ELSEVIER

Birth Order and Familial Sentiment: Middleborns are Different

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Effects of birth order on several aspects of family relations and self-identity were examined in three studies. In Study 1, first and lastborn undergraduates were more likely than middleborns to refer to kinship in characterizing themselves. In Study 2, subjects were asked to whom they would turn under two scenarios of duress. First and lastborns were more likely to nominate parents, whereas middleborns were much more likely than other respondents to nominate siblings. In Study 3, analyses of historical archives and of an Internet questionnaire indicated that genealogical research attracts many more firstborns and many fewer middleborns than expected by chance. In all three studies, first and lastborns were much more likely than middleborns to nominate their mothers as the person to whom they felt closest. These substantial effects support Sulloway's claim that birth orders constitute significant family "niches," which differ with respect to the perceived dependability of parental investment and therefore also differ in the social orientations that they engender.

KEY WORDS: Birth order; Genealogy; Kinship; Parental investment.

Theoretical models of the evolution of parental inclinations predict that parents will often treat their offspring differently. There are grounds for predicting discriminative parental solicitude in relation to a number of variables including offspring age, parental age, birth order, offspring sex, cues of phenotypic quality, and cues of parentage (Clutton-Brock 1991; Daly and Wilson 1987, 1995; Trivers 1974; Trivers and Willard 1973; Wilson and Daly 1994). The unifying notion behind these theories is that natural selection has shaped parental psychologies to function as if they "value" individual offspring and invest-

Received January 21, 1998; revised April 6, 1998.

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Acting Editor for this paper was Charles Crawford, Department of Psychology, Simon Fraser University.

Evolution and Human Behavior 19: 299–312 (1998)

655 Avenue of the Americas, New York, NY 10010
1090-5138/98/$19.00
PII S1090-5138(98)00022-1

ments in their development in proportion to the expected impacts of such investments on parental fitness (genetic posterity) in ancestral environments.

The anticipated relevance of birth order is a corollary of the importance of offspring age. One's expected contribution to parental fitness resides mainly in one's "reproductive value" (expected future reproduction; Fisher 1930), and this quantity increases with age until at least puberty, making an older immature offspring more valuable from the parental perspective than a younger one (Montgomerie and Weatherhead 1988). In the human case, parental favoring of older offspring can be masked by changing parental response to children with changing needs and abilities, but it becomes apparent in tough choices: When one child must be sacrificed so others can be saved, it is apparently a cross-cultural universal that the youngest is the likeliest victim (Daly and Wilson 1984). For these reasons, Sulloway (1995, 1996) argues that it is ultimately their security in the expectation of parental favoritism that makes firstborn children defenders of parental values and the status quo, whereas laterborns are relatively inclined to be "rebels."

Plomin and Daniels (1987) posed the question of why children from the same family are so different from one another. In their behavioral genetics review article, they pointed out that environmental influences (in particular, environmental differences between children in the same family) make two siblings as different from one another as are pairs of children selected randomly from the population. One of these environmental differences is birth order itself.

Besides enjoying the relative security of parental preference in a pinch, firstborn children have always benefited from an early absence of sibling contenders for a share of parental investment. Even in the modern west, where parental resources are presumably less stretched than in noncontracepting, premodern societies, firstborn children still receive more parental caretaking and attention in infancy than laterborns (Jacobs and Moss 1976), and they grow faster, such that despite being smaller at birth they are larger by 1 year of age (Meredith 1950; Wingerd 1970).

There is, however, a countervailing effect: As parents themselves grow older, the fitness value of an offspring of any given age and phenotype increases relative to the parent's residual reproductive value. Thus, in any species in which expected future reproduction is a declining function of parental age, older parents will have been selected to invest more in offspring, all else equal, than younger parents (Pugesek 1995). Thanks to menopause, this argument certainly applies to the human female, and dramatic decreases in rates of maternally perpetrated infanticide as a function of maternal age appear to be one reflection of age-related changes in the relative weights that the maternal psyche places on one's infant versus one's future (Bugos and McCarthy 1984; Daly and Wilson 1984, 1995).

