informed

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