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## Brief Report

## Birth order and the dominance aspect of extraversion: Are firstborns more extraverted, in the sense of being dominant, than laterborns?

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## ABSTRACT

The present study set out to examine the relationship between birth order and the dominance facet of extraversion in a community sample of around 1500 participants. In contrast, to Sulloway's (1995) predictions, the present study, using a between-family design, found firstborns to be less extraverted, in the sense of being less dominant, than laterborns. This effect was found while controlling for potential confounds, such as age, and using a constant sibship size. Results are discussed with reference to the current literature on birth order and personality.

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## 1. Introduction

According to Sulloway (1995, 1996), firstborns are highly motivated to defend their favored status and to preserve valued parental resources. As a result, they are expected to be higher in extraversion than laterborns, specifically in the sense of being more assertive and dominant. In contrast, for laterborns, being approachable and easygoing is an important mean to gather parental attention in a family environment that is characterized by sibling rivalry. As a consequence, laterborns can be expected to be more agreeable. Evidence for the hypothesis that firstborns are more extraverted, is, however, mixed, as Sulloway (1995) concluded himself from a meta-analysis of 196 studies on birth order and personality. For instance, whereas Klein (1984) found firstborns to be more introverted, Abdel-Kahlek and Lester (2007) did not find a relationship between extraversion and birth order, and McCormick and Baer (1975) found only firstborns males to be more extraverted. Beer and Horn (2000), using adoption cohort data, did find evidence for Sulloway's predictions regarding extraversion, with younger siblings reporting relatively more extraversion. The effect size of birth order on extraversion was, however, much lower than Sulloway predicted ( $r$  of 0.05 compared to  $r$  of 0.4). Dixon, Reyes, Leppert, and Pappas (2008), using data from large families (six siblings or more), also found support for Sulloway's reasoning: younger siblings were found to be more extraverted than older

ones. Sulloway (1995) explained these mixed findings with regards to birth order and extraversion by arguing that birth order is related differently to different aspects of extraversion: whereas the sociability aspect of extraversion is higher in laterborns, the dominance aspect of extraversion is higher in firstborns.

Studies that have explicitly examined this issue have, however, revealed mixed findings as well. Whereas in a within-family design of 96 students, Beck, Burnet, and Vosper (2006) indeed found firstborn siblings to rate higher on the dominance facet of extraversion, and laterborns higher on the sociability facet of extraversion, Jefferson, Herbst, and McCrae (1998), using self-reports and peer ratings on a sample of siblings, did not find a difference between first- and laterborns on these aspects of extraversion (see also Michalski & Shackelford, 2002).

Given the mixed findings in this area, it still remains unclear whether firstborns are more extraverted, in the sense of being more dominant, than laterborns. By using a large community sample, the present study aims to shed more light on this issue. In contrast to previous studies, the present study has a large sample size (in contrast to, for instance, Beck et al., 2006) and adequately controls for sibship size (in contrast to, for instance, Jefferson et al., 1998). Studies typically statistically control for sibship size (e.g., Michalski & Shackelford, 2002). This does not, however, solve the statistical dependency between both measures: the likelihood of being coded as a firstborn, middleborn or lastborn is a function of sibship size (Pollet & Hoben, in press; Pollet & Nettle, 2007, 2009). In large families, where individuals have in excess of two siblings, the likelihood of being coded as a middleborn is larger than one third, whereas in families where individuals have but one sibling, the likelihood of being coded as a middleborn is zero. The only way to resolve this

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issue is by limiting the sample to individuals with two siblings. In this case the likelihood of coding a firstborn, middleborn or lastborn is constant and equal for every individual (one third).