Thus, although their initial uncontested status and their greater fitness value give firstborns what Sulloway (1996: 305) calls "an edge in courting parental investment," this advantage may be offset by a growing willingness of aging parents to sacrifice themselves to benefit needy young. Moreover, as Sulloway (1996: 305) goes on to note, a lastborn child has the advantage of being "the only member of the family to receive parental investment undiluted by the needs of a younger rival," with the upshot being that "the losers in this Darwinian calculus are often middle

children." Nevertheless, with few exceptions (Kennedy 1989; Kidwell 1982), analyses of the possible effects of birth order have contrasted firstborns with laterborns and ignored the middleborn-lastborn distinction.

Psychologists have been skeptical about the reality of birth order effects, especially since Ernst and Angst (1983) reviewed the literature and concluded that most are artifacts of poor research design and vanish when appropriate controls for such factors as family size and social class are incorporated. This conclusion was not based on a formal meta-analysis, however, and when Sulloway (1995) conducted one, he found that it was unwarranted. In fact, the literature demonstrates many highly significant differences between firstborns and laterborns on such personality traits as extroversion, agreeableness, neuroticism, openness, and conscientiousness, differences that cannot be attributed to the confounding factors implicated by Ernst and Angst.

According to Sulloway (1996), some birth order effects are modulated by sibship sex combinations, birth intervals, and other variables. These complications have reinforced a misperception that birth order effects are unreliable and perhaps artifactual. If the arguments presented previously are sound, then the failure to distinguish the lastborn status from that of other "laterborns" is a second likely source of failures to detect genuine effects, and the failure to consider the countervailing effects of maternal age at the child's birth is a third. Finally, we would suggest that few studies have focused on the domain in which birth order effects are most strongly to be expected, namely, familial sentiments.

Theory suggests that first and lastborns will see their parents and familial resources as dependable sources of support to a greater degree than will middleborns, and some evidence supports this expectation. Kidwell (1981: 330) analyzed survey responses of 10th-grade boys in U.S. public schools and concluded that "the middleborn male respondent reports that his parents are considerably more punitive and less reasonable and supportive towards him than do either the firstborn or lastborn respondents." Kennedy (1989) analyzed questionnaire responses of U.S. college students and found that middleborns reported lower levels of parental support with their tuition than either firstborn or lastborn respondents, and that middleborns professed to phone home relatively infrequently and to feel less close to their parents. We predicted that birth order effects would be conspicuous in such domains as one's reliance on parents as social supports, the relevance of one's family to one's self-concept, and one's interest in family as manifested in genealogical research.

STUDY 1

Who do people consider to be their closest interactants or confidants? On the basis of the previous arguments, we would expect firstborns and lastborns to be relatively likely to nominate parents, and middleborns to be relatively likely to nominate an unrelated friend or partner. We also would expect that with birth order held constant, respondents with older mothers will have experienced those mothers as more investing and will be relatively likely to nominate them as the individual to whom they feel closest. This latter prediction contrasts with what one might predict from

the notion of a "generation gap" whereby the older the mother, the more likely it is that she will be out of touch with her child's interests and concerns.

Familial sentiment and solidarity also may be reflected in people's open-ended self-characterizations. Hartley's (1970) "Who am I?" test (sometimes called the "Twenty Statements Test" [TST]) is a technique for investigating personal identity by the elicitation of multiple responses to the single item "Who are you? I am . . . ". Responses are usually coded as "physical," "social," "attributive," and "global" (Hartley 1970), but our interest is in partitioning responses in the social realm, and specifically in family roles and names. (We have reduced the 20 to 10, because 20 proves tedious for many subjects and begins to elicit formulaic answers.) This method has been widely used, but the majority of previous studies have focused on race, ethnicity, or personality traits, and not on family relationships. Some authors have made some distinctions among "social" responses in their analyses (McGuire and Padawer-Singer 1986), but no one has tabulated or presented results with respect to the issues of concern to us here.

Methods

Three hundred McMaster University undergraduate students (150 female and 150 male) completed a questionnaire concerning "identity and family relationships" as partial fulfillment of a requirement (participation as a research subject or a library research paper) for an introductory course in psychology. Ages ranged from 18 to 30 years with a mean of 20.3 $\pm$ 2.45. Firstborns had a mean age of 20.26 $\pm$ 1.89, middleborns 20.63 $\pm$ 3.81, and lastborns 20.18 $\pm$ 1.47.

In addition to such demographic information as age, birthplace, and number and ages of siblings, subjects were asked, "Whom of all the people you know, are you closest to?"

