

Effects of Birth Order on Personality: A Within-Family Examination of Sibling Niche
Differentiation.

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Abstract

The Sibling Niche Differentiation Model (Sulloway, 1996) suggests that an individual's birth order acting as a proxy for within-family environmental factors like age, size and strength relative to ones siblings influences the strategies used to gain resources and minimize sibling conflict. Recent within-family birth order research (for example Paulhus, Trapnell and Chen, 1999; Healey & Ellis, 2007) has found a systematic effect of birth order on personality, with firstborn siblings found to be more conscientious and secondborn siblings more open to experience. However, an examination of birth-order effects by independent raters, has been lacking in the birth order literature. Furthermore no prior examination comparing the type of stimulus material used to elicit participant responses has been conducted. Study 1 (N = 203) sought to replicate previous birth order findings for the two Big-5 traits Conscientiousness and Openness to Experience, while also testing an alternative explanation (hypo-masculinization hypothesis) for observed birth-order differences (Beer & Horn, 2000). Study 2 compared the efficacy of four different types of stimulus material (rankings, ratings, independent ratings and real-world scenarios) in observing birth order effects (combined N = 544), while also testing novel predictions about the saliency and generalisability of birth-order effects on personality outside the context of the family. General support was found for the Sibling Niche Differentiation Model across studies and across stimulus materials, but limited support was found for the nature of within family personality differences between siblings extending to contexts outside the family environment.

Chapter One: Birth Order and Personality

The overarching tenant of this dissertation is that the birth order of individuals within a family implies differing developmental needs. As a means to ensure access to the resources determined by these needs, siblings diverge in their developmental strategies by “carving their own niche” and these strategies manifest as behavioral and personality differences between siblings. This dissertation begins by examining the behavioral-genetic evidence relating to the origins of personality differences between individuals, particularly between siblings. Following this, I appeal to relevant theories in evolutionary biology to explain the forces that shape an individual’s development; shedding some light on the possible underlying causes driving sibling interactions. After a brief appraisal of the history of birth order research up to 1984 (the year that birth order research died according to eminent researchers of the time), Frank Sulloway’s (1996) evolutionary niche model of personality differences between siblings is outlined. Next, an extensive, breakdown of the birth-order research examining Sulloway’s, 1996, niche differentiation model is undertaken. Finally, based on this analysis of the past birth order literature, I highlight the key issues and research goals currently in need of investigation, and provide the rationale for the empirical methods employed to test the hypotheses relating to the effects of birth order on personality development.

Personality: Shared and Nonshared Experience

According to a voluminous output of research over recent years in the field of behavior genetics, it has been found that genetic influences account for roughly 40 percent of all variance in individual personality, nonshared environments account for about 35 percent; and shared environments account for only five percent of the variance in individual personalities, with the

remaining 20 percent put down to measurement errors (Sulloway, 1999, 2001; Plomin & Daniels, 1987, Turkheimer & Waldron, 2000). The most striking of these results is perhaps the small role that shared experience plays in the formation of an individual's personality. As a fair proportion of personality is formed during the early years of development, one startling implication of these results is that the personality of an individual growing up with brothers and sisters in the same family (having shared experience) is likely to be as similar to a complete stranger, as it is to one or more of his or her siblings' personalities. In short, shared family experiences seem to have little effect on the formation of an individual's personality (Turkheimer & Waldron, 2000).

The apparently small role played by shared family experiences in forming personality has provoked a good deal of criticism and refinement in the methods adopted in the field of behavioral genetics (Moffitt, 2005). For example, recent reviews have shown that estimates of the amount of variance given to the shared environment may need to be increased, the importance of gene-environment interactions is becoming apparent (Moffitt, 2005), and the concept of "shared environment" has been shown to be anything but straightforward or simple.

Taking this last feature – the concept of a shared family environment – it has been argued by Sulloway (2001), among others, that the within-family environment in which siblings coexist does not necessarily lead to shared sibling experiences. Experiences that two or more siblings have in common, which are typically considered shared experiences, have many differentiating factors. For example, siblings are likely to be of different ages and genders leading to differences in size, strength, and cognitive maturity - which would result in differing experiences and interpretation of apparent shared events, leading to differing effects on development.

Additionally, as the specific needs and wants of individual siblings differ so should their interpretation of the shared environment. Indeed, in many cases divergent responses to shared stimuli may be beneficial to the siblings within the same family environment. Nowhere is this more obvious than in the competition for resources that takes place between siblings. At an early age the majority of resources an individual sibling requires arrive via parental allocation. While in modern cultures parental distribution of resources to siblings is ideally equal, historically and in contemporary tribal societies unequal distribution of resources to siblings is commonplace, from investing heavily in the oldest child (primogeniture) to investing more in the youngest (ultimogeniture). Parental distribution of resources to their children is typically predicated on the availability of resources at any particular time and gaining access to these resources is the dilemma that all siblings face.

Sibling competition and differentiation

Any individual sibling within a family will be better served by diverting parentally allocated resources to themselves at the expense of the other siblings. Solutions to this problem in most species typically favor the eldest offspring, since the eldest is more often than not the biggest and strongest. In most cases this leads to either siblicide by the eldest against the youngest or a reduction in resources acquired by younger siblings as their elder sibling counterpart monopolizes scarce parental resources. In species that produce litters of offspring this is most evident -- the runt is least likely to survive whereas the older, bigger and stronger offspring have a considerable advantage (Suloway, 2007).

The idea of age differences between siblings in species producing litters may not seem important, given that the time differences in birthing of multiple offspring in many litter species

typically varies from minutes to hours (in some cases there is even no correlation between birth order and size and strength) and not years as is more typical in *Homo sapiens*. However, for siblings in litter species the crucial developmental period occurs very early. If they fail to get access to food in the first few days their chances of survival are very low, and being in direct short-term competition with multiple combatants, the strategies available are limited. In such cases genetic endowment, size and strength, are the most important factors in acquiring resources. The point here is that genetic endowment is the strong determining factor; the big and strong survive, the weak and small perish (Sulloway, 2007).

Homo sapiens, in contrast, have large gaps between fewer offspring. While genetic factors undisputedly impact upon many aspects of individual functioning, salient environmental factors also play a strong role. Developmental plasticity in ever-changing environments is adaptive. Physiological capacities that display developmental plasticity tend to facilitate phenotypic change as the environment changes. The adoption of particular resource-gaining strategies (so the argument goes) to solve the problem of resource acquisition in *Homo sapiens*, displays developmental plasticity by encouraging phenotypic change (via personality) when particular cues are present or lacking in the environment (Sulloway, 2007).

In essence, it is argued that the diversification of sibling resource-gaining strategies is one such psychological capacity that reduces competition between siblings within the family environment and can manifest itself in terms of differences in sibling personality. How individuals react to the world within the family, and their identity within the family, are heavily determined by their needs, wants, age, size, and relative status. Birth order says a great deal about relative age, size and position of power within the family. In essence the birth order of any sibling in the family can be regarded as a short hand proxy for the factors that determine and

influence the amount of competition, and thus the range of strategies open to individuals in their quest to secure access to resources within the family.

Siblings who fail to adopt alternative strategies in the presence of competitors, especially when the competitors are bigger and stronger, lower their likelihood of surviving critical developmental periods. Without plasticity in developmental strategies such failures signal genetic death for those traits the individual carries, at the expense of those that confer survival and reproductive advantages in another individual. As is the case for all biological organisms, human siblings are faced with the prospect of “adapt or be doomed.” For siblings within the same family this means finding a strategy that allows them access to resources while minimizing potentially dangerous sibling conflict (Sulloway, 1996, 1999, 2006).

For the firstborn child this direct competition is not present since there are no other siblings to compete with. Only the child’s parents stand between him or her and the resources required. In this case the best strategy to acquire resources may be by pleasing the parents. Admittedly, few parents would be likely to refuse their only child access to resources such as food, clothing or attention if the child failed to ‘please the parents’ as such. Yet the reality of the situation suggests that all the child needs to do is acquiesce to the parents’ demands in order to easily gain access to resources. Regardless of whether these demands are for good behavior, clean hands before dinner, or even the expectation of a tidy bedroom, once the child conforms to parental expectations the resources will normally be made available with little hesitation. Thus, one finds that firstborn siblings are likely to adopt strategies for gaining resources that involve parental approval, such as high achievement on tasks and conforming to parental demands (Sulloway, 2007).

These strategies acquired via birth order become, over time, ingrained and manifest as personality traits, so the argument goes. This leads to the idea that firstborn siblings will more likely be considered the high achiever or conformist within the family (Sulloway, 1996, 2007).

For the second born siblings the situation is somewhat different. From the moment they arrive in the family they have a rival for parental attention and resources; a rival who is older, bigger, usually stronger, and one who has already secured a fruitful resource gaining strategy. This is where conditional adaptive strategies can be seen at work. For the second born sibling to mimic the strategy of the firstborn would be to their detriment. Competition and rivalry between the siblings would intensify and owing to the firstborn being older, bigger and stronger, the second born sibling would more often than not end up losing out. A more adaptive strategy may be for the second born sibling to carve his or her own niche. Faced with an older, stronger and often more aggressive sibling the second born may turn to more alternative low-power strategies, which appeal to the parents' sense of justice and fairplay, or which avoid direct intersibling-competition. Thus one finds that secondborn siblings, will often seek an alternative strategy to gain access to resources. As a result of (perhaps unconsciously) adopting alternative strategies the secondborn sibling is more likely to be considered unconventional, rebellious and open to new experiences - what is commonly thought of as a personality style high in "openness to experience" - in relation to their firstborn brother or sister (Sulloway, 1996; Paulhus et al., 1999; Healey & Ellis, 2007).

While patterns may emerge in sibling strategies (e.g., firstborn favoring the status quo) the contingent adaptive strategies the individual adopts are not set in stone. The particular strategy a sibling adopts is greatly influenced by the strategies adopted by other siblings within the family and also by the degree of competition between the siblings. Siblings, for example

firstborn and thirdborn siblings who differ in age by five years, have differing needs and hence different resource requirements and may in fact adopt strategies that are similar in nature. Conversely, the more two siblings are in direct competition for the same resources the more likely their long-term strategies will be different (Sulloway, 1996, 2007).

A Brief History of Birth Order Research

In the last 150 years one of the pioneering and most prominent theorists to comment on the relationship between birth order and personality was Freud's disciple Alfred Adler. From clinical observations and accompanying anecdotal evidence Adler (1928) suggested various personality dispositions that should relate to an individual's ordinal position within the family. Adler suggested that the firstborn sibling would be strongly nurtured and loved in the family until the arrival of a second child, whereupon the firstborn would have feelings of resentment as his or her special status in the family is lost. The firstborn would feel 'dethroned' and would in time become neurotic and be more likely to end up institutionalized as well as suffer from substance abuse. According to Adler, the last child in the family would be spoilt and overindulged and thus find him or herself unprepared emotionally in the world of human social interaction. The middle child, or children, from Adler's perspective would be the most functional, secure and successful in the family, mainly because they have not experienced the negative influences of dethronement and overindulgence. However, Adler failed to provide any empirical evidence for these speculative suggestions, nor did he offer any testable theory for these expectations.

