



The associations of birth order with personality and intelligence in a representative sample of U.S. high school students



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ABSTRACT

We tested birth order associations with personality traits and intelligence using Project Talent, a representative sample ($N = 377,000$) of U.S. high school students. Using a between-family design and several background factors (i.e., age, sex, sibship size, parental socio-economic status, and family structure), we were able to control for potential confounds, and estimate the links between birth order and outcomes across several different social categories. In addition to differences between firstborns and laterborns across the entire sample, we also tested birth rank trends in a sub-sample of targets from sibships of three, raised by two parents. Overall, the average absolute association between birth order and personality traits was .02, whereas the one between birth order and intelligence was .04.

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1. Introduction

Birth order is a human experience that is one of the most pervasive and universally thought to determine who we are (Sulloway, 1996). The debate over the association of birth order with personality and intelligence has spawned continuous interest over the past hundred years, both from the general public and from scientists. Books on birth order and why it matters for children's personality, intelligence, development, and future success are among the top bestselling parenting books. And yet, among scientists, despite a consistent stream of research on birth order, results remain inconclusive and controversial. The present study uses the largest representative sample of U.S. students ever employed to help answer questions regarding the magnitude of associations between birth order, personality, and intelligence.

1.1. Theoretical background

Theories of the link between birth order and personality were at the core of one of the most heated scientific disputes of all time, between Sigmund Freud and Alfred Adler. To Freud's outrage, Adler (a middle child himself) maintained that first- and lastborn children suffer from neuroses caused by their constant struggle for success and superiority, whereas middle children are healthier,

easy going, and rebellious (Adler, 1928). Not surprisingly, Freud (a firstborn child himself) felt threatened by Adler's idea, so the dispute ended in Adler's resignation from the Psychoanalytic Society, and the minting of a new branch of psychology, the Society for Individual Psychology (Sulloway, 1999).

In more recent times, as psychologists have moved away from psychoanalysis, questions about the link between birth order and personality have remained popular, but the dominant theoretical model is currently derived from evolutionary theory. According to evolutionary models, siblings compete for maximum parental investment (Trivers, 1985) and develop strategies to increase parental attention by filling different "niches" within the family (Sulloway, 1996). Thus, the firstborn fills the more "traditional" niche, by being a responsible, dominating role-model, who worries about parent-pleasing (i.e., the firstborn should be higher in Conscientiousness, intellectual aspects of Openness, the dominance aspect of Extraversion, and Neuroticism), whereas the laterborn fills the more "rebellious" niche, by being more original, easy going, and sociable (i.e., the laterborn should be higher in the unconventional aspects of Openness, Agreeableness, and the sociability aspect of Extraversion).

In addition to being linked to personality, birth order has also been linked to intelligence, though this theoretical model has a distinct history. The idea that birth order might be related to intelligence started with Sir Francis Galton (1874) who found that firstborn sons were over-represented among prominent English scientists. He attributed this finding to primogeniture practices, whereby 19th century English families invested more resources

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in firstborn sons (both in terms of attention, nourishment, as well as financial resources and education). He also proposed an explanation based on family environmental influence, whereby firstborns are given more responsibilities than their younger siblings, which might help their intellectual development.

Modern theory has maintained the idea that firstborns might show higher levels of intelligence because of the family environment in which they are raised. Thus, the confluence model (Zajonc, 2001; Zajonc & Markus, 1975) has proposed that the ordinal position of each child in the family determines the level of intellectual stimulation available in early years and thus, their later intelligence. The basic tenet is that the more adults and the fewer children are present in the home, the richer is the overall intellectual environment. Furthermore, with each (younger) child that is added to the family, the overall intellectual environment becomes diluted. Therefore, the level of intellectual stimulation is purportedly lower for laterborns because the parents have less undivided attention to offer them and the overall intellectual environment of the home is depressed. Though theories based on family environmental influences, such as the confluence model, are by far the most influential, some theories have claimed that the link between birth order and intelligence is explained by prenatal or gestational factors. Specifically, Gualtieri and Hicks (1985) have proposed that maternal antibody levels increase with each subsequent pregnancy which might affect the fetal brain and thus lead to lower intelligence levels among laterborns. We will revisit this issue later, when we present past empirical data.

1.2. Methodological considerations

In studying the links between birth, personality, and intelligence, there are two major methodological issues that have contributed to the continuing debate over inconsistent findings present in the literature. First is the issue of confounding variables, which, if not properly taken into account, can produce biased estimates of the effects. Second is the issue of design choice, that is, whether a birth order study uses a between- versus a within-family design. We discuss both of these issues below.