The salience of family in self-identity was assessed with the following question (adapted from Hartley 1970): "In the ten blanks below, please make ten different statements in response to the question 'Who are you?' Write your answers in the order that they occur to you. Go fairly quickly." Responses were categorized as: (1) indicating a role within the family (brother, sister, mother, etc.); (2) invoking a family name (Smith, Johnson, etc.); or (3) not family related.

The questionnaire completed by a subset of 120 subjects (60 female and 60 male) included several new questions in addition to those completed by the initial 180 subjects (90 female and 90 male). For present purposes, the only noteworthy addition was mother's age at the time of the respondent's birth.

Results

Thirty-two subjects (17 female and 15 male) were "only children" (had no siblings). Their responses are excluded from the following analysis.

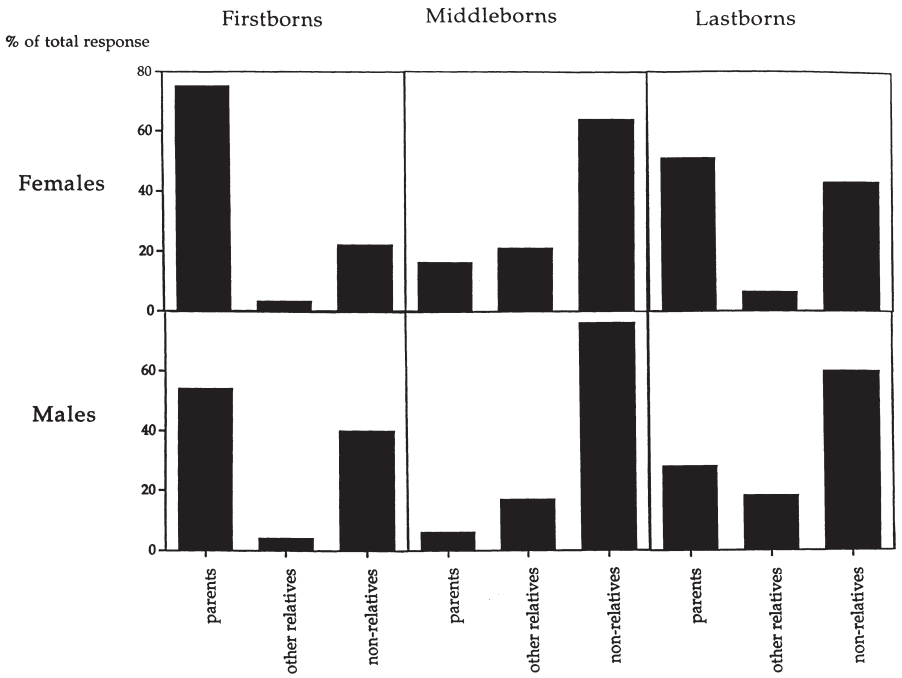
Table 1 gives the distributions of responses to the questions, "Whom of all the people you know, are you closest to?" Birth order effects were large: 64% of first-

Table 1. Number of Subjects Naming a Specific Individual as the Person They Feel Closest to in Relation to That Subject's Sex and Birth Order in Study 1

	Firstborn female (n = 36)	Middleborn female (n = 48)	Lastborn female (n = 49)	Firstborn male (n = 39)	Middleborn male (n = 46)	Lastborn male (n = 50)
Mother	22	5	22	17	2	9
Father	5	2	3	4	1	5
Sibling	0	9	3	1	8	4
Other relative	1	1	0	1	0	2
Total naming relatives	**28**	**17**	**28**	**23**	**11**	**20**
Mate	2	7	7	10	20	19
Friend	6	24	14	6	15	11
Total naming nonrelatives	**8**	**31**	**21**	**16**	**35**	**30**

borns named a parent, compared to 39% of lastborns and just 10% of middleborns (Figure 1). This birth position effect was not an artifact of sibship size: Firstborns were relatively likely to nominate mother, and middleborns were relatively unlikely to do so, more or less regardless of the number of siblings (Figure 2). Differential nomination of parents in relation to birth order was significant within both female (Chi-square 2 $df = 31.8$, $p < .001$) and male (Chi-square 2 $df = 23.2$, $p < .001$) respondents. (Females were more likely than males to nominate parents—44% vs. 28% in total—whereas 36% of males but only 12% of females nominated their mates. These sex differences were orthogonal to birth order differences.)