After Alder came a raft of research examining the relationship between birth order and almost every conceivable aspect of human psychology including personality, schizophrenia,

learning, intelligence, creativity, and insomnia. In an effort to make sense of the wealth of birth-order research from Adler onwards, Swiss researchers Ernst and Angst, in 1983, published an influential review of the birth-order literature. Their examination of over 1000 birth-order studies indicated that birth-order effects on personality were trivial and that the prevailing research methods had repeatedly failed to generate replicable significant findings. They argued that birth-order researchers were clutching at straws. However they noted that the majority of studies reviewed suffered from a variety of methodological problems such as failure to apply weighting for sibship size and lack of control for confounding variables like social class (socio-economic status) and ethnicity.

Ernst and Angst (1983) also made the claim that within-family analyses are better suited for birth-order research as by their very nature they control for extraneous environmental and genetic factors. Moreover, they noted that this kind of study in which family members made judgments of each other often found positive results. These two factors, within-family analyses and family oriented methodologies, emerged in later research as the approach most likely to provide sufficient power for uncovering birth-order effects. These issues will be discussed later.

Despite Ernst and Angst's pessimistic critique of the research methods employed in birth-order research, other scholars and researchers offered insightful commentaries and observations on the birth-order field in general, many of which are now being rediscovered in the contemporary birth-order literature. These include Schooler (1972), Breland (1974) and Kidwell (1981) who all recognized that the influence of spacing in the number of years between siblings needs to be taken into account when examining the influence of birth order. Schooler (1972) suggested that birth-order analyses needed to include a careful examination of all possible combinations of age spacing, coupled with all possible gender combinations between adjacent

siblings. Similar conclusions were reached by Breland (1974) who found that siblings reared “in isolation”, where there were large age spacings between the target sibling and their adjacent sibling, tended to perform better on tasks of verbal and nonverbal achievement compared to siblings with a small spacing between them.

In one of the most informative early investigations in the birth-order literature, Kidwell (1981) noted that when the age gap between adjacent siblings, for example between a secondborn and thirdborn sibling becomes large enough (i.e., above 6 years) the family environment becomes very different. The upshot is that the thirdborn finds him or herself in an environment that is close to what a firstborn sibling occupied as an only child. Kidwell highlighted the point that birth-order research at the time typically tended to ignore the influence of age spacing and tended to group all thirdborn siblings together. She cited the birth-order literature prior to 1970, which generally posits that firstborn siblings are the recipients of more parental attention and interaction, are more likely to receive stricter upbringings, have higher expectations thrust upon them, and are expected to be more responsible. Such expectations on subsequent siblings decrease as the ordinal position within the family increases (Sears et al, 1957; Lasko, 1954; Rosen, 1964 and Kammeyer, 1967; all cited in Kidwell, 1981).

In stressing the affects of birth order, Kidwell (1976, 1981) outlined a curvilinear model of sibling age spacing (using a male-male only sibling sample) as it affects the children’s perceptions of parental reasonableness, supportiveness, and lack of punitiveness. Where age spacing is less than one year and more than five years this renders positive perceptions by the child, and the remaining age spacing produce more negative perceptions. This curvilinear model is also observed when applied to ordinal position within the family. Where age spacing between all siblings of more than one year and less and than five years exist firstborn and thirdborn

siblings report more favorable perceptions of their parents being reasonable, supportive and less punitive than do secondborn siblings.

A further analysis by Kidwell (1981) showed that when age spacing was controlled, the postulated differences in these perceptions by birth order disappeared. These findings led her to suggest that a five year gap between siblings leads to an optimal environment in which the demands on parents to give attention and resources to the siblings are minimized owing to a reduction in similar needs and demands by the other two siblings. She also highlights the effects that a spacing of less than one year has on the family environment and suggests that more favorable responses by the children are caused by the parents treating the two siblings in a two-for-one manner, where the effort of giving the necessary attention and resources is minimized owing to the two siblings having very similar requirements. Thus when the age spacing of siblings falls between one and five years, although there is overlap in the required needs of siblings, these needs are not identical, which results in a drain on parental attention and application. This age gap is sufficient to cause a disparity, in the siblings' perceptions at least, in the distribution of essential resources.

Kidwell's analysis was framed in the context of the quality of the parent-offspring relationship and revolves around the idea of differential parental treatment of siblings, although her findings are also explained in part by the reduction in competition between siblings for access to parental resources, be they physical resources like food and shelter, or emotional resources like attention and stimuli. This implication is echoed in Sulloway's family niche model of sibling deidentification via competition for resources, developed 25 years later (Sulloway, 1996), in which direct competition for resources results in differing sibling strategies being adopted in order to gain access to these resources.

Sulloway and the Evolutionary Niche Model of Personality

The name most associated with theorizing and research in the birth-order field in recent years is the renowned historian and Freud scholar, Frank Sulloway. Indeed, the birth-order field is experiencing a rebirth following the release of Sulloway's 1996 book "Born to Rebel: Birth Order, Family Dynamics and Creative Lives". In this book Sulloway examined prominent historical figures, their birth order, and their attitude toward scientific innovation. He argued that prominent historical firstborn figures were more conservative and resistant to change than their secondborn siblings, who were more open to new ideas and radical innovation including scientific theories and social movements. Sulloway conducted a meta-analysis of prominent historical figures and their reaction to innovative scientific ideas as well as a meta-analysis of the research findings discussed by Ernst and Angst (1983) and found modest but consistent patterns of birth-order effects (Sulloway, 1995, 1996).

The underlying theory behind these systematic birth-order differences is firmly evolutionary, according to Sulloway, and argued it is primarily conflict in an evolutionary context that drives these differences. Hamilton (1966) and Trivers (1972) introduced the notion of parental investment as a key factor regarding Darwin's (1859) theory of sexual selection. In particular, differential parental investment encourages developmental plasticity in the strategies adopted by offspring in the quest for mates. Sulloway couples this notion with further work by Trivers (1974) on the idea of parent-offspring conflict. Sulloway and Trivers both argued that the pool of resources available to parents for investment in, and distribution amongst, offspring varies over time within the family unit, implying the need for flexible offspring strategies as they strive to attain the necessary resources (Sulloway, 1996, 2007; Trivers, 1974).

This integration by Sulloway of established evolutionary theories provides a well grounded theoretical basis for explaining the sources of conflict in parent/sibling relations and the factors underlying the adaptive needs of offspring. Sulloway's (2007) family dynamics model of birth-order differences in human behavior works from this theoretical base providing a more refined account of the relationship between parents and offspring. Sulloway suggests that the conflict in perceptions of an equal and fair distribution of resources between parents and offspring is the first of four primary causal mechanisms driving differences in sibling personality.

The second causal mechanism Sulloway calls 'dominance hierarchy effects' where the type of strategy siblings adopt in the face of competition for access to resources is influenced by disparities in size and strength between siblings. Typically, older siblings are further along the developmental path than their younger siblings, and are thus bigger and stronger. Firstborn children are in effect the 'alpha males'. For the firstborn sibling more physical strategies like intimidation and aggression may prove fruitful against their smaller and weaker younger siblings, resulting in more dominant and assertive personality styles (Sulloway, 2007).

If physical aggression and intimidatory tactics are punished or discouraged by parents, as they typically are, these dominance effects may be manifest by firstborn siblings using their higher status and established position in the family as a means by which to retain the status quo. Acquiescence to parental demands and expectations would be the resulting behavioral patterns for firstborn siblings and their subsequent manifestation in personality representing higher levels of conscientiousness and achieving, and lower levels of openness to new ideas and experiences.

Filling the role of surrogate parent to younger siblings would be another way for firstborn children to do this. It is this role filling or 'niche-partitioning' that, according to Sulloway, is the third causal mechanism behind sibling personality differences.

Sulloway's fourth causal mechanism, 'sibling deidentification' suggests that differences in age between siblings is a strong determinant of the adaptive strategies employed by each sibling. Where there is a small age gap between siblings their developmental requirements often overlap, and accordingly competition amongst the siblings to secure parentally determined resources increases. Deidentifying or diversifying in the strategy each sibling adopts leads to niche partitioning; that is, each sibling finds their own niche within the family direct sibling competition is reduced. For siblings that have large age gaps between them and therefore have differing developmental needs, according to age, the adoption of different strategies (finding one's niche within the family) arrives by necessity and not as a strategy to reduce direct sibling competition.

Sulloway's theorizing has furthered our understanding of birth-order effects by providing a framework for nuanced and more precise tests than prior research. Certainly, global claims about the impact of birth order on human psychology fail to take into account the multifaceted nature of the phenomenon. Sulloway's emphasis on functional birth order over ordinal position in the family is a key concept; for example, within a family where the age gap between the firstborn and secondborn sibling is large (greater than five years), both the firstborn and secondborn may display characteristics typical of a firstborn sibling. Owing to the different ages of the siblings there would be minimal competition between them and the necessity to deidentify would be absent; thus, the secondborn sibling may take the direct route to resource acquisition, as the firstborn before them did, through acquiescence to parental demands and the subsequent

adoption of parental norms and values (Sulloway, 2007). In this case both the firstborn and secondborn can be seen as functional firstborns.

A further example of functional birth order rather than ordinal birth position being a strong determining factor of the roles siblings adopt within families is that of conformity in female-female sibling pairs. In this case, running contrary to the expected pattern, second born siblings are the more conforming of the two sisters. This is owing to siblings learning gender appropriate behavior from each other. The younger of the two sisters grows up seeing her older sister as model of female behavior, and thus the younger sister emulates the sisterly virtues including cooperation and conformity (Sulloway, 1996).

The notion of functional birth order highlights the point that it is the sibling's role within the family in relation to other siblings -- primarily the age gap between them -- that is the driving force behind birth-order effects, rather than their direct ordinal placing (simply first versus second born). In turn niche-partitioning, deidentification, dominance hierarchies, and parental-investment, or related sibling perceptions, all play a part in determining the role each sibling adopts in an effort to find adaptive solutions to the problems inherent in familial dynamics (Sulloway, 1996, 2007).

Empirical Tests of Sulloway's Model

The following section will review literature that either directly tests or has implications for Sulloway's theory. First, research that directly challenges aspects of the evolutionary niche model of personality are examined, this is followed by a review of studies that provide confirmatory evidence for Sulloway's theory.

Recent Research Disconfirming Sulloway. Freese, Powell and Steelman (1999) utilized both between-family and within-family approaches. Freese et al. used 24 measures of social attitudes such as “support for existing authority” and “opposition to liberal social movements” – which broadly fall under the Big-5 category “Openness to Experience” (Schmitt et al., 2008) – from the General Social Survey (GSS) ($n = 1945$). They ran various regression analyses (four different models) employing controls for age, sibship size, race and parent’s education among others. None of these analyses yielded results in support of Sulloway’s hypotheses and many provided contradictory findings. Freese et al. however conceded that there existed a call within the literature (e.g., Rutherford & Sewell, 1991 cited in Freese et al., 1999) for birth-order studies to employ within-family data. Their second study attempted a within-family analysis.

Linked with the 1994 GSS, the Study of American Families (SAF) interviewed one randomly selected sibling of the GSS respondents. Freese et al. (1999) matched the GSS and SAF data and proceeded to remove cases where the selected sibling was a step-, half- or twin, so that the retained data was from firstborn and laterborn full siblings within each family. Matched-pairs t-tests were used in the analysis of this within family data. Like the analyses using between-family data, birth order was not found to be a significant predictor of any of the measures of social attitudes they employed. Their general conclusion was that birth order is unable to predict social attitudes as Sulloway suggests they can.