## 2. Method

### 2.1. Participants and procedure

The Netherlands Kinship Panel Study (NKPS) dataset was obtained through the Netherlands Interdisciplinary Demographic Institute (NIDI). The NKPS is a large-scale study designed to investigate family and kin relations in the Netherlands and targeted 8500 non-institutionalized individuals between 18 and 79 years old (Dykstra et al., 2004). These individuals were randomly drawn from a large Dutch address register. The sampling procedure, representativeness, the survey method and other aspects of the study are described in much more detail by Dykstra et al. (2004). The study yielded a final sample with data for 8161 persons (mean age = 46.43;  $SD = 15.13$ ). The sample was somewhat unbalanced in terms of gender, with more female than male respondents ( $n_{men} = 3420$ ;  $n_{women} = 4741$ ). Individuals were interviewed face-to-face by trained researchers between October 2002 and October 2004 about various aspects of their family life, including relationships with their siblings. Respondents also provided detailed information on a wide range of socio-demographic variables (e.g., educational attainment, marital status). In addition, the respondents completed a questionnaire. The dependent variable we used for our analyses is from the questionnaire.

From this dataset, we selected all individuals who had no more or no less than two full siblings at the time of the interview. As argued above, this method adequately controls for sibship size. Respondents who had step- or half-siblings were excluded from analysis, in line with other studies (e.g., Freese, Powell, & Steelman, 1999; Michalski & Shackelford, 2002). Birth order of the respondent was then coded as firstborn ( $n = 539$ ), middleborn ( $n = 467$ ), or lastborn ( $n = 488$ ) based on the year of birth. Individuals for which the birth order could not be determined in this way were excluded from analysis, leading to a final sample of  $n = 1494$ . More details on the working sample can be found in Pollet and Nettle (2007, 2009).

### 2.2. Measures

#### 2.2.1. Introversion–extraversion

In the NKPS-questionnaire respondents completed, among other things, a shortened four-item introversion–extraversion measure derived from Eysenck, Eysenck and Barrett (1985); Dykstra et al., 2004, p. 113). The original items are: ‘Are you a talkative person?’, ‘Can you easily get some life into a rather dull party?’, ‘Do other people think of you as being very lively?’, and ‘Can you get a party going?’. These items represent the *dominance* aspect of extraversion, in the sense that they reflect assertiveness, activity, and excitement seeking (see Beck et al., 2006; Jefferson et al., 1998; in contrast to those facets that represent the *sociability* aspect of extraversion, such as warmth, gregariousness, and positive emotions). Yet, it is important to stress that this measure was not designed to discriminate between these two aspects of extraversion. The four items of this measure were scored on five point Likert scales and summed into a scale with a higher score indicating higher extraversion ( $M = 13.22$ ;  $SD = 2.94$ ). This measure had a good reliability (Cronbach’s  $\alpha = 0.839$ ).

#### 2.2.2. Validation of the four-item introversion–extraversion measure

Data from a community sample were available ( $n = 254$ , 50% female, age  $M = 49.55$ ,  $SD = 13.56$ ; described in Barelds & Luteijn,

2002) containing scores on the Dutch version of the Eysenck Personality Questionnaire (EPQ; Sanderman, Arrindell, Ranchor, Eysenck, & Eysenck, 1995), the Dutch Personality Questionnaire (DPQ; Luteijn, Starren, & Van Dijk, 2000), and the Five-Factor Personality Inventory (FFPI; Hendriks, Hofstee, & De Raad, 1999). The four introversion–extraversion items listed above were recovered from the EPQ ( $\alpha = .711$ ). The correlation between the four-item introversion–extraversion scale and the *Dominance* scale of the DPQ was  $r = .56$  ( $p < .001$ ).

The FFPI is based on the Abridged Big Five Circumplex model (AB5C; Hofstee, de Raad, & Goldberg, 1992), which is an integration of the Big Five model with circumplex models of personality. In the AB5C model, personality descriptive terms are positioned in two-factor circumplexes. The trait *dominant*, for instance, has a primary loading on the positive pole of the first factor (extraversion), and a secondary loading on the negative pole of the second factor (agreeableness), and is consequently assigned to the I + II – segment in the AB5C model. The trait *sociable*, with a primary loading on the positive pole of extraversion and a secondary loading on the positive pole of Agreeableness, is assigned to the I + II + segment (Hofstee et al., 1992). To examine if the four-item introversion–extraversion measure is more of a dominance than a sociability measure, correlations were first computed between the four-item introversion–extraversion scale and the FFPI’s *Extraversion* and *Agreeableness* scales. Correlations were  $r = .62$  and  $r = -.26$  respectively ( $p$ ’s  $< .001$ ). Correlating the introversion–extraversion measure with FFPI facet scores yielded similar results: the correlation with the I + II – facet was  $r = .66$ , and with the I + II + facet  $r = .46$  ( $ps < .001$ ; test for dependent correlations  $t = 5.23$ ,  $p < .01$ ). These results indicate that the four-item introversion–extraversion scale might be interpreted as a dominance rather than a sociability scale.

