

# Does Birth Order Affect Intelligence?

Originally prepared by: Amber Esping (fall 2003)

Revised:

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## In a Nutshell

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The answer to the question is probably yes, if you base your conclusions on cross-sectional data. The answer is most likely no if you base your conclusions on longitudinal data.

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## The Antecedent Question: Is Birth Order related to Eminence?

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Scholarly interest in the relationship between birth order and extraordinary achievement can be traced to 1874 when [Francis Galton](#) published *English Men of Science: Their Nature and Nurture*. This book chronicled the lives of 180 eminent men from various scientific fields. Galton was able to collect birth order data from 99 of his subjects, revealing that 48% of them were firstborn sons or only sons. (Note: Galton did not count female children when reporting his results. Theoretically, a subject could be counted as a “first born” even if he was the 10th child, providing that his 9 older siblings were female.)

Interest in birth order and eminence has continued unabated, and countless studies have confirmed Galton’s conclusion: Firstborn children are overrepresented among Nobel Prize winners (Clark & Rice, 1982) classical music composers (Schubert, Wagner & Schubert, 1977) and prominent psychologists (Terry, 1989). Indeed, a study of 314 eminent 20th century personalities found that 46% of them were firstborn children (Goertzel, Goertzel, & Goertzel, 1978; See Simonton, 1984/1999 p. 26-27 and Simonton, 1999, p. 133 for reviews).

It must be noted that the correlation between firstborn status and eminence is probably limited to certain types of scientific achievement. Laterborn children are more likely to become revolutionary leaders and scientists, and they may in fact be more creative than their firstborn siblings (Sulloway, 1996; 1999; Simonton, 1984/1999, 1999).

# Birth Order and Intelligence: A Classic Study

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In 1973 Lillian Belmont and Francis Marolla published family size, birth order and intelligence test (Dutch version of the Raven Progressive Matrices) data from nearly the entire population of 19 year-old Dutch men (386, 114 subjects). Their study design was complex, so interested readers should consult the primary source. However, a general overview of the results will be presented here. Belmont and Marolla found:

1. "Children from large families tend to make poorer showings on intelligence tests and on educational measures, even when social class is controlled."
2. "Within each family size (i) firstborns always scored better on the Raven than did later borns; and (ii) with few inconsistencies, there was a gradient of declining scores with rising birth order, so that firstborns scored better than secondborns, who in turn scored better than thirdborns, and so forth."
3. "In general, as family size increased, there was a decrease in Raven performance within any particular birth order position." For example, a thirdborn child from a 3-child family would be expected to score higher than a thirdborn child from a 4-child family. A thirdborn child from a 5-child family would be expected to score even lower, and so on.

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## Recent Research: Different Approaches = Different Conclusions

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**Cross-sectional studies** (like the Belmont and Marolla study described above) generally find that the higher the birth order, the lower the IQ (See Zajonc, 1976 for a review; See De Lint, 1966 for an exception to this pattern). **Longitudinal studies**, which track individual families over time, usually demonstrate that there is no relationship between birth order and IQ (Berbaum & Moreland, 1980; Retherford & Sewell, 1991; Rodgers, et al., 2000; Schooler, 1972). However, the tendency for large families to produce lower IQ children holds regardless of the research approach (Rodgers, et al., 2000).

### The Admixture Hypothesis

Page & Grandon (1979) have suggested the "admixture hypothesis" to account for the apparently causal link between birth order and IQ. Proponents of this hypothesis argue that other factors, like parental IQ or socioeconomic status, may be responsible for both large families and low IQ, making it appear in cross-sectional studies as though high birth order causes lower IQ. Instead, it is possible that parents with lower IQs tend to have more children. If this were true, then it would be expected that the mean IQ score for any given population would gradually decline. In fact, mean IQ scores are rising somewhere between 5 and 25 points with each successive generation. (For more information on this phenomenon, please see our related [Hot Topic](#)).