One of the more important pieces of research in the birthorder field was conducted by Beer and Horn (2000) who attempted to not only test Sulloway’s theory but also test it against their own theory - hypo-masculinization hypothesis (PHH). Like Freese et al. (1999), Beer and Horn’s (2000) research employed both within and between family methodologies. In an attempt to separate the effects of biological birth order from rearing order Beer and Horn’s 2000 study

employed two samples of adoptee cohorts (Texas Adoptee Program, TAP, $n = 208$; Colorado Adoptee Program, CAP, $n = 218$), all of whom were biological firstborns reared in various ordinal positions. Using these samples they were able to conduct between-family analyses (both CAP & TAP) and a within-family analysis (CAP only) of birth-order differences in personality as measured by the Sixteen Personality Factor Questionnaire (16PF). Beer and Horn (2000) matched items on the 16PF to the relevant Big-5 categories, providing items for all Big-5 categories. They conducted analyses on all 16PF scales as well as selecting and combining 23 single-items that according to Sulloway's theorising, would show the greatest difference by birth order (comparing firstborn and laterborn siblings). In their between-family analyses no statistically significant birth-order effects were observed. The within-family analysis was more fruitful, with the 16PF-G scale (Conscientiousness for the Big-5) showing a statistically significant difference in the predicted direction by birth order (i.e, firstborns rated higher than secondborns) with a similar effect size to that found in other research ($r = .14$, $d = .32$). Their analysis of the 23 combined single-items hypothesized by Beer and Horn (2000) as most likely to show the greatest difference by birth order was also statistically significant ($p < .05$) with a moderate effect-size between siblings ($r = .13$, $d = .32$).

Despite finding significant personality differences by birth order, in the predicted direction, when using within family methodologies; Beer and Horn (2000) interpreted their results as failing to support Sulloway's model of sibling niche differentiation being the driving force behind sibling differences in personality and instead offered an alternate hypothesis. Beer and Horn (2000) cite Blanchard and Klassen's (1997) observation that males with older male siblings were significantly more likely to display stereotypical feminine behaviors and characteristics the further down the birth order they were and the more older brothers they had.

Blanchard and Klassen (1997) suggest the birth of subsequent male children causes mothers to become progressively more immune to the effects of the H-Y antigen. The H-Y antigen is a male-specific secreted protein activated by a gene on the Y chromosome causing the undetermined embryonic gonad to differentiate into testes. Beer and Horn (2000) posit this prenatal hypo-masculinization hypothesis as a more likely explanation for many observed birth-order effects on personality.

Beer and Horn (2000) presented hypotheses derived from both PHH and Sulloway's model to be used in future research as tests between these two alternate explanations for birth-order personality effects. Primarily they suggested that PHH would predict that in comparisons of mixed gender sibling pairs from two child families, the males (either the firstborn in male-female pairs or the secondborn in female-male pairs) would be no different from each other on gender specific traits, like tender-mindedness – a 16PF personality item which best fits “Openness to Experience” in the Big-5 - that are affected by prenatal brain development. In contrast they suggested Sulloway's theory would predict that the secondborn male in female-male pairs and the female in male-female pairs (from two child families) would be similar on measures such as tender-mindedness.

Further mixed findings using between-family analyses on the five major personality dimensions came from Michalski and Shackelford (2002a). They conducted a series of analyses including controls for sex, age, sibship size and SES on a sample of full related siblings ($n = 270$), mixed (half-, step-, and adopted-) siblings ($n = 104$) and both combined ($n = 380$). As suggested by Sulloway, these researchers found that in general firstborn siblings scored lower on Agreeableness compared to other siblings. For Conscientiousness where Sulloway suggests laterborn siblings should display this characteristic more than firstborn siblings, Michalski and

Shackelford (2002a) found that birth order did not predict Conscientiousness. When Openness was examined Michalski and Shackelford (2002a) found that Openness was considered a firstborn trait in both the complete and mixed genetically related sample analyses; but for the full genetically related sample birth order failed to predict Openness.

This latter finding led Michalski and Shackelford (2002a) to suggest that “future researchers might consider the genetic relatedness of siblings in their investigations of the relationship between birth order and personality” (p187). This is an important point that further research on birth order and personality would do well to heed as will be shown later.

Another between family approach, this time examining the issue of sexual strategy and its relationship to birth order has been tested by Michalski and Shackelford (2002b). Based on Sulloway’s (1996) theory, laterborns would be more likely to adopt a short-term sexual strategy (i.e., more risk taking) while firstborns opt for long-term strategies (i.e., more conservative). Their results provided mixed findings in relation to Sulloway’s hypotheses (1996). Using a between family methodology ($n = 438$) and multivariate ANOVA, Michalski and Shackelford (2002b) found no difference between firstborn and laterborn siblings in sociosexuality (as measuring short-term sexual strategies) nor on desired age of first marriage (as measuring long-term sexual strategy). But in contrast, and supporting Sulloway, they found that firstborns desired children at an earlier age than laterborns, suggesting to some degree that firstborns favoured longer-term sexual strategies than laterborns. Also, as Sulloway hypothesized, Michalski and Shackelford (2002b) found that laterborns desired more sexual partners than firstborns.

The between-family work of Saroglou and Fiasse (2003) uncovered differences in personality by birth order ($n = 122$, using families with three siblings only). Their study used a standard Big-5 measure of personality via self reports and included a report of the respondent's personality from their mothers. Strong positive correlations between self reports and mother reports were found for all Big-5 measures ($r = .48$ for Neuroticism to $r = .66$ for Conscientiousness). No controls were implemented in their statistical tests. This issue is only addressed in relation to sample selection where they note all participants were of middle socioeconomic status, lived in urban areas, and the majority had some form of higher (post secondary school) education.

Their analyses (ANOVA) of the self report data revealed a significant interaction effect of Conscientiousness by birth order, where they found through post-hoc tests, that middle born siblings scored lowest relative to their older and younger siblings, though this difference was borderline non-significant ($p < .10$) between firstborn and second- born siblings. Interestingly, while the analysis on the mother's reports for Conscientiousness was nonsignificant (again borderline, $p < .10$) post hoc tests showed firstborn siblings were more conscientious than their secondborn counterparts and ratings of firstborn sibling were similar to those given to last (third) born siblings. This quadratic pattern has been observed in previous birth-order studies (Kidwell, 1981; Sulloway, 1996). Saroglou and Fiasse (2003) had little to offer by way of explanation for these findings, despite their own citation and appeals to Sulloway's (1996) family niche model, which would predict such patterns.

Summary of Disconfirmatory Findings. Research by Saroglou and Fiasse (2003), Michalski and Shackelford (2002b), Michalski and Shackelford (2002a), Beer and Horn (2000), and Freese et al. (1999) all failed to provide supporting evidence for Sulloway's evolutionary model of personality. The majority of research reviewed above utilized between family methodologies or hybrid within/between methodologies. Where results are reported that outright contradict Sulloway's theory between family methodologies are typically employed. In those cases where hybrid or within family methodologies are utilized within the research, results that tentatively support Sulloway emerge.

Recent Research Supporting Sulloway. An important set of studies following Sulloway's "Born to Rebel" (1996) were executed by Salmon and Daly (1998). They conducted 3 studies (Study 1 $n = 300$, Study 2 $n = 140$, Study 3 $n = 136$) examining birth order and familial sentiment, testing the claim made in previous birth-order literature (e.g., Kidwell, 1976, 1981) that firstborn and lastborn siblings would view parents and the familial environment as more dependable sources of support than would secondborn siblings. Grounding themselves in Sulloway's (1996) approach to sibling niche formation, and drawing on Kidwell's (1981) findings, they suggested that birth-order research often failed to distinguish between "laterborn" siblings and lastborn siblings, especially when secondborn siblings are lumped in with subsequent siblings for comparison with the firstborn.

Salmon and Daly's (1998) three studies all showed that firstborn and lastborn siblings were more likely to identify with parents and family as a source of support than were secondborn siblings (who typically nominated nonrelatives), with firstborn siblings showing the strongest identification. In Study 1, where size of sibship was controlled for, the relative likelihood of identification with parents and family by birth order remained consistent for all sibship sizes

examined (2 children, 3 children and 4+ children families). Salmon and Daly also revealed an interaction between maternal age (at respondent's birth) and the respondent's birth-order position. Mothers who were older (> 28years) when the respondent was born were more likely than younger mothers to be nominated as the family member to whom they were closest, if the respondent was the firstborn or lastborn child. The reason for this being as parental age increases their future reproductive success decreases thus older parents should invest more in existing offspring relative to older parents (Salmon & Daly 1998).

This maternal age effect, however, was not observed in middleborn children who were least likely to nominate their mother as "closest" within the family regardless of mother's age at the time of their birth. In closing Salmon and Daly (1988) suggested that it is a combination of firstborn favoritism by parents, lastborn freedom from competition from successors, and maternal age, that produce these results. Firstborn and lastborn children identify, rely on, and show interest in family and family members more than middleborn children who are more likely to invest in non-kin reciprocal relationships.

Zweigenhaft and Von Ammon (2000) conducted a between-family study comparing siblings from different families, which implemented controls for confounds such as family size (as reflecting socioeconomic status) and education levels. In a sample of college students ($n = 73$), including 17 who had recently been arrested while participating in rallies and pickets against retail giant Kmart; Zweigenhaft and Von Ammon. found that laterborns were more likely to have had been arrested than the firstborn participants. The use of real world events, arrest via radical behavior, may be the crucial component in this study as individuals actually taking risks in life is very different from the provision of self-reports of their propensity to do so. Thus, examination

of real world behaviors may provide tests of greater power than pure self-reports (Sulloway, 1996, 2007; Zweigenhaft & Von Ammon, 2000).

Another between-family study ($n = 364$), using family size and father's education level as controls for socioeconomic status, as well as employing high school and college age samples, conducted by Zweigenhaft (2002) found mixed results for birth order as a predictor of marijuana use, and levels of activism assumed to be indicators of the personality traits "openness to experience" and rebelliousness". For all participants in the high school sample birth order was found to be the only statistically significant predictor of marijuana use. In the majority of cases laterborns reported more frequent use of marijuana than did middle-borns who in turn reported more frequent use than firstborns. When family-size was taken into account, in the high school sample, a statistically significant interaction between gender and birth order was revealed, in which both laterborn males and females were more likely to have used marijuana than their firstborn counterparts. Neither birth order nor gender on their own were significant predictors of marijuana use, although gender emerged as a predictor of marijuana use in three child families, with males being more likely than females to have been users.

In the college sample the only significant finding in relation to marijuana use was in two child families where birth order predicted more frequent use by the secondborns in relation to firstborns. When Zweigenhaft (2002) examined activism, no significant birth-order effects were uncovered in the high school sample, and in the college sample birth order was a significant predictor of activism only in two child families, as was gender, and there were also interaction effects between birth order and father's education, as well as gender and father's education. Unlike Zweigenhaft and Von Ammon's 2000 study of real world activism, the data employed in the 2002 study were self-reports, which lead Zweigenhaft (2002) to comment "...the findings on

activism probably can be attributed to just how multiply determined political activism is, and to the fact that the measure obtained here was vague” (p 232).