1.2.1. Confounds

Previous research and theory (e.g., Sulloway, 1996) suggests that the most important potential confounds in birth order research are sibship size, parental socio-economic status (SES), family structure, age, and gender. If not properly accounted for, these factors may lead to biased estimates of the links between birth order, personality, and intelligence (Ernst & Angst, 1983; Rodgers, Cleveland, van den Oord, & Rowe, 2000).

The most recurring “offender” among the above confounds, across research on birth order and personality, as well as research on birth order and intelligence, is sibship size (Ernst & Angst, 1983; Rodgers et al., 2000). Sibship size represents the total number of siblings present in a family. This is an important confound for research on birth order, because firstborns (versus lastborns) are more likely to be “found” in low sibships (e.g., the probability of finding a firstborn child from a sibship of two is .50, whereas the probability of finding a firstborn child from a sibship of five is .20). Furthermore, sibship size might influence family dynamics, which might in turn result in distinct patterns of sibling competition and personality development (Dixon, Reyes, Leppert, & Pappas, 2008). Sibship size may also influence intelligence levels, because, according to the confluence model, families with more children exist in a diluted intellectual environment, which may negatively affect intellectual development (Zajonc, 2001). Additionally, researchers (Rodgers et al., 2000) have proposed that sibship size is related to parental intelligence because parents with higher levels of intelligence tend to have fewer children. This

implies that any study that finds higher levels of intelligence among firstborns without controlling for sibship size may simply be showing that intelligence is heritable. Finally, sibship size is also highly correlated to parental SES (i.e., wealthier, more educated parents tend to have fewer children), which brings us to the next confound.

Parental SES is a composite score derived from the level of education, income, and occupational prestige attained by the parents. Parental SES is an important confound in birth order because firstborns tend to come disproportionately from higher SES families, due the lower sibship sizes present in these families (Ernst & Angst, 1983; Rodgers et al., 2000). Furthermore, Previous research has shown that parents of higher SES tend to have higher levels of intelligence and tend to be higher in personality trait levels that might have helped them become successful in the first place (e.g., high conscientiousness, high dominance extraversion) (Shanahan, Bauldry, Roberts, Macmillan, & Russo, 2014). Thus, higher SES parents may pass on to their children higher levels of intelligence and certain personality traits through both genetic and environmental mechanisms independent of birth order (Shanahan et al., 2014), but because firstborns are over-represented among higher SES families, in the absence of parental SES controls, it may appear as if firstborns were higher in intelligence, conscientiousness, dominance, and so on due to their birth rank.

Another confound that’s been highly debated in the context of birth order and personality research is family structure, which classifies families into families with two parents, parent and step-parent, single parent, adoptive parents, no parents, and so on. Children who are raised in stable homes by two parents should provide a cleaner test of birth order associations, because other types of family structure might introduce various confounds; for example, in blended families, where younger siblings are the genetic offspring of both parents, but older half-siblings are not, the younger siblings are likely to receive higher-quality parental investment and thus be more likely to act as firstborns (Sulloway, 1996).

Age is another possible confound of the associations between birth order and personality, because associations are expected to be larger in childhood and adolescence (Sulloway, 2010). As mentioned earlier, according to Sulloway, birth order effects on personality arise from sibling competition. This competition necessarily happens within the family context and it is likely at its peak during childhood and adolescence when the siblings are most dependent on resources from their parents, and thus must strive to capture their attention and favors through carving their own personality “niche.” However, as children grow up and become increasingly independent, it is possible that birth order effects decrease because the roles that were once relevant for survival in the family context in early years may no longer be relevant once the child leaves the family environment (Harris, 2000, 2006).

Finally, some researchers (e.g., Sampson & Hancock, 1967) have argued that gender is another potential confound of the association between birth order and personality, because male and female firstborn children may have different levels of susceptibility to parental influence. Specifically, the researchers argued that firstborn males might be more susceptible to parental influence and to filling the more “traditional” niche by being a responsible, dominating role-model. This increase susceptibility of male firstborns might be due to social norms which have historically imposed a lot of family responsibility on the shoulders of the firstborn son as the one to take over the role of future head of the family in paternalistic societies.

In sum, any serious attempt at establishing the link between birth order, personality, and intelligence should take into account the following background factors: sibship size, parental socio-economic status (SES), family structure, age, and gender.

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