#### 2.2.3. Control variables

Gender (59% female), age, ( $M = 43.36$ ;  $SD = 14.67$ ), educational attainment and marital status (52% married) of the respondent were also coded and used as control variables in the analyses (see Dykstra et al., 2004). Marital status consisted of four categories (Never Married, Married, Divorced and Widowed) and educational attainment consisted of ten categories ranging from incomplete primary to postgraduate. Educational attainment was recoded in order to avoid categories with very low frequencies. The first two categories (‘incomplete’ and ‘primary’) of the educational attainment variable were merged, as were the last two categories (‘university’ and ‘postgraduate’). This variable was treated as a continuous variable in the analyses ( $M = 5.33$ ;  $SE = 2.16$ ); treating it as a categorical variable did not alter any of the results below. Additional information on these variables can be found in the NKPS codebook (Dykstra et al., 2004) and in Pollet and Nettle (2007, 2009). These variables were included to rule out that effects attributed to birth order are due to these effects (see Steelman, Powell, Werum, & Carter, 2002).

### 2.3. Analytic strategy

The association between birth order and extraversion was analyzed by use of Generalized Linear Models. We first tested for an effect of birth order on extraversion. Given that we had a specific hypothesis that firstborns will differ from other birth orders, we only examined this contrast. Subsequently, we fitted all control variables and birth order simultaneously and then finally ran another GLM excluding any predictors with  $p > .15$ . We only reported this final model (excluding predictors  $p > .15$ ).

Missing values on variables were treated listwise. For all analyses there were less than 2% of the data missing. Given that the focus of this short report is on the effect of birth order we do not

discuss the effects of the control variables. Estimates for the control variables can be requested from the authors.

### 3. Results

Univariate GLM showed a statistical trend for birth order [ $F(2, 1492) = 2.42; p = 0.09$ ], indicating that firstborns were significantly less extraverted than individuals with higher birth orders (Mean difference Firstborns vs. Mean:  $M = -0.222; SE = 0.105; p = 0.035$ ; Fig. 1). After controlling for marital status, age and educational attainment, the overall effect of birth order lost its marginal significance, but the contrast between firstborns and other birth orders remained significant (Mean difference Firstborns vs. Mean:  $M = -0.207; SE = 0.104; p = 0.038$ ). Table 1 shows all the effects in multivariate GLM. Gender of the participant did not predict extraversion ( $p > 0.38$ ) and was therefore not included in the final GLM.

### 4. Discussion

The present study showed that firstborns were less extraverted, in the sense of being less dominant and assertive, than laterborns. This finding is at odds with Sulloway's hypothesis that the sociability aspect of extraversion is higher in laterborns, whereas the dominance aspect of extraversion is higher in firstborns. In contrast, our findings are in line with those of Dixon et al. (2008), who also used the items of the EPQ to assess extraversion, showing that the three youngest siblings of large families were higher in overall extraversion than the older ones. Although these scholars did not distinguish between the dominance and sociability aspects of extraversion, their findings, as ours do, suggest that younger siblings are more dominant than older siblings.

Why might firstborns be less extraverted, in the sense of being less dominant than laterborns? A possible explanation is



Fig. 1. Means and 95% confidence intervals for the dominance aspect of extraversion by birth order.

Table 1

F-tests and effect sizes for GLM's on the dominance aspect of extraversion.