A 2006 study by Mysterud, Drevon and Slagsvold examined gift-giving behaviors in a mixed gender Norwegian sample ($n = 50$). While Mysterud et al.’s research compared siblings from different families they implemented a number of controls in their analyses including number of siblings and money spent on gifts given. Their findings most relevant to the topic of the current thesis – where gift-giving behaviors are examined in the context of sibling niche differentiation and the subsequent within-family identification showed that firstborn siblings were found to give more gifts to kin including relatives outside their immediate family, and middle siblings gave more to male friends than firstborn and lastborn siblings, when number of male friends was controlled for. Middleborn siblings were also less likely to buy gifts personally, instead relying on others to do the purchasing for them, as well as being less likely to have regular contact with their parents than any of their siblings.

An in-depth investigation by Rohde, et al. (2003) examined the relationship between birth order, parental favoritism, closeness to kin, and rebelliousness within the family. Rohde et al., (2003) gathered samples from a number of European countries, including Austria, Germany, Norway, Russian and Spain, as well as a sample from Israel (combined $n = 2024$), and employed measures from previous birth-order research like Salmon and Daly’s (1998) measure of who siblings were closest to in the family. Rohde et al. (2003) excluded participants over the age of 30 years, those coming from families that did not remain intact owing to divorce or loss of parent, twins, those coming from families with step-, half- or adopted- siblings, as well as those with an age difference greater than 8 years between themselves and the next younger or older sibling.

As siblings from different families were compared Rohde et al. implemented controls, where appropriate, for age, country of birth, pairing status and social class. In their analyses of rebelliousness, Rohde et al. (2003) found that the lastborn in sibships of two was more likely ($p < .001$), to be judged as rebellious; but in sibships of three the middle born was considered no more rebellious than the lastborn sibling, while both middle- and lastborn siblings were rated as more rebellious than the firstborn, although this was statistically nonsignificant ($p = .10$).

For perceived parental favouritism the quadratic trend, observed by Kidwell (1981) and hypothesized by Rohde et al. (2003), that firstborn and lastborn siblings were considered favoured by parents more than middleborn siblings, is ambiguously reported by Rohde et al. (2003). In their discussion Rohde et al. (2003) claimed this hypothesis was disconfirmed by a statistically non-significant difference between firstborn and middleborn ratings. However, they neglected to include an examination of the quadratic trend across firstborn, middleborn and lastborn siblings. Rohde et al. (2003) did report the raw percentages of siblings who rated themselves as most favoured (35% of firstborns, 32% of middleborns, 49% of lastborns). This suggested a smaller proportion of middleborn siblings considered themselves the favoured sibling compared to the reports given by firstborn and lastborn siblings and thus provided some evidence for the existence of a quadratic trend in perceived parental favoritism for three child families.

When examining the relationship between birth order and closeness to kin, Rohde et al. (2003) found that in sibships of two, firstborns tended to feel closer to their parents than did lastborn children and in sibships of three, when asked to name to whom they felt the closest in the family, middleborn children were less likely to name a parent. These results supported the

notion of sibling deidentification in that firstborn siblings were more likely to acquiesce to, identify with, and adopt parental norms and values compared to middleborn siblings.

Contrary to previous research by Salmon and Daly (1998), which found that middleborn children were more likely to identify with, and name a nonrelative as the person to whom they felt closest to, Rohde et al. (2003) found that middle born children were no more likely than firstborn or lastborn children to name a non-relative as the person to whom they were closest. When age of mother was introduced into the analyses Rohde et al. (2003) replicated Salmon and Daly's (1998) result. For those siblings who identified more with their mother compared to other family members, when the age of the mother at the respondents birth was greater than 27 years, a quadratic trend emerged where middle born children were less likely to name their mothers as closest compared to firstborn and lastborn children.

Paulhus, Trapnell and Chen (1999), conducted investigations of birth-order effects on personality and achievement using a within-family approach in which participants were asked to compare themselves to their siblings on various personality measures. The four studies conducted used three university aged samples (Study 1: $n = 164$, Study 2: $n = 395$, Study 3: $n = 203$) and an older (>40) aged sample (Study 4: $n = 309$). The first two studies required respondents to nominate the 'rebel' and the 'achiever' within their family; Study 3 extended the criteria variables to include Big-5 personality measures. The purpose of Study 4 was to rule out observed birth-order effects being an artefact of young age university samples; thus a sample of adults from Vancouver, Canada was selected for participation. In general Paulhus et al. (1999) found support for the predictions made by Sulloway's niche model of personality development in that firstborn siblings were rated as more achieving and conscientious and laterborn siblings were rated as more rebellious, liberal and agreeable.

This effect was observed irrespective of the age of participants and regardless of whether or not participants were aware that the relationship between birth order and personality was being examined. As a measure of effect size, Paulhus et al.(1999) adopted a novel technique more at home in the bio-medical literature than in psychology. As some authors have called for (e.g., Rosenthal & Rosnow, 1991) they utilized binomial effect size displays, such as odds-ratios, in reporting the observed size of effect. For example, in Paulhus et al. (1999) an odds-ratio of 2.28 for achieving as a firstborn characteristic means the proportion of firstborn siblings being rated as the achiever in the family is 2.28 times greater than the proportion of secondborn siblings being nominated as the achiever.

In conclusion Paulhus et al. (1999) stressed that within-family analyses were essential in detecting within-family influence such as the affect birth order has on personality. While they disputed Ernst and Angst's (1983) claims that these effects are wholly "parent-specific" – driven by differential parental treatment alone - they acknowledged that they may very well be "family-context-specific" by being manifestly limited in their expression to contexts that mimic that of the individual's early developmental and familial environment (Paulhus et al., 1999).

The relationship between extraversion and birth order was the topic of a 2006 study by Beck, Burnett and Vosper. Sulloway (1996) claims that tests of the relationship between birth order and extraversion that do not tweak apart the sub-facets of the trait would give muddled results, since firstborn siblings would be more likely to give high scores for the temperamental aspects of extraversion whereas laterborn siblings would be more likely to be judged high on the interpersonal side. With this in mind Beck et al. (2006) gathered a sample of 95 participants who were given a take-home questionnaire pack comprised of a 12-item extraversion scale from the NEO Five-Factor Inventory. This within-family study required participants to rate themselves

and their siblings on the sub-facets of extraversion, dominance and sociability. Beck et al. found that firstborn siblings were more likely to be nominated as dominant, than were laterborn siblings, and that laterborn siblings were more likely to be nominated as sociable than were firstborn siblings. Beck et al. acknowledged that within family studies provide the correct research design for uncovering birth-order effects in personality in the context of familial relationships, but tempered this with the suggestion that within family designs magnify differences between siblings in within family contexts that would not otherwise be apparent in other contexts in everyday life (Beck et al., 2006). Thus the examination of whether within family birth order effects translate to the outside world is warranted.

In an effort to bring together some of the concerns raised in previous studies (for example the failure to separate secondborn and thirdborn siblings when they are lumped as “laterborns” or “lastborns” and the need to factor in age gaps between siblings) Healey and Ellis (2007) conducted a within family study examining the relationship between birth order, conscientiousness and openness to experience, employing a number of methodological refinements. The main refinements were derived from the expectations that patterns of sibling deidentification in personality would be most evident between the firstborn and the secondborn siblings when certain conditions apply. First, the age gaps between the two should be no smaller than two years and no larger than five years. This ensures adequate competition is present between the siblings to facilitate the need for deidentification. The second condition is that siblings should be born and raised in the same family and not come from incomplete or blended families containing step-, half-, adopted siblings. Blended families, for example, often experience a disparity in parental investment where a younger sibling who is the genetic offspring of both parents may receive greater investment than an older step- or half- sibling.

Two samples were gathered: (1) a university age sample (mean age = 24.3, $n = 161$) and (2) an older aged sample (mean age = 36.3, $n = 174$), to help identify age of participants as a possible confound. Participants were required to rank themselves along with all of their siblings on various sub-facets of the Big-5 categories Openness to Experience and Conscientiousness. The multiple single-item sub-facets of Openness to Experience, and in turn Conscientiousness, were combined and averaged within their respective Big-5 category to form a combined, or composite, variable for each. Healey and Ellis (2007) found statistically significant differences in the rankings of firstborn and secondborn siblings in both samples on composite variables of the Big-5 categories Openness to Experience (effect sizes ranging from $d = .28$ to $d = .63$) and Conscientiousness ($d = .39$ to $d = .41$). Firstborn siblings were more likely to be considered as conscientious within the family and secondborn siblings were more likely to be considered open to new experiences.

Healey and Ellis (2007) also tested Beer and Horn's (2000) claim that their hypo-masculinization hypothesis (PHH) provides a better model for describing the effect of birth order differences on personality than Sulloway's sibling niche differentiation model. Healey and Ellis (2007) hypothesized that if PHH progressively feminized males as the number of males in the family increased (according to the PHH hypothesis) there should be a more marked difference in personality between males in male-male sibling pairs than between females in female-female pairs. Healey and Ellis' (2007) study found the reverse. The differences between females in female-female pairs were greater than that between males in male-male pairs; thus, their results failed to support Beer and Horn's (2000) PHH model. It must be noted, however, that Healey and Ellis (2007), owing to the nature of their sample, could not make birth order comparisons in

mixed gender pairs and thus were unable to test the hypothesis as explicitly formulated by Beer and Horn.

Summary of Empirical Tests of Sulloway's Evolutionary Niche Model. In general Paulhus et al., (1999), Beck et al., (2005), and Healey and Ellis (2007) provide further evidence in support of Sulloway's evolutionary niche model hypothesis that within family methodologies offer sufficient power to uncover birth-order effects in personality. Research employing between family methodologies and analyses - comparing all firstborn siblings with secondborn or laterborn siblings irrespective of matching within family – have provided contradictory findings in relation to Sulloway's hypothesis. Some lend support to Sulloway's hypothesis (Salmon & Daly, 1998; Zweigenhaft & Von Ammon, 2000; Zweigenhaft, 2002; Rohde et al., 2003; Mysterud, Drevon & Slagsvold, 2006) whereas others (Freese et al., 1999; Beer & Horn, 2000; Michalski & Shackelford, 2002a, 2002b; Saroglou & Fiasse, 2003) showed disconfirmatory evidence or failed to provide conclusive evidence for the evolutionary niche model.

Overview of Current Research Aims

Two studies are included in the current thesis. Study 1 sought to replicate and extend previous findings relating to within family birth-order related differences in sibling personality (Sulloway, 1995, 1996, 2007; Paulhus et al., 1999; Healey & Ellis, 2007). The first aim was to examine differences in rankings of Conscientious and Openness to experience between first and second born siblings of varying gender combinations (i.e., all genders combined, female-female, male-male, female-male and male-female pairs) and family sizes (i.e., all sizes combined, two children, three or more children). Furthermore Study 1 investigated the relationship between

nonconformity, family size and gender. Sulloway (1996) has observed that a subtle interaction should exist between sibling pairs, birth order, and measures of conformity. In female-female pairs who are the only two children in the family the secondborn sister models her behavior on that of the firstborn. Thus she typifies feminine virtues such as cooperation and conformity to group ideas, more-so than does her firstborn sister who is comparatively the more nonconforming of the two. In female-female firstborn and secondborn pairs in families with three or more children, and/or in pairs and families where males are present, the secondborn should more often be the nonconforming of the two siblings.