FIGURE 1. Percentage of respondents of a particular birth order and sex who nominated a mother, other relative, or non-relative as the person they feel closest to in Study 1.



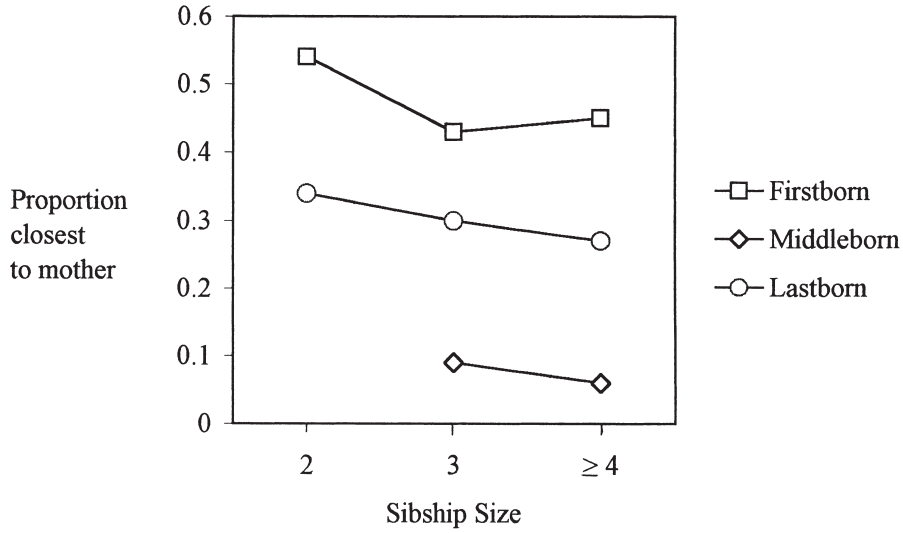
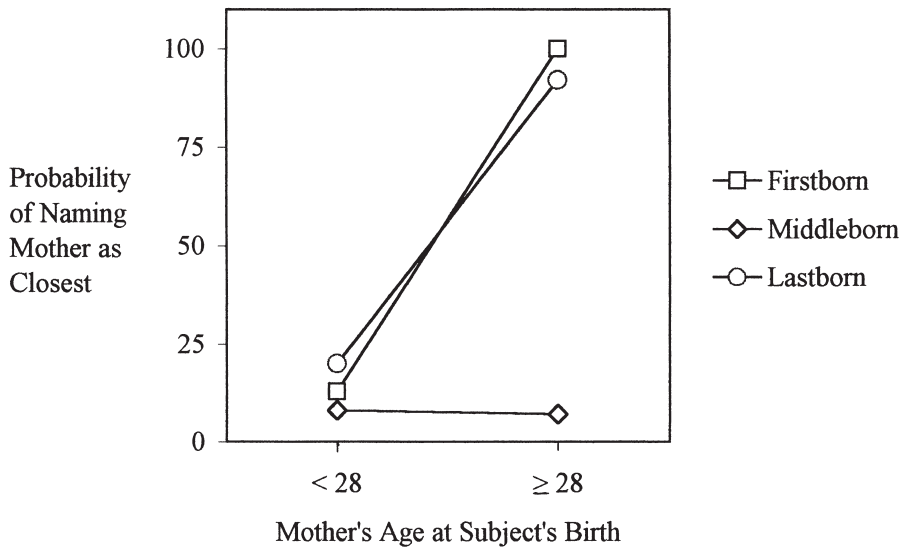


FIGURE 2. Proportions of undergraduate subjects of a particular birth order naming their mothers as their closest intimate in relation to family size in Study 1.

Figures 2 and 3 present the incidences of nominating mother in relation to birth order and mother's age at the time of the respondent's birth. For analysis, mothers were divided at the median age into those 27 and younger versus those 28 and older at the subject's birth. Those in the older mother group were four times as likely as subjects in the younger mother group to name mother as the individual they were closest to (Chi-square 1 $df = 31.1$, $p < .001$). This effect was distinct from the birth

FIGURE 3. The probability of subjects naming mother as their closest intimate in relation to age of mother at subject's birth.



order effect in that it held up within firstborns (Chi-square 1 $df = 23.8$, $p < .001$) and lastborns (Chi-square 1 $df = 21.5$, $p < .001$). No such effect was evident within middleborns. This pattern was consistent across family size, with first and lastborns always being more likely to nominate mother than middleborns.

One hundred fifty-six of the 268 subjects mentioned either a family role (mother, brother, etc) or a family name, or both, among their ten responses to the question, "Who are you?" Sixty-eight percent of firstborns mentioned such terms, compared to 57% of lastborns and just 38% of middleborns (Chi-square 2 $df = 15.52$, $p < .001$). When males and females were considered separately, this birth order difference was significant only for males (Chi-square 2 $df = 23.79$, $p < .001$).

STUDY 2

The Study 1 results indicate that birth order is a powerful determinant of familial sentiment. But family ties are not just sentimental. Although modern industrialized society often is contrasted with traditional kin-based societies, adult Americans still turn to blood relatives for help, and as the required assistance increases in magnitude, they rely on kin more and on unrelated friends less (Essock-Vitale and McGuire 1985; Hogan and Eggebeen 1995). Middleborns seldom name their parents as their closest interactants, but do they turn to them for support nonetheless? In an early study of fear's effects on the "need for affiliation," Schachter (1959) found that firstborns expressed a stronger desire to affiliate with others when frightened than did laterborns, but Schachter's and subsequent studies neither distinguished between middleborns and lastborns nor addressed the question "desire to affiliate with whom." Thus, we asked to whom respondents would turn when faced with emotional or financial distress.

Methods

One hundred forty McMaster University undergraduate students (70 female and 70 male), all of whom had a least one sibling and none of whom had participated in Study 1, completed a questionnaire on "family relationships and helping behavior." Participation in this study partially fulfilled a research participation requirement for either an introductory or second year course in psychology. The subjects ranged in age from 17 to 35 years with a mean of 19.76 ± 1.87. The mean age of firstborns ($n = 65$) was 19.77 ± 2.26, 20.30 ± 1.94 for middleborns ($n = 40$), and 19.63 ± 1.25 for lastborns ($n = 35$).

Subjects were asked questions about themselves, including age, birthplace, whom they most closely resemble, and the number and ages of any siblings. They were asked to name the person to whom they felt closest, as in Study 1, and to name the sibling to whom they felt closest, if they had more than one. Participants also were given two scenarios to read, each of which was followed by questions about the scenario and what the subject would do in such a situation, including to whom they would turn for emotional (Scenario 1) and financial (Scenario 2) help. Scenario

1 read as follows: "Imagine that you are in the following situation. Last night, you were on your way home and you saw several people killed in a fiery car crash on the highway. It upset you a great deal." Scenario 2 read as follows: "Imagine that you are in the following situation. You had what you thought was a secure job and took on a mortgage for quite an expensive home. Now you have lost that job and are in serious financial trouble. A bank won't give you a loan because you have no job."

Results

Responses to the question, "Whom, of all the people you know, are you closest to?" replicated the pattern of results in Study 1, although the total numbers nominating relatives was lower, with 36% of firstborns naming a parent (mother 31%, father 5%), compared to 29% of lastborns (mother 29%, father 0%) and just 7% of middleborns (mother 7%, father 0%) with a Chi-square 2 $df = 9.94$, $p < .01$).

When asked to whom they would turn for emotional support in Scenario 1, 42% of firstborns named a parent (parents 15%, mother 21%, father 6%), compared to 44% of lastborns (parents 13%, mother 25%, father 6%) and just 21% of middleborns (parents 3%, mother 17%, father 0%). This was a significant difference (Chi-square 1 $df = 4.41$, $p < .05$). Instead of naming parents, the middleborns were more than five times as likely to name a sibling than were firstborn or lastborn respondents.

When asked to whom they would turn for financial support in Scenario 2, 87% of firstborns named a parent (parents 60%, mother 0%, father 27%), compared to 81% of lastborns (parents 50%, mother 6%, father 25%) and just 63% of middleborns (parents 44%, mother 4%, father 15%). This difference was significant (Chi-square 1 $df = 5.06$, $p < .05$).

The three tasks (closest person, Scenario 1, Scenario 2) were not simply redundant. Only 12 subjects (8.6%) named the same individual in response to all three. Moreover, every subject without exception named a relative in response to at least one of the three.

STUDY 3

It is often maintained that the relevance of kinship to social life has been greatly diminished in modern western society. However, the thousands of daily visitors to the Mormon Genealogical Library in Salt Lake City (Shoumatoff 1985) attest to the continuing appeal of tracing one's ancestry. Canadian women exhibit more extensive knowledge of their family trees than their brothers (Salmon and Daly 1996), but is there also differential interest in family connections in relation to birth order? The arguments and findings above suggest that middleborns may focus their social attentions elsewhere, while firstborns and lastborns are familially oriented.

This is one domain within which one might expect lastborns to be rather less like firstborns and more like middleborns than was the case for closeness of ties to parents as measured in Studies 1 and 2. The greater reproductive value of older chil-

dren affects their fitness value to other family members (grandparents, aunts/uncles) in the same way that it affects their fitness value to parents, but the rationale for prolonged "indulgent" investment in lastborns applies only to the parents. In stratified societies, firstborn advantage is often apparent in the forms of primogeniture for firstborn sons and superior dowries for firstborn daughters, and, historically, reproductive performance decreased with increasing birth order in such societies (Boone 1988). Under the practice of primogeniture, it is especially in the interests of firstborns to be interested in family status within the community and the maintenance of the status quo within their own family (Sulloway 1996).

So who invests discretionary time and effort in the study of their family connections? Is the pursuit of genealogical research practiced differentially in relation to birth order? Jacobson (1986) suggested tersely that it is not, but this conclusion was based only on a failure to find a significant firstborn-laterborn difference between members of a genealogical society and a control group of "hobbyists"; no details were presented. We investigated the question using both historical archives and field research methods.

Methods

Study 3a used archival materials, namely, two collections of "family histories" from the rural communities of Binbrook, Ontario (Binbrook Historical Society 1979) and Antler, Saskatchewan (Antler and District History Committee 1983). These compendia included histories of families owning property in the township of Binbrook between 1792 and 1973, and histories of families living in the district of Antler between 1892 and 1982.

For analysis of differential participation in this work in relation to birth order, the birth position of each of the individuals who played the role of family genealogist within their own natal sibships was noted, and the observed frequencies of firstborns, middleborns, and lastborns were compared to "expected values" computed in the following way. It was taken as a given that each family history had been compiled by some member of the sibship to which the actual compiler belonged, and the null hypothesis for computing expected values was that each member of the sibship who lived to adulthood was equally likely to have played that role. (Thus, for example, a genealogist with two siblings would have contributed 0.33 to the expected numbers of firstborn, middleborn, and lastborn genealogists; one with three siblings would have contributed 0.25 to the expected number of firstborns, 0.50 to the expected number of middleborns, and 0.25 to the expected number of lastborns; and so forth.) Actual numbers were then compared to the expected ones via Chi-square analysis. Every one of the 136 genealogists of their natal families in these two compendia had at least one sibling.

Study 3b used a questionnaire filled out by volunteer respondents who frequented genealogical newsgroups on the Internet. The questionnaire contained demographic questions including questions indicating the respondent's birth order and sibship size; questions about the respondent's rationale for doing genealogical research; the "Whom, of all the people you know, are you closest to?" question used

in the previous studies; and a question addressing "radicalness" ("Do you think that you are open to new and radical ideas?"), which was based on the findings of Sulloway (1996). This question was included both in an attempt to replicate Sulloway's findings and to unobtrusively see whether the sample was similar to that of a "normal" population. Participation was, of course, entirely voluntary. Those who elected to respond e-mailed their questionnaires to an account created for that purpose. Participation in relation to birth order was compared to expected values by the same method as was applied to the archival data in Study 3a, and responses to other questions were compared by birth order. The mean age of these respondents was 45.54 $\pm$ 11.59 years.

Results

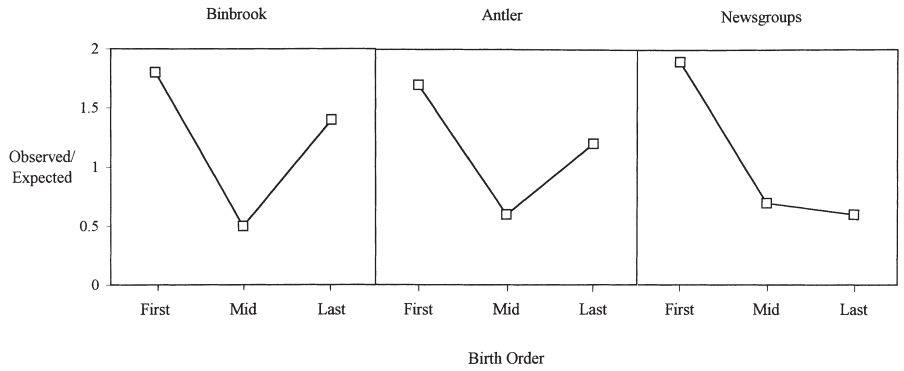
Figure 4 portrays the relationship between birth order and genealogical research participation in the various groups.

In Binbrook, firstborns were 4.6 times more likely than middleborns to submit a family history, and the difference between observed and expected birth orders of the submitting genealogists was highly significant (Chi-square 2 $df = 19.5$, $p < .001$). When the 28 male and the 37 female genealogists are considered separately, the same pattern of underparticipation by middleborns is significant ($p < .05$) in both.

The results for Antler replicate those for Binbrook. Again, fewer middleborns than expected submitted family histories (Chi-square 2 $df = 14.5$, $p < .001$), with firstborns being 3.6 times more likely than middleborns to submit a family history. Again, the same pattern held when the 31 male and 40 female genealogists were considered separately ($p < .01$ in both cases).

One hundred Internet genealogy newsgroup respondents (56 women and 44 men) returned the electronic questionnaire. Differential participation by birth order was again highly significant (Chi-square 2 $df = 33.03$, $p < .001$), with firstborns 2.7 times more likely to submit a questionnaire than middleborns, but in this instance

FIGURE 4. The ratio of observed to expected numbers of each birth order submitting family histories or responding to the e-mail questionnaire.



lastborns were also underrepresented. Moreover, even within this sample of volunteer respondents self-selected for an interest in genealogy, birth order effects on family sentiment were replicated. Echoing the undergraduate respondents in Studies 1 and 2, 41% of the 59 firstborn Internet genealogists nominated mother as the person to whom they felt closest, as did 52% of the 19 lastborn respondents, compared to just 14% of the 22 middleborns (Chi-square 2 $df = 10.44$, $p < .01$).

The effects of mother's age at the respondent's birth on her chance of being nominated as the respondent's closest interactant were assessed within firstborns and lastborns considered separately. The average age of mother at the birth of the 24 firstborn genealogists who nominated her was 25.9 years, whereas the 35 firstborns who nominated someone else were born to women whose mean age was 25.1. This difference was in the predicted direction, but was not significant (t 39 $df = 0.5$). For lastborns, the average age was 33.8 for those nominated and 31.3 for those who were not nominated (t 13 $df = 0.65$), which was again in the predicted direction, though not significant. There were not sufficient mothers nominated by middleborns to make this comparison.

There was no apparent effect of birth order on professed rationales for conducting genealogical research, but there was a significant sex difference, with women more likely to articulate family as a motivation for research whereas men (particularly firstborn ones) were more likely to explain their interest in terms of a general interest in history. As for the question addressing the issue of "radicalness," firstborns were the least open to radical views (Chi-square 2 $df = 17.09$) with 47% of firstborns saying "yes," whereas 86% of middleborns and 89% of lastborns said "yes." There were no apparent sex differences.

DISCUSSION

Sulloway (1996) argued that birth order is the key determinant of innovativeness and additional aspects of scientific and other careers, ultimately because firstborns are the beneficiaries of parental favoritism and have the most to gain from upholding the status quo. Although most of his analyses contrasted only firstborns versus "laterborns," Sulloway (1996: 305) also noted that whereas firstborns "have an edge in courting parental investment," the "losers" are "often middle children," because the lastborn has the advantage of being "the only member of the family to receive parental investment undiluted by the needs of a younger rival."

In the studies reported here, birth order was found to have a large impact on self-concepts, on nominations of one's closest social ties, on claims about who one would turn to for help, and on self-selected participation in genealogical research. As predicted from an evolutionary psychological analysis of discriminative parental solicitude (Daly and Wilson 1995; Wilson and Daly 1994) and from the analysis by Sulloway (1995, 1996) of intrafamilial niche differentiation, firstborns were consistently found to be the most parentally and familially oriented, and middleborns the least.

Kidwell (1982) called middleborns "the neglected birth order," suggesting that the prevalent practice of comparing firstborns to laterborns has masked the effect of

being a middleborn. Arnstein (1978) proposed that the condition that distinguishes the middleborn position is its lack of perceived distinction and attention in the family, and he suggested that this lack of uniqueness may result in a tendency for the middleborn to be overlooked by parents and to receive less special attention. Most research on birth order has either contrasted firstborns versus laterborns or analyzed in terms of each serial position (first versus second versus third, etc.). The categorization first versus middle versus last has been used only rarely, but as we noted in the Introduction, the few previous results are consistent with the present analysis in indicating that middleborns can rely on parental support less than either first or lastborn children, and that they respond accordingly (Kennedy 1989; Kidwell 1981, 1982). Salmon (in press) has demonstrated that the use of kin terminology ("My brothers and sisters . . .") to elicit support for political views is more effective when the listeners are first or lastborns than middleborns, another indication that middleborns are less affiliative with kin.

Some critiques of the birth order literature have suggested that family size is confounded with birth order and that this makes apparent birth order effects spurious. Middleborns necessarily come from sibships of three or more, whereas firstborn and lastborn groups could include many subjects from two-child families. However, Figure 2 illustrates that these birth order effects are not artifacts of family size. Looking at firstborns versus middleborns versus lastborns within a given sibship size, effects of birth order on nominations of one's closest interactants remain large.

The chroniclers of Binbrook and Antler family histories represent traditions of rural landholding in which farms usually were inherited by the eldest son. It is hardly surprising that middleborns in such a situation should be relatively disinclined to take an active interest in family history. But it is perhaps less obvious why birth order effects were as striking among women as among men, and why lastborns are keener genealogists than middleborns (Figure 4). Not only does primogeniture in inheritance seem to dictate a firstborn-laterborn contrast, but one might also note that the greater reproductive value of firstborns affords them a greater "fitness value" to other family members in much the same way as to parents, whereas the evolutionary psychological rationale for "indulging" lastborns applies only to parents. Results for the web genealogists would appear to jibe with these arguments for a firstborn-laterborn contrast, since both middleborns and lastborns were underrepresented. However, it should be noted that firstborns are generally overrepresented on the Internet, as they are in college (www.cc.gatech.edu/gvu/user_surveys).

In Study 3, the middleborn Internet respondents were the least likely to claim family as the main rationale for conducting their research, in some cases even stating that friends provided the main encouragement. An interesting additional point is that female respondents actually outnumbered males, despite a predominance of males on the Internet and on newsgroups in particular (Clerc 1997). This result echoes the finding of Salmon and Daly (1996) that Canadian women have more extensive (or more accessible) genealogical knowledge than their brothers, presumably reflecting the fact that family "kinkeeper" is predominantly a female role.

It is not our claim that lastborns are more like firstborns than like middleborns in all domains. Self-professed openness to "new and radical ideas," for example,

differentiated firstborn versus laterborn Internet respondents in Study 3, in exactly the way that the discussion of Sulloway (1996) would predict. The study by Davis (1997) of the relationship between birth order, sibship size, and status striving in modern Canadians demonstrated that firstborns are more status oriented than lastborns, specifically with middleborns excluded from the analysis. Although both first and lastborns may enjoy relatively high and dependable levels of parental investment, there may be qualitative differences. Kidwell (1982: 226) argued that parents invest heavily in firstborns because of high achievement goals, whereas "for the lastborn, the standards and expectations are relaxed, and parental attentions are directed toward the greater enjoyment of the last child—the baby of the family."

Increasing "indulgence" as birth order rises also is to be expected on the basis of increasing maternal age (Wilson and Daly 1994). In Study 1, such an age effect was demonstrably distinct from the birth order effect, as mothers who were older when the respondent was born were substantially more likely to be nominated as "closest" within both the firstborn and lastborn groups. No such effect was apparent in middleborns, perhaps because of a "floor effect": only 7% nominated mother at all.

In sum, these results support Sulloway's claims concerning the powerful impact of birth position on family relations. The combination of firstborn favoritism, lastborn freedom from competition from successors, and maternal age effects appears to result in greater family interest and reliance on the part of first and lastborns, whereas middleborns apparently invest more of their efforts in non-kin reciprocal relationships.

This research benefited greatly from the support and constructive criticism of Margo Wilson. Thanks also must go to Frank Sulloway for several helpful conversations and suggestions. Financial support for this research was provided by a grant to M. Daly from the Natural Sciences and Engineering Research Council of Canada.

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