Extraversion	F	p	Partial $\eta^2$
Birth order	2.24	0.106	0.003
Marital status	3.38	0.107	0.067
Age	18.45	<0.0001	0.005
Educational attainment	5.11	0.024	0.004

that firstborns are dominated more by their parents than laterborns. Because of their own fears and insecurities as a parent, parents are usually more strict and overprotective with their first child than with later children. According to several scholars (e.g., Leary, 1957; Wiggins, 1979), individuals behave according to the rule of interpersonal complementarity, especially in the interpersonal dimension of dominance vs. submission. That is, dominant behaviors, including friendly behaviors, evoke submissive behaviors in others and vice versa. Especially in parent-child relations, submission is complementary to a parent's directive or controlling behavior (Lorr, 1991). In cases where parents are extremely oppressing and controlling, children's submissiveness may even develop into depression and feelings of helplessness (Amanat & Butler, 1984). Thus, because of their relatively dominant and overprotective parents, firstborns may, more than laterborns, be forced in the submissive position and develop a less extraverted personality, in the sense of being less dominant. Research indeed shows that extraversion is negatively and submission positively related with overprotection by one's parents and parental interference (Amanat & Butler, 1984; Nakao et al., 2000). An alternative explanation, which would still be in line with Sulloway's reasoning on developmental niches (1996) is that firstborns are less dominant than laterborns because there is no need for them to behave dominantly given their privileged position. Finally, it might be the case that in adulthood the dynamics of birth order are substantially different than during development. In samples of children, adolescents and young adults, firstborns could indeed be more dominant than laterborns. Yet, in samples of adults this pattern could be reversed, as there is no pressure for firstborns to behave dominantly when competition for parental resources ceases to exist (Pollet & Nettle, 2007; Pollet & Nettle, 2009).

A key limitation of this study is that our measure was not designed to capture the dominance aspect of extraversion and that this measure consisted of only four items. Yet, this measure showed excellent internal consistency, despite the low number of items. In addition, we validated this four item measure in a different sample, showing that our measure could be interpreted as a measure for the dominance aspect of extraversion rather than the sociability aspect. Nonetheless, although less strongly than to the dominance aspect of extraversion, our measure still related to the sociability aspect. In this case, the key benefit of this study, i.e. the fact that our sample is representative for a larger non-student population and the increase in external validity that results from it, comes at the cost of having a rather poor measure of extraversion. Future research clearly disentangling the dominance and sociability aspect of extraversion is necessary to confirm that firstborns are indeed less extraverted, in the sense of being less dominant, than laterborns.

Another potential limitation of our study is that it utilized a between-family design, rather than a within-family design. According to Rodgers, Cleveland, Van den Oord, and Rowe (2000) a within-family design is more appropriate when studying birth order, because this type of design reduces variations in, for instance, parental personality, whereas a between-family design does not. It must be noted, however, that other authors (e.g., Michalski & Shackelford, 2001) disagree. According to Michalski and Shackelford (2001) within-family designs do not necessarily reduce variation and both designs may suffer from confounds.

A potential advantage of using the NKPS is that it has a longitudinal design and in future studies we therefore aim to demonstrate the stability of the relationship between birth order and (the dominance aspect of) extraversion over time. For now, however, we have shown that (the dominance aspect of) extraversion varies, in an interesting and systematic way, with birth order in a between-family design.