Finally, Study 1 sought to test Beer and Horn's (2000) hypo-masculinization hypothesis. Previous tests of PHH, specifically Healey and Ellis (2007), provided some disconfirmatory evidence for PHH but failed to directly test the hypotheses Beer & Horn (2000) suggested would provide clear cut evidence for either their PHH or Sulloway's sibling niche differentiation model (at the expense of the other). This was addressed in Study 1 by a test of the hypothesis that in mixed gender pairs from two child families there will be no difference in personality between the males from each pair, where the male is the firstborn child in one pair and the secondborn child in the other. A result showing no difference between the male children should provide support for Beer and Horn (2000)'s PHH, whereas a difference between males in mixed gender pairs would support Sulloway's model, if firstborn males are reported as more conscientiousness and secondborn males are more open to experience.

The second study of this thesis sought to investigate a number of issues not yet touched upon in the birth-order literature. The previous within-family birth-order research of Paulhus et al., (1999), Beck et al., (2005) and, Healey and Ellis (2007), all utilized a single data source (single sibling reports of sibling personality rankings). The possibility exists that using only a

single data source may result in method variance. This could result in biases such as halo-effects, where an individual allows an overall impression or a specific outstanding trait to influence their ratings of the person. In addition, self-serving or defensive attribution biases might bias the results. To eliminate method variance resulting from reliance on a single data source, Study 2 collected data via self- and sibling- reports from firstborn and secondborn siblings within the same family unit. The interval-level personality rating data obtained from these self reports and sibling reports were compared with the single-source ranking data of the form utilized in Study 1 and in previous birth-order literature (Healey & Ellis, 2007) in order to judge the efficacy of the different data gathering methods in uncovering within family birth-order effects.

In addition, peer ratings of personality were collected from an acquaintance of each sibling. This nominated peer (friend or workmate) was someone who knew only one individual of the sibling pair (long enough to assess their personality) and had no intimate knowledge of the dynamics of the sibling pair's family. The peer ratings of each sibling's personality allowed Study 2 to investigate an issue not yet touched upon in the empirical birth-order literature. This issue centers around the generalizability of observed within family birth-order effects on personality. If it is personality per-se being influenced by within family differential sibling experience, then this should be apparent to all observers and not just those with prior knowledge about the roles siblings adopt within the family. In this case, peer appraisals of the target sibling's personality should match those given by the target and their sibling. Alternatively if peer appraisals fail to match self and sibling appraisals of the target's personality, then the expression of personality *traits* would seem to be more context-specific. Study 2 hypothesized that peer appraisals of personality should match those provided by the target's sibling, suggesting a uniformity of personality expression across contexts -- specifically the context of the family

environment versus a work place context free from developmentally established within-family cues.

Study 2 also examined the claim by Sulloway (2007) that situation-specific research should elicit better estimates of general personality traits compared to personality appraisals generated from scale questionnaires free of a real world context. When individuals are asked to provide personality ratings or rankings of themselves and their sibling these responses may be influenced by pre-existing patterns of interaction between the siblings derived from within-family developmental factors. Data obtained from situation-specific (or real-world) scenarios portraying social injustice or criminal activity should allow individuals to express themselves, and thus reveal their personality, without this comparative within-family context influencing their immediate responses. According to Sulloway (2007), the difference in personality between firstborn and secondborn siblings would be more pronounced when siblings make judgements on situation-specific scenarios compared to the difference between siblings when personality estimates are derived from sibling comparison, scale-based questionnaires.

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Chapter Two: Study 1

The main aim of this study was to extend and replicate the work of Paulhus et al (1999) and Healey and Ellis (2007) both of whom provided confirmatory evidence for the claim that differences on the Big-5 personality categories of Openness to Experience and Conscientiousness, between siblings within a family, can in part be accounted for by the individual's birth order; as derived from Sulloway's (1996, 2007) sibling niche differentiation model. Refinements to Paulhus et al. (1999), as suggested and discussed in Healey and Ellis (2007), and derived from Sulloway's model, were implemented in this study; namely, I a) used a within-family data source, b) focused on differences between firstborn and secondborn siblings, c) imposed age gap restrictions on the sample, and d) only used siblings from standard nuclear family settings. Each criterion is discussed in turn.

Sibling Niche Differentiation Model

Within-family data source. Sibling niche differentiation is an adaptive strategy to avoid direct sibling-sibling competition in the acquisition of resources which operates within families. Siblings within the same family are in direct competition with each other and not with siblings from other family units. Thus comparisons between groups of siblings (where the groups differ by their birth order) need to be conducted on sibling pairs within the same family. Effects caused by within-family processes are more likely to be observed by research employing within-family methodologies than those testing siblings between families (Rodgers, 1988, 2001; Rogers, Cleveland, van den Oord & Rowe 2000). This method has the added advantage effect of mitigating the need to control for between family confounds like socio-economic status, ethnicity and genetics. With these points in mind, estimates of sibling personality characteristics obtained

by sources within the family were utilized in this study.

Firstborn and secondborn siblings only. Past birth-order research often fails to distinguish secondborn siblings from those further down the birth-order spectrum. This results in second-, third- and fourthborn siblings (and so on) being lumped together and labeled 'laterborns', with birth-order comparisons typically taking the form of firstborns compared with laterborns. This aggregation of birth-order positions is problematic. With sibling niche differentiation taking place between adjacent sibling pairs it is feasible that thirdborn siblings might differentiate themselves from rebellious secondborns in order to reduce direct sibling competition, and may adopt a more conforming and parentally acquiescing role (one that is very much like that previously filled by the firstborn sibling) (Sulloway, 1996, 2007). Narrowing the focus of study to include only differences between firstborn and secondborn siblings provides the strongest test of the effect of birth order on personality.

Age-gaps. A further refinement implemented in this study was to employ an age gap criterion - no less than 18 months and no more than five years difference between siblings. Sibling niche differentiation is primarily an adaptive strategy contingent on environmental factors used to promote resource acquisition and avoid direct sibling conflict. One environmental factor that would trigger an individual's personal strategy would be the size and strength of their competitor relative to their own, as indexed by the age difference between them. If siblings are too close together in age the environmental cues that trigger birth-order strategies would be absent, owing to very little difference in size and strength between the siblings. The further apart siblings are in age the less their developmental needs overlap and in turn the less they need to compete directly (Sulloway, 1996, 2007; Kidwell, 1981). There would be no adaptive pressure to avoid direct competition if no direct competition exists. Thus, the sibling niche differentiation

model emphasizes functional birth order over ordinal birth order. For example, both an ordinal firstborn sibling and secondborn sibling may display typical firstborn characteristics if the age gap between them is small enough so the need for competition is depressed. In this case both the firstborn sibling and secondborn sibling are considered functional firstborns in Sulloway's model. Invoking a strict age gap criterion between siblings in the current research (18 months minimum to five years maximum) should avoid the possible confound of age difference and the resulting quadratic or zig-zag effects that are likely to follow.

Nuclear family. Where families are split by parental divorce and possible recombination into other family units, or where sibling mortality occurs, or adoptive siblings enter the family, the relationship between biological siblings, the salient environmental cues, and the resulting adaptive strategies employed become complex (Sulloway, 1996, 2007). To control for the effect of all these likely confounds, family units comprising biological siblings only, with no parental divorce or separation, and no intervening sibling mortality or adoptees, should provide the best test of sibling niche differentiation.

Employing the refinements discussed above strengthened the theoretical approach by allowing more exact birth-order predictions to be made. This exactness in prediction is important as birth-order effects in many domains, personality in particular, are often small and subject to many confounds and subtle interactions (Sulloway, 2007).

Extended sibling niche differentiation model

Conformity - nonconformity. As a further extension to Paulhus et al. (1999) and Healey and Ellis (2007) the current study investigated a claim made by Sulloway (1996) which suggested that the relationship between birth order, personality, and gender can lead to anomalous observations in personality, particularly in conformity (Openness to Experience as per the Big-5 classification). According to Sulloway (1996), in two child families in which both siblings are female, the second born female should be more likely to adopt gender appropriate behaviors compared to her firstborn sister. Conversely, in two child families in which the firstborn is female and the second born male, the expected pattern of the firstborn being more conforming in comparison to the second born should emerge. This same expected pattern should again be present when the firstborn sibling is male and the second born sibling female, with this male-female combination showing the largest difference in conformity between the siblings (Sulloway, 1996). The combination of a within-family methodology, strict theoretically derived selection criterion, and gender pair analyses has been absent in the birth-order literature to date. Study 1 of the current thesis made a preliminary attempt to address these shortcomings in the birth-order literature following Sulloway's comments on the relationship between conformity, gender combinations, and family size.

Hypo-masculinization Hypothesis

An alternative explanation for sibling personality differences, that offered by Beer and Horn (2000) and known as the hypo-masculinization hypothesis (PHH), was also tested in this study. Beer and Horn (2000) based this hypothesis on Blanchard and Klassen's (1997) explanation for why biologically later born males are significantly more likely to display

stereotypical feminine behaviors and characteristics, the more older brothers they have and the further down the birth order they are. Blanchard and Klassen (1997) theorized that with the birth of subsequent male children mothers become progressively immune to the effects of the H-Y antigen, a secreted protein activated by a gene on the Y chromosome which, being male specific, causes the indifferent embryonic gonad to differentiate into testes in its presence. Little empirical evidence exists for the underlying biochemical mechanism(s) involved (Blanchard, 1997) but speculatively when mothers develop, albeit partial, immunity to the H-Y antigen the resulting effects of maternal antibodies on the still developing foetal brain causes the genetic (XY) male to acquire female phenotypic characteristics.

Healey and Ellis (2007) provided some disconfirmatory evidence for PHH, but as previously noted in the general introduction of the current thesis, they did not directly test the hypothesized effect (if PHH were true). As stated by Beer and Horn (2000), in two child families the secondborn male of a female-male sibling pair should be no different to any other firstborn male on those traits claimed to be influenced by prenatal brain development. Beer and Horn (2000) suggest the single-item “tendermindedness” from the Sixteen Personality Factor Inventory (16PFI) as a candidate for a gender related trait influenced by prenatal biochemical factors. In this study the PFI16 item “tendermindedness” – defined as being openminded, intuitive and emotionally receptive - best relates to the NEO-PIR Big-5 category Openness to Experience (Beer & Horn 2000). While recent research (Schmitt et al., 2008) suggests some ambiguity in gender differences on the general Big-5 category Openness to Experience it was retained in the current study for tests of PHH as per Beer and Horn’s (2000) suggestion. The Big-5 category Conscientiousness, found by Schmitt et al. (2008) to be consistently reported as a female characteristic, was also included for tests of PHH.

A further implication of the hypo-masculinization hypothesis was also examined, which is that birth-order differences should be greater in magnitude in pairs of brothers than in pairs of sisters owing to the feminization of personality characteristics in subsequent male offspring where other male children precede them in the birth order hierarchy.

Hypotheses

Sibling niche differentiation. With respect to Sulloway's (1996, 2007) evolutionary theory of birth-order differences in sibling personality, this study hypothesized that firstborn siblings would be considered more conscientious than their secondborn counterparts (eg., higher achieving and more responsible). For secondborn siblings it was hypothesized that they would be considered more open to experience than firstborn siblings (eg., more rebellious, nonconforming and liberal).

Extended sibling niche differentiation: Gender Pairs, Family Size and Conformity. Same gender, female-male, and male-female two-child families were compared with respect to the level of the single-item marker "nonconformist." It was hypothesized that in female-female, two-child families firstborn females would more often be considered nonconforming in relation to secondborn females. For male-male, female-male and male-female two-child families, it was predicted that secondborn siblings would more often be ranked as nonconforming than their older sibling, with the male-female pairing showing a greater magnitude of difference in nonconformity rankings. All two child sibship combinations were in turn compared to their respective sibling pairs from families with more than two children, both to investigate possible novel effects and to retain methodological thoroughness. Where family sizes of three or more siblings were examined, all expectations of differences in conformity were the same as those

hypothesized under the standard model -- firstborn siblings should be less likely to be ranked as “nonconformist” compared to secondborn siblings.

This study also sought to investigate possible novel effects in same and mixed gender pairs in families comprising two children and those with three or more children. Analyses were conducted at the level of gender pairs (and within these they were broken down further into family size) for the Big-5 categories Openness to Experience and Conscientiousness.

Hypo-masculinization. Two tests of PHH were conducted. The first hypothesis tested was that second born males in female-male two-child families would be more like firstborn males in male-female and male-male two-child families on the Big-5 composite measures of Openness to Experience and Conscientiousness. In other words the firstborn male child would be ranked on the two composite measures at the same rate as a second born male in a female-male two-child pair. The second test hypothesized that under PHH there would be more pronounced differences in personality between male-male siblings than between female-female siblings on composite measures of Openness to Experience, hypothesized to be a secondborn characteristic, and Conscientiousness, hypothesized to be a firstborn characteristic.

Method

Participants and Procedure

Demographics. Responding participants were taken from a Stage 1 Introduction to Psychology class, Psyc104, at the University of Canterbury in New Zealand. Participants filled out an in-class birth-order ranking questionnaire while under the supervision of the researcher. As the topic of birth order and personality was not included in the syllabus for this course the

assumption was made that participants had no prior knowledge of the prevailing theories and research within the field.

Selection criteria. No limits were placed on either the age or particular birth order of the responding participants at the time of participant participation. All selection criteria were applied after respondents completed the set task. As the primary focus of the analyses was on the difference in rankings between firstborn and secondborn siblings, those respondents who were the only child in their family were excluded. The limiting criteria also applied to the makeup of their family of biological origin and the age gap between the firstborn and secondborn siblings. With the previously discussed theoretical limitations in mind, only age gaps between the firstborn and secondborn siblings of no less than 18 months and no more than 5 years were accepted. All firstborn and secondborn siblings were to be born of the same parents and to have shared the same family environment for the majority of their early, pre-teen, development. No single-parent families were allowed. Also mixed families with step-, half- or adopted- siblings were not considered. This applied to all siblings, regardless of family size, and not only to firstborn and secondborn siblings. A minimum age of 17 years was placed on the secondborn sibling, to avoid issues with the suitability of the Big-5 trait taxonomy scales for adolescents, but no upper age limit was set for the eldest.

Participants. Three hundred and forty three birth-order questionnaires were returned. Of those returned 203 matched the selection criteria where 35% of respondents were themselves firstborns, 41% secondborns, and 24% were thirdborn or later. Seventy seven percent of responding participants were female and 23% male, with an average age of 24.97 years (m males = 24.9 years, m female = 25 years).

Measures

To remain consistent with previous birth-order research all personality measures were based on the Big-5 trait taxonomy model (Costa & M^cRae, 1998; Goldberg, 1999). Of the Big-5 categories, only Openness to Experience and Conscientiousness were considered, owing to strong theoretical reasons for their inclusion discussed earlier; and also because past research had revealed that these provided the largest observed magnitude of effect (Sullo way, 1996, 2007; Paulhus et al, 1999 and Healey & Ellis, 2007). Multiple single-item markers for Openness to Experience and Conscientiousness were employed and from these a composite variable for each of the two target Big-5 categories was constructed.

Dependant measure. A short form within-family personality ranking questionnaire was utilised (“Family Ranking Questionnaire”, Appendix 1). This required responding participants to list all siblings in their family in order from firstborn through to the seventhborn. Restrictions in space on the questionnaire did not allow for more than seven siblings to be entered. Each sibling was then given a ranking for the single-items related to the Big-5 personality traits of Conscientiousness - “responsible/organized”, “scholastically achieving”- and Openness to Experience which included: “rebellious”, “non-conformist”, “open to new experience”, ,and “liberal”. The sibling who displayed the trait the most within the family was given a ‘1’ in the space provided, subsequently a ‘2’ was given to the sibling who displayed the trait the second, and so on, until a ranking for all siblings within the family had been given. Composite measures of Openness to Experience and Conscientiousness for all analyses were computed by summing across the relevant individual items and averaging this combined score. Composites were employed as they allowed for more reliable measures of personality traits and for the utilization of parametric significance tests by transforming dichotomous rankings into a continuous

variable. From previous research employing composite variables constructed in this manner the average alpha-reliability was .47 for Conscientiousness and .66 for Openness to Experience (Healey & Ellis, 2007).

All single-item measures were dichotomously recoded with '0' representing the firstborn sibling and '1' representing the second born sibling. The single-items that applied to the two Big-5 Categories under investigation were combined and averaged. For example if a responding participant gave a rank of '1' on "nonconformist," '1' on "open to new experience," '0' on "liberal" and '1' on "rebellious", these were summed to obtain an aggregate score of '3' and then divided by the number of items (4) to arrive at a final Openness to Experience score of .75. In this way, the categorical rank-order data was converted into a continuous composite dependent variable.

Owing to the nature of coding the single-item measures, with '0' for firstborn and '1' for secondborn, a score below .50 on the respective composite variable implies the firstborn sibling displays the characteristic more often than the secondborn; conversely a score above .50 implies the secondborn sibling is more often ranked as displaying the characteristic. The composite variables Openness to Experience and Conscientiousness were constructed once (see Results "Composite Construction") and were employed in further analyses using the relevant cases.

Data analysis.

The composite measures of Conscientiousness and Openness to Experience were analysed for all sibling pair combinations (i.e., full sample, male-male pairs, female-female pairs, male-female pairs and female-male pairs). Each of these combinations were further analysed by looking at family sizes of two children, three or more children, and all family sizes combined.

Statistical significance was tested for the composite variables using one-tailed single sample t -tests. From the single sample t -tests the statistic Cohen's d was calculated as a conservative estimate of effect size (t -value divided by the square root of the sample size).

For tests of PHH, the rate at which the target male sibling was ranked on each composite variable is presented as a percentage. The calculation of this percentage was derived from the value in the "mean" column of the respective sibling gender-pair table. The method of calculation for these percentages differed depending on the birth order of the target male. When the target male was the secondborn sibling the raw value of "mean" was multiplied by 100. When the target male was the firstborn sibling the value of "mean" was subtracted from 1 and multiplied by 100.

For the categorical item-level measure of "nonconformity", statistical significance was tested using the non-directional Chi-square (χ^2) goodness-of-fit test.

Results

Composite Construction

All single items within the Big-5 categories Conscientiousness and Openness to Experience were candidates for combination into their relevant Big 5 categories. The single items were grouped by their Big-5 category and reliability checks were conducted on each group. Those single items that were deemed suitable, each having an item total with the other single items of no less than $r = .30$, were summed and then averaged per participant.

For Conscientiousness a final alpha reliability of .58 was achieved when the two single-item markers "responsible/organised" and "scholastically achieving" were combined. For

Openness to Experience a final alpha-reliability of .58 was achieved comprising the single-item markers of “rebellious” and “nonconformist”. The single-item markers for “liberal” and “open to new experience” were excluded from the Openness to Experience composite, as the reliability check revealed that the item total correlations for both single items were under the .3 threshold, suggesting that the markers “liberal” and “openness to new experience” were not measuring the same personality construct, in the eyes of participants, as were “rebellious” and “nonconformist”.

Table 1**Ranking Data: Single-sample *t*-tests for composite variables *Openness to Experience* and *Conscientiousness* (Study 1)**

| | All Family Sizes | | | | Two Children | | | | Three or More Children | | | |
|----------------------------|------------------|------|-----------------|-------------|--------------|------|-----------------|-------------|------------------------|------|-----------------|-------------|
| | N | Mean | <i>t</i> -value | Effect Size | N | Mean | <i>t</i> -value | Effect Size | N | Mean | <i>t</i> -value | Effect Size |
| All Gender Pairs | | | | | | | | | | | | |
| Conscientiousness | 203 | .40 | -3.32** | .23 | 79 | .42 | -1.77 | .20 | 124 | .40 | -2.82* | .25 |
| Openness to Experience | 200 | .57 | 2.20* | .14 | 76 | .53 | .58 | .07 | 124 | .59 | 2.31* | .21 |
| Female-Female Pairs | | | | | | | | | | | | |
| Conscientiousness | 69 | .36 | -3.06** | .37 | 24 | .35 | -1.78 | .36 | 45 | .36 | -2.46* | .37 |
| Openness to Experience | 67 | .55 | 1.02 | .12 | 22 | .45 | -.53 | .11 | 45 | .60 | 1.60 | .24 |
| Male-Male Pairs | | | | | | | | | | | | |
| Conscientiousness | 40 | .31 | -2.90** | .46 | 17 | .38 | -1.17 | .28 | 23 | .26 | -2.90** | .60 |
| Openness to Experience | 40 | .55 | .78 | .12 | 17 | .44 | -.62 | .15 | 23 | .63 | .14 | .32 |
| Female-Male Pairs | | | | | | | | | | | | |
| Conscientiousness | 39 | .24 | -4.98** | .80 | 15 | .23 | -4.00** | 1.03 | 24 | .25 | -3.40** | .69 |
| Openness to Experience | 38 | .66 | 2.50* | .41 | 14 | .71 | 2.48* | .66 | 24 | .63 | 1.45 | .30 |
| Male-Female Pairs | | | | | | | | | | | | |
| Conscientiousness | 55 | .65 | 2.67** | .36 | 22 | .66 | 1.78 | .38 | 33 | .64 | 1.96 | .34 |
| Openness to Experience | 55 | .53 | .45 | .06 | 22 | .57 | .77 | .16 | 33 | .50 | .00 | .00 |

Note. Values of composite variables range from 0, indicating firstborn siblings ranked more often on the relevant measure, to 1, indicating secondborn siblings ranked more often. The further the mean value deviates from .5 in either direction the more often the relevant sibling was ranked as displaying the trait. Single-sample *t*-tests assumed no difference in sibling rankings thus the mean value is tested against the population mean of .5. Negative *t*-value indicates firstborn siblings ranked more often.

* $p < .05$; ** $p < .01$

Personality Differences by Birth Order

Results of the analyses examining personality differences across siblings are presented in Table 1. These include the mean difference, standard error of the mean, *t*-value from the matched-pairs *t*-test, and estimates of effect size. Results are provided by gender (i.e., all gender pairs combined, female-female, male-male, female-male, male-female) and across three family sizing options (i.e., all family sizes combined, two child families, three or more child families).

All Gender Pairs Combined. Overall, the results supported the hypothesis in that Conscientiousness was rated more often as a firstborn characteristic whereas as Openness to experience was more often rated as a second born characteristic. While these birth order differences were only statistically significant in analyses where all family sizes were combined and where families were comprised of three or more children, the same trend was observed in families with only two children, albeit not significant. This may be due to the markedly smaller sample size in this family type.

Female-Female Pairs. As hypothesized, firstborn siblings in female-female pairs were more often ranked as conscientious than second borns, As in the all gender pair analyses, these differences were significant in both the analyses where all family sizes were combined and those for families with three or more siblings. For families of only two children the same trend was present, but not significant. This may well again have been due to the smaller sample size ($n = 24$).

The analyses of birth order differences on ratings of Openness to Experience within female-female pairs did not yield any significant results. The means for the analyses using both all family sizes combined and families with three or more

children, showed trends in the predicted direction. Contrary to the stated hypotheses firstborn sisters in two child families were ranked as slightly more open to new experience than their secondborn sisters.

Male-Male Pairs. The results for the male-male sibling pairs analyses displayed the identical trends to those describe above for female-female pairs.

Female-Male Pairs. In these sibling pairs the first born is female and the second born male. Generally the results of female-male sibling pair analyses were as hypothesized with Conscientiousness being significantly more often ranked as a firstborn characteristic and Openness to Experience as a secondborn characteristic, across all three family composition analyses. For both the analyses where all families sizes were combined, and those using only families with two siblings, secondborn siblings, as hypothesized, were ranked significantly more often as being open to experience than were firstborns. For families of three or more children the same trend was observed however it did not reach statistical significance.

Male-Female Pairs. In these sibling pairs the first born is male and the second born female. Results for these gender pairs were contrary to the hypothesis in that Conscientious was more often ranked as a second born female characteristic these in male-female sibling pairs. This result was only significant when all family sizes were combined, however the trend was the same for families with two or more than two children. As hypothesized, secondborn females siblings were slightly more often ranked as open to experience than were their first born male siblings, when all family sizes were combined and in families of only two children, although neither of the results reached statistical significance. For families of three or more children, first and second borns were rated equally as open to experience

Gender and Family Size analyses of “nonconformity”

For all possible combinations of gender and family size, firstborn and secondborn siblings were examined for birth-order differences on the characteristic of “nonconformity”. These results are presented in Table 2. For Female-Female two-child families, the comparison of main interest, no statistically significant difference was found between rankings of firstborn and secondborn siblings.

For female-female firstborn and secondborn siblings from families with 3 or more children a nonsignificant difference ($p = .10$) in rankings was found with secondborn siblings more often ranked “nonconformist”. All other comparisons were not statistically significant though all differences in sibling ratings were in the hypothesized direction.

Table 2

Percentage of times conformity was ranked as a 1st born or 2nd born characteristic within sibling pairs, significance levels for χ^2 , and observed direction (Study 1)

| Gender Pair | Nonconformity | | | | |
|----------------------|---------------|---------------------------------------|--------------|----------|----------------------|
| | N | 1 st % – 2 nd % | Difference % | χ^2 | Direction |
| Female-female | | | | | |
| 2 children | 21 | 61.90 – 38.10 | 23.81 | 1.19 | 1 st born |
| 3 or more | 45 | 37.78 – 62.22 | -24.44 | 2.69*** | 2 nd born |
| Male-Male | | | | | |
| 2 children | 17 | 52.94 – 47.06 | 5.88 | 0.06 | No difference |
| 3 or more | 23 | 39.13 – 60.87 | -21.74 | 1.09 | 2 nd born |
| Female-Male | | | | | |
| 2 children | 15 | 40.00 – 60.00 | -20.00 | 0.60 | 2 nd born |
| 3 or more | 23 | 43.48 – 56.52 | -13.04 | 0.39 | 2 nd born |
| Male-Female | | | | | |
| 2 children | 16 | 40.91 – 59.09 | -18.18 | 0.73 | 2 nd born |
| 3 or more | 39 | 45.45 – 54.55 | -9.09 | 0.27 | 2 nd born |

Note. As an artifact of presentation a negative percentile difference implies rankings in the second born direction.

*** $p < .10$

Analysis of PHH

For the male-male pairs in two child families, tests of PHH revealed that the rate at which firstborn males in male-male sibling pairs were ranked on Openness to Experience was 56% and 62% for Conscientiousness. The frequency that secondborn males in female-male two-child sibling pairs were the given the highest rankings was 23% for Conscientiousness and 71% for Openness to Experience. The firstborn males in male-female sibling pairs were ranked higher 34% of the time for Conscientiousness and 43% for Openness to Experience. In regard the first PHH hypothesis – where PHH suggests that secondborn males in female-male pairs would be ranked as the sibling more open to experience and more conscientious at a rate similar to the rankings given to firstborn males in male-male and male-female sibling pairs - the results of the current study fail to support this.

The second PHH hypothesis tested was that there would be more pronounced differences in personality between male-male siblings than between female-female siblings, from two-child families, on both composite measures. The results from Study 1 fail to support this hypotheses as the magnitude of difference between male brothers was of a similar size – 24% difference between firstborn and secondborn males for Conscientiousness and 12% difference for Openness to Experience – to the magnitude of difference between sisters – 30% difference between firstborn and secondborn sisters for Conscientiousness and 10% for Openness to Experience.

Discussion

This study tested hypotheses concerning the effect that an individual's birth order, within their own family, has on their personality. Sulloway's (1996) functional birth-order model of sibling niche differentiation was tested as well as the alternative ordinal birth-order model proposed by Beer and Horn (2000). Novel predictions were made and tested for both models. The study also sought to test, for the purpose of replication and the accumulation of effect size statistics, the observed birth-order effects reported in past research. In general this study provided confirmatory evidence for Sulloway's sibling niche differentiation model for the two Big-5 personality traits employed (i.e. Conscientiousness and Openness to Experience), while no evidence for PHH was found. Evidence was also provided for the novel predictions concerning the subtle and seemingly contradictory relationship between birth order, gender, and personality, as suggested by Sulloway (1996).

Sibling niche differentiation

Conscientiousness. As hypothesized, this study indicated that in general, the composite variable Conscientiousness was more likely to be a firstborn rather than a secondborn characteristic. For all analyses where rankings were in the predicted direction the average effect size obtained was of an even greater magnitude, $d = .54$, to that found in previous birth-order literature. Sulloway had repeatedly claimed that tests of Conscientiousness should yield the most consistent and robust results of all personality traits; these results supported that claim.

When further analyses on the composite variable Conscientiousness were conducted for same- and mixed- gender pair cases one unhypothesized finding emerged. For cases where the firstborn was male and the secondborn female, it was

the secondborn female who was more likely to be considered conscientious within the family. This finding was statistically significant for all cases within male-female sibling pairs; and while the difference was nonsignificant for two-child families ($p = .09$) and three or more child families ($p = .06$) cases, all effect sizes were of a similar order of magnitude; $d = .36$ for all pairs, $d = .38$ for two-child families case pairs and $d = .34$ for families with three or more children.

A possible interpretation is that the gender of an individual accounts for them being considered conscientious and not their birth order. If this was the case then there should be no statistically significant difference in rankings on Conscientiousness when both the firstborn and secondborn siblings are female, since it is gender and not birth order that leads females to conscientious behavior. Yet, in this study the reverse was true. First born females were ranked as the more conscientious sibling within the family in female-female pairs. Furthermore, a comparison of the effect sizes for female-male and male-female sibling pairs was revealing. If only females are considered conscientious within sibling pairs then there should be no difference in effect size between a male and a female regardless of which was the firstborn and which was the secondborn. However, this study showed that there was quite a marked difference in effect size when female-male cases were compared with male-female cases. The average effect size for the three analyses within female-male sibling pairs was $.36$ (Cohen's d) compared to the average for male-female pairs, $d = .80$.

In short females were rated as more conscientious in relation to their male sibling when they were the firstborn of the pair; but still outranked males on Conscientiousness even when they were the secondborn sibling. The general claim made by Sulloway that the effect of birth order is typically stronger than that of

gender has been called into question from the analysis of the composite Conscientiousness. A more nuanced examination of this 2-way interaction between gender and birth order was not possible with the dichotomous ranking data-set obtained in this study. However, future research would be well served to examine this.

Openness to Experience. As predicted for the analysis comprising all sibling pairs regardless of the sibling's gender secondborn siblings were more likely to be ranked as being open to new experiences than their firstborn counterpart. The obtained average effect size for Openness to Experience, $d = .14$, is consistent with those found in past research. The results of this study conformed in general to Sullo way's model of birth-order differences for the Big-5 category Openness to Experience.

Breaking down the sample into gender pairs, only female-male pairs showed a statistically significant difference by birth order where secondborn males were ranked more open to new experience than their firstborn sisters. The average effect size of $d = .46$ for female-male pairs was more than double that for all gender pairs combined. The most marked difference in birth-order rankings within female-male pairs occurred in the two child family cases ($d = .66$). Of all the combinations of gender pairs, birth order, and family size examined, secondborn males, with an older sister, in two child families were considered the most open to new experience.

An examination of other results from gender pair and family size analyses suggested a more complex interaction for Openness to Experience than Conscientiousness. For all combinations of sibling pairs only same gender two child families for Openness to Experience displayed a reversed pattern of findings with the firstborn sibling being ranked more on this Big-5 category. While this reversed pattern

was not statistically significant for both the male-male and female-female two child family gender pairs, the average effect size for the two ($d = .14$) was the same as that found in the general analysis ($d = .14$). This is in stark contrast to the results for same gender pairs from families with 3 or more children which were both in the expected direction and had an average effect size double that of their same gender two child family counterpart ($d = .28$). A three-way interaction between gender pair, family size (two children or more than two) and birth order appears to be at play.

Extended sibling niche differentiation: Gender, Family Size and Conformity.

Of all gender pairs and family size combinations only the difference between firstborn females and secondborn females from families with three or more children achieved statistical significance. The main comparison of interest, between female firstborn and secondborn siblings in two child families, revealed a statistically nonsignificant difference on the single-item measure of “nonconformity”. This difference between sisters in two-child families was in the hypothesized direction (the reverse of that specified in the standard model of sibling niche differentiation). All other gender-pair and family-size comparisons revealed differences in rankings as predicted under the standard model of sibling niche differentiation; with firstborn siblings being ranked more often than their secondborn counterparts on “nonconformity”.

The results of this study failed to support the hypothesis that in the gender pair combinations where one or both siblings is female, the two child family pairing of male firstborn and female second born would show the greatest difference in rankings on “nonconformity” by birth order.

On the whole some evidence is provided for Sulloway’s claim that for female-

female sibling pairs in two child families, the firstborn sister would be the least conforming of the two siblings contrary to the standard model. Even though the difference between sisters in female-female two-child families was statistically nonsignificant, the difference in the frequency of rankings when comparing female-female two-child families (% diff = 23.8) with female-female three or more child families (% diff = 24.44) in which a statistically significant difference between sibling rankings was observed, was almost identical. The small sample size in the female-female three or more child families sample ($n = 21$) compared to that in female-female three or more child families ($n = 45$) suggests a lack of statistical power, via small sample size, more than an absence of effect as an explanation for the statistically nonsignificant finding in female-female two-child families. It appears that a more subtle relationship between birth order, nonconformity, and gender than the general model of sibling niche differentiation allows is at play.

Hypo-masculinization hypothesis (PHH)

Beer and Horn predicted that under PHH males in female-male two-child families should be no different than firstborn males in male-female and male-male sibling two-child families on the Big-5 categories Openness to Experience and Conscientiousness. This hypothesis was not supported in this study. Contrary to the PHH hypothesis, for the Big-5 Category Openness to Experience, which theoretically encompasses Beer and Horn's "tendermindedness", firstborn male children were ranked as having this characteristic 71% of the time in female-male two-child families, 43% of the time in male-female two-child families and 56% of the time in male-male two child families. For Conscientiousness, not considered by Beer and Horn to be prenatally influenced, firstborn male children were ranked 33% of the time

in female-male pairs, 34% in male-female pairs and 62% in male-male pairs. The strong effect that gender, in particular being female, had on rankings for the composite Conscientiousness appears to underlie the similarity in firstborn male children's rankings in female-male and male-female pairs; and not the effect of maternal antibodies on the still developing foetal brain as per PHH. Furthermore no firm evidence was found for the hypothesis derived from PHH that males in male-male two child families were more different than females in female-female two-child family pairs.

Limitations and Implications for Future Research

To obtain within-family data on firstborn and secondborn sibling pairs this study obtained rankings of the target sibling from a single data source. Responding participants providing the rankings for both siblings were themselves predominately either firstborn or secondborn though no limit was placed on their birth order. Future research employing ranking questionnaires could acquire within-family personality rankings from both the firstborn and secondborn siblings in order to strengthen the validity of ranking data and to mitigate possible criticisms of self-ranking bias.

A drawback of dichotomous ranking data is that parametric statistical tests, which offer the advantage of high power, are precluded in data analysis. Even the construction of (quasi-) continuous composite variables could not fully circumvent this issue. Combining multiple dichotomous ranks from a single data source also does allow for simple parametric tests of difference where a population parameter could be accurately estimated (i.e., single sample t-tests with an expected population mean of .5 were used for the two composite variables). More advanced techniques, like regression analysis, were unusable given that the criterion variable for both Openness

to Experience and Conscientiousness composite variables implicitly contained the predictor variable (birth order).

One solution to this problem would be to obtain continuous data through ratings of sibling personality on anchored 7-point scales. Ideally, rating data for both the firstborn and secondborn sibling's personality would be obtained, including each sibling's rating of themselves and their sibling. This would allow for tests that could control for, and investigate, the interactions between birth order, gender, and family size as touched upon (but not fully investigated) in this study. In Study 2 of the current thesis, self- and sibling- ratings were obtained for both firstborn and secondborn siblings in order to help address this issue.

While the current study provided more confirmatory evidence for the utility of within-family methodologies in uncovering within-family effects it was unable to engage one contentious issue in the birth-order and personality debate; namely, the degree to which personality is generalisable across contexts rather than operating within contexts (e.g., within specific family contexts). One way to address this debate involves obtaining estimates of each sibling's personality from sources outside the family, specifically, sources that have little knowledge of the dynamics, interactions and roles taking place within the rated individual's family. Thus, in Study 2 ratings of each sibling's personality were obtained from an independent source (i.e., a friend or workmate of each sibling) who had minimal knowledge of the intimate detail of the rated sibling's family environment.

Chapter Three: Study 2

Study 2 primarily investigated the extent to which birth-order effects in personality are manifested outside family-role contexts. The accumulated empirical evidence in recent years leaves little doubt that there is a modest but observable effect of birth order on personality, when personality appraisals of siblings in the family were given by members of the same family. Exactly what is meant by personality in the previous claim is worthy of consideration. Some critics (Harris, 2000, 2005; Pinker, 1997) contend that the context in which birth-order effects typically tend to emerge are family-role specific. What is being measured, it is argued, is not a sibling's personality per-se, as exhibited in day-to-day adult behaviour, but the styles of interaction and behaviour that are learnt from early childhood as ways of specifically dealing with ones siblings and parents. These context specific family-roles may emerge only in environments that reflect those of the individual's early experience, and the within-family studies that typically uncover birth-order effects incorporate and reflect these contexts. In contrast the same individuals if removed from their familial context and placed into differing environments, with their own novel environmental problems, may produce a different set of behaviours and attitudes.

This study sought to shed light on the issue by gathering personality ratings of individuals where the rater, specifically a workmate or friend (peer), had minimal knowledge about the family of the individual being rated. If birth-order differences in sibling personalities are not purely family-context specific, but generalise to adult personality, independent raters should provide judgements of personality that are consistent with the sibling within-family ratings.

Another related aspect of the context-specific debate was also investigated in this study. There is growing evidence (Sulloway, 1996, 1999; Rohde et al., 2003, Salmon & Daly, 1998, Zwienghaft et al., 2000) that when participants are asked to make judgements about events in situation-specific or real-world contexts, such as controversial social and scientific debates, the effect size of birth-order differences increase. By presenting examples highlighting social and criminal injustice the current study sought a valid but more indirect measure of sibling's attitudes towards emotive social issues and related personality traits.

Firstborn siblings should identify more with the *status quo* and acquiesce to the demands of authority, and thus should be more likely to sanction actions that derive from those in a position of authority. Furthermore, firstborn siblings were expected to judge more harshly the actions of an individual that challenged the *status quo* or that defied authority. In contrast secondborn siblings should identify with an individual (viewed as the downtrodden) who confronted or defied authority. If the personality effects of birth order are fixed to family roles, then birth-order effects should disappear when such measures are used. Conversely, if birth-order effects are generalisable across contexts, one would expect the differences between siblings to follow the expected patterns found in within-family research employing the methodological refinements suggested by Healey & Ellis (2007).

Further Methodological Refinements

The methodological and participant selection criteria employed in Study 1 were also enforced in this study with some refinements.

Within-family data source. The diversification of sibling strategies in order to gain access to resources and avoid direct competition operates within families. Thus

all personality information reported by siblings should involve a comparative component; be it dichotomous rankings of self and other sibling or anchored scale questions where siblings are required to provide a self rating and a rating of their sibling. Furthermore, as previously identified in the discussion of Study 1, having a single sibling within a family providing personality appraisals of the firstborn and secondborn sibling's personalities may lead to biases in favourable self-reports over sibling-reports. To avoid this issue and to generate multiple data sources of sibling personalities Study 2 obtained personality ratings and rankings from both the firstborn and secondborn siblings directly.

Firstborn and secondborn siblings only. To avoid the possible confound that quadratic or zig-zag effects may have on sibling comparisons (i.e., third born siblings may adopt strategies similar to firstborns under conditions of reduced competition by the firstborn) only firstborn and secondborn siblings were included for comparison. This study further extended this requirement by gathering data only from firstborn and secondborn siblings (unlike Study 1 where any sibling could rank the personalities of the firstborn and secondborn).

Age-gaps. A further attempt to mitigate quadratic or zig-zag effects in sibling comparisons was to limit sibling age gaps to no less than 18 months and no more than 5 years. Larger age gaps than 5 years between firstborn and secondborn siblings implies early developmental requirements are radically different and thus the resulting reduction in sibling conflict would reduce the need for differential strategies. If age gaps are smaller than 18 months the environmental cues that trigger sibling diversification may not be present.

Nuclear family. In order to minimize possible confounding influences on the environmental cues which trigger sibling deidentification, the families of the participating siblings should be free from factors such as adopted siblings, the introduction of new siblings from blended families, and sibling mortality.

Gender. Since previous within-family examinations of birth order and personality observed inconsistent effects when comparing mixed gender sibling pairs, Study 2 sought to refine this approach and selected same-gender sibling pairs alone. Same-gender pairs acted as a control for possible gender confounds within pairs and enabled gender specific investigations, currently lacking in the birth-order literature.

Hypotheses

Personality differences by birth order. This study hypothesized that firstborn siblings would be seen as more conscientious than their secondborn counterparts who in turn would be considered more open to new experience. These predictions were tested using the composite variable Big-5 trait taxonomy categories Conscientiousness and Openness to New Experience. Furthermore it was expected that these hypotheses should hold in the family ranking data, as well as the self and sibling rating data. This consistency across data sources should extend to patterns of findings across gender pair combinations and family size combinations. In general, significant findings in the expected birth-order direction should emerge for all inclusive-case analyses, female-female gender pair analyses, male-male gender pair analyses, two child family analyses and families with 3 or more children case analyses.

In contrast to the pen-and-paper ranking and rating stimulus materials, scenarios taken from real-world contextual events – court case summaries - asking participants to make judgements as a measure of their personality were also

employed. It was hypothesized that like all other style of stimulus materials in this study that firstborn siblings return responses should indicate higher conscientiousness – compared to secondborn – whereas secondborn siblings will be more open to new experience. Furthermore it was hypothesized these real-world, contextually grounded scenarios would elicit greater effect sizes than context neutral pen-and-paper questionnaires.

Personality or family-roles. In general, if adult personality is influenced by the differential strategies siblings adopt during their shared developmental history then differences in personality between firstborn and secondborn siblings should be observable by independent raters. The findings from peer-ratings of the target sibling's personality should be similar to those obtained from the siblings themselves. Thus it was hypothesized that independent raters (peers) should give higher ratings to firstborn siblings on the Big-5 trait taxonomy composite variable Conscientiousness than they would to secondborn siblings, and in turn peers would rate secondborn siblings higher than firstborn siblings on the composite variable Openness to New Experience.

An extension of the idea that within-family birth-order effects should manifest in situations other than those exhibited in the context of family-role comparisons was also examined in this study. This was tested by investigating sibling differences in severity of punishment assigned to individuals who committed acts of radical or subversive behaviour, or which involved subjugation of minorities and/or the downtrodden by authority figures. It was hypothesized that when provided with real-world scenarios involving criminal acts by authority figures and under-dogs, firstborn siblings should identify with authority figures, whereas secondborn siblings should

identify more with the under-dog. I also conducted a test of Sulloway's claim that these real-world scenarios should elicit a more pronounced difference between firstborn and secondborn siblings than would pen and paper tests of personality.

Conformity and gender pairs. While the standard sibling niche differentiation model of sibling differences in personality makes the general prediction that all secondborn siblings should be more open to new experiences (nonconforming) compared to firstborn siblings (conforming), the refined model makes a contrasting prediction for female-female sibling pairs from families with only two siblings. Therefore this study hypothesized that the firstborn sisters in female-female two child families should be seen as more nonconforming. For all other gender-pair and family-size combinations the standard prediction of secondborn siblings being seen as the more nonconforming sibling was expected.

Gender and personality. Expectations concerning the relationship between gender and the levels of Conscientiousness and Openness to Experience were also tested in this study. It was hypothesized that females should be seen as more conscientious than males and that in turn males should be seen as more open to new experience. These expectations about the relationship between gender and the two Big-5 categories Conscientiousness