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## Why Might Birth Order Affect IQ?

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In 1874 Francis Galton offered several reasons why birth order might affect eminence. Among them, he listed:

1. Primogeniture laws. Firstborn sons would be more likely have the financial resources to continue their education.

2. Firstborns had the advantage of being "treated more as companions by parents." This means that they also undertake more responsibility than their younger siblings.
3. Firstborn children would get more attention and better nourishment in families with limited financial resources (pp. 25-26).

These explanations are very similar to those offered by modern researchers to explain the finding that firstborn children have higher IQs. Here is a sampling:

### **The Resource Dilution Model**

This Resource Dilution Model, proposed by Blake (1981) and elaborated by Downey (2001) offers a simple explanation both for the higher IQ scores of firstborn children and the overrepresentation of firstborns among the college population and the eminent. It rests on three assumptions:

1. "Parental resources are finite." Resources include money, personal attention and cultural objects such as books. Parents do have discretion as to how they use their resources, but they cannot necessarily create more when they are needed.
2. "Additional siblings reduce the share of parental resources received by any one child." Parents can devote 100% of their resources to an only child or a firstborn who's siblings have not yet arrived. Parents with more than one child must divide their resources accordingly. For example, parents who can afford to send one child to college may not be able to send two children. This may offer one explanation for the overrepresentation of firstborns in the college population (Schachter, 1963).
3. "Parental resources have an important effect on children's educational success." It is assumed that the relative richness of the environment affects cognitive development. Further, opportunity for higher education is a factor in the achievement of eminence. Eminent individuals (especially in scientific and technical fields) almost always attended college (Schachter, 1963). (The quotes in 1-3 above are from Downey, 2001).

### **The Confluence Model**

The Confluence Model proposed by R.B. Zajonc & Markus (1975) and Zajonc (1976, 2001) explains the firstborn IQ advantage in terms of the ever-changing intellectual environment within the family. It uses a simple mathematical formula to compute the relative advantages and disadvantages of these factors:

1. Firstborns do not have to share their parents' attention, so they benefit from their parents' complete absorption in the new responsibility. Laterborn children never experience this advantage. Moreover, additional siblings automatically limit the amount of attention any of the siblings get-and this includes the firstborn. This would explain the Belmont and Marolla (1973) finding that firstborns from smaller families have higher IQs than firstborns from larger families.
2. Firstborn children are exposed to more adult language. Laterborns are exposed to the less mature speech of their siblings. This may affect their performance on the verbal scales of intelligence tests. Moreover, the linguistic environment becomes increasingly less mature as more children enter the family. This also gels with the finding that children in larger families have lower IQ scores.
3. As more children enter the family, the general intellectual environment becomes less mature. This would explain why firstborns and older children from large families have lower IQs than firstborns and older children from smaller families.
4. Firstborns (and older siblings in general) often have to answer questions and explain things to their younger siblings. It is believed that the act of tutoring helps the older children to cognitively process information. Further, teaching others

may improve their verbal abilities. Except in very rare cases, youngest siblings do not get the opportunity to tutor their brothers and sisters. This is the reason why only children do not tend to have higher IQs than firstborns.

## Does It Really Matter?

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It is possible that firstborn children are more intelligent than their siblings. However, there are several reasons why this finding, if true, may not be very important. First, growing body of research suggests that intelligence is not the most important factor in the achievement of eminence (Simonton, 1984/1999, 1999; Sulloway, 1996). Several studies have demonstrated that specific personality traits such as conscientiousness and openness to experience are up to 10 times more important than IQ (Sulloway, 1996). Second, in studies showing a statistically significant advantage for firstborns, birth order accounts for only one percent of the variance in IQ scores (Sulloway, p. 473). Third, the firstborn advantage is tiny-about 1 IQ point higher than the second sibling, 2 points higher than the third sibling, and so on. (Sulloway, p. 74). This minute difference is not likely to matter in the pursuit of eminence:

*Even within science, IQ is only weakly related to achievement among people who are smart enough to become scientists. Research has shown, for example, that a scientist who has an IQ of 130 is just as likely to win a Nobel Prize as a scientist whose IQ is 180 (Hudson, 1966, p. 104, cited in Sulloway, p. 357).*

## References

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- Belmont, L., & Marolla, F.A. (1973). Birth order, family size and intelligence. *Science*, 182, 1096-1101.
- Berbaum, M.L., & Moreland, R.L. (1980). Intellectual development within the family: A new application of the confluence model. *Developmental Psychology*, 16, 500-515.
- Blake, J. (1981). Family size and the quality of children. *Demography*, 18, 421-442.
- Clark, R.D., & Rice, G.A., (1982). Family constellations and eminence: The birth orders of Nobel Prize winners. *Journal of Psychology*, 110, 281-287.
- De Lint, J. (1966). Note on birth order and intelligence test performance. *The Journal Of Psychology*, 66, 15-17.
- Downey, D.B. (2001). Number of siblings and intellectual development: The resource dilution explanation. *American Psychologist*, 56(6/7), 497-504.
- Ernst, C., & Angst, J. (1983). *Birth order: Its influence on personality*. Berlin and New York: Springer-Verlag.
- Galton, F. (1874, 1895). *English men of science: Their nature and nurture*. New York: D. Appleton and Company.
- Goertzel, M.G., Goertzel, V., & Goertzel, T.G. (1978). *Three hundred eminent personalities*. San Fransisco: Jossey-Bass.

Hudson, L. (1966). *Contrary imaginations: A psychological study of the English schoolboy*. London: Methuen.

Page, E.B., & Grandon, G. (1979). Family configuration and mental ability: Two theories contrasted with U.S. data. *American Educational Research Journal*, 16, 257-272.

Retherford, R.D., & Sewell, W.H. (1991). Birth order and intelligence: Further tests of the confluence model. *American Sociological Review*, 56, 141-158.

Rodgers, J.L., Cleveland, H.H., van den Oord, E., & Rowe, D.C. (2000). Resolving the debate over birth order, family size and intelligence. *American Psychologist*, 55(6), 599-612.

Schooler, C. (1972). Birth order effects: Not here, not now! *Psychological Bulletin*, 78, 161- 175.

Schachter, S. (1963). Birth order, eminence and higher education. *American Sociological Review*, 28(5), 757-768.

Schubert, D.S.P., Wagner, M.E., & Schubert, H.J.P. (1977). Family constellation and creativity: First born predominance among classical music composers. *Journal of Psychology*, 95, 147- 149.

Simonton, D.K. (1984/1999). *Genius, creativity and leadership: Historiometric inquiries*. Cambridge: Harvard University Press.

Simonton, D.K. (1999). *Origins of genius: Darwinian perspectives on creativity*. Oxford: Oxford University Press.

Sulloway, F.J. (1996). *Born to rebel: Birth order, family dynamics and creative lives*. New York: Pantheon Books.

Sulloway, F.J. (1999). Birth order. In M.A. Runco (Ed.). *Encyclopedia of creativity* (pp 189- 202). San Diego: Academic Press.

Terry, W.S. (1989). Birth order and prominence in the history of psychology. *Psychological Record*, 39, 333-337.

Zajonc, R.B. (1976). Family configuration and intelligence. *Science*, 19, 227-236.

Zajonc, R.B. (2001). The family dynamics of intellectual development. *American Psychologist*, 56 (6/7), 490-496.

Zajonc, R.B., & Markus, G. (1975). Birth order and intellectual development. *Psychological Review*, 82, 74-88.

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For further information please contact

Content questions: Dr. Jonathan Plucker (jplucker AT jhu.edu)

Technical questions: Technical Co-Director(intelltheory AT gmail.com)

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