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## References

- Abdel-Kahlek, A. M., & Lester, D. (2007). Sibship size, birth order, and personality among Kuwaiti college students. *Psychological Reports, 101*(1), 25–26.
- Amanat, E., & Butler, C. (1984). Oppressive behaviors in the families of depressed children. *Family Therapy, 11*(1), 65–77.
- Barelids, D. P. H., & Luteijn, F. (2002). Measuring personality: A comparison of three personality questionnaires in the Netherlands. *Personality and Individual Differences, 33*(4), 499–510.
- Beck, E., Burnet, K. L., & Vosper, J. (2006). Birth-order effects on facets of extraversion. *Personality and Individual Differences, 40*(5), 953–959.
- Beer, J., & Horn, J. (2000). The influence of rearing order on personality development within two adoption cohorts. *Journal of Personality, 68*, 789–819.
- 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*, 953–959.
- Dykstra, P. A., Kalmijn, M., Knijn, T. C. M., Komter, A. E., Liefbroer, A. C. & Mulder, C. H. (2004). Codebook of the Netherlands kinship panel study, a multi-actor, multi-method panel study on solidarity in family relationships, Wave 1. NKPS Working paper no. 1. The Hague, Netherlands Interdisciplinary Demographic Institute. (version of July 2005).
- Eysenck, S. B., Eysenck, H. J., & Barrett, P. (1985). A revised version of the psychoticism scale. *Personality and Individual Differences, 6*, 21–29.
- Freese, J., Powell, B., & Steelman, L. C. (1999). Rebel without a cause or effect: Birth order and social attitudes. *American Sociological Review, 64*, 207–231.
- Hendriks, A. A. J., Hofstee, W. K. B., & De Raad, B. (1999). *Handleiding bij de Five-Factor Personality Inventory (FFPI) (The Five-Factor Personality Inventory: Professional manual)*. Lisse: Swets Test Publishers.
- Hofstee, W. K. B., de Raad, B., & Goldberg, L. (1992). Integration of the Big Five and circumplex approaches to trait structure. *Journal of Personality and Social Psychology, 63*(1), 146–163.
- Jefferson, T. J., Herbst, J. H., & McCrae, R. R. (1998). Associations of birth-order and personality traits: Evidence from self-reports and observer ratings. *Journal of Research in Personality, 32*, 498–509.
- Klein, S. (1984). Birth order and introversion-extraversion. *Journal of Research in Personality, 18*(1), 110–113.
- Leary, T. (1957). *Interpersonal diagnosis of personality*. New York: Ronald.
- Lorr, M. (1991). A redefinition of dominance. *Personality and Individual Differences, 12*(9), 877–879.
- Luteijn, F., Starren, H., & Van Dijk, H. (2000). *Handleiding Nederlandse Persoonlijkeids Vragenlijst (NPV) (manual for the Dutch personality questionnaire)*. Lisse: Swets & Zeitlinger.
- McCormick, K., & Baer, D. J. (1975). Birth order, sex of subject and sex of sibling as factors in extraversion and neuroticism in two-child families. *Psychological Reports, 37*(1), 259–261.
- Michalski, R. L., & Shackelford, T. K. (2001). Methodology, birth order, intelligence, and personality. *American Psychologist, 56*(6–7), 520–521.
- Michalski, R. L., & Shackelford, T. K. (2002). An attempted replication of the relationships between birth order and personality. *Journal for Research on Personality, 36*, 182–188.
- Nakao, K., Takaiishi, Y., Tatsuta, K., Katayama, H., Iwase, M., Yorifuji, K., et al. (2000). The influences of family environment on personality traits. *Psychiatry and Clinical Neurosciences, 54*(1), 91–95.
- Pollet, T. V. & Hoben A. D. (in press). An evolutionary perspective on siblings: Rivals and resources. In: Salmon C.A. & Shackelford T. K. (Eds.), *Handbook of Evolutionary Family Psychology*. Oxford: Oxford University Press.
- Pollet, T. V., & Nettle, D. (2007). Birth order and face-to-face contact with a sibling: Firstborns have more contact than laterborns. *Personality and Individual Differences, 43*, 1796–1806.
- Pollet, T. V., & Nettle, D. (2009). Birth order and family relationships in adult life: Firstborns report better sibling relationships than laterborns. *Journal of Social and Personal Relationships, 26*, 1029–1046.
- 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*, 599–612.
- Sanderman, R., Arrindell, W. A., Ranchor, A. V., Eysenck, H. J., & Eysenck, S. B. (1995). *Het meten van persoonlijkheidskenmerken met de Eysenck Personality Questionnaire (EPQ) (measuring personality aspects with the Eysenck Personality Questionnaire (EPQ))*. Groningen: Noordelijk Centrum voor Gezondheidsvraagstukken.
- 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*, 243–269.
- Sulloway, F. J. (1995). Birth order and evolutionary psychology: A meta-analytic overview. *Psychological Inquiry, 6*(1), 75–80.
- Sulloway, F. J. (1996). *Born to rebel: Birth order, family dynamics, and creative lives*. New York, NY, US: Pantheon Books.
- Wiggins, J. S. (1979). A psychological taxonomy of trait-descriptive terms: The interpersonal domain. *Journal of Personality and Social Psychology, 37*, 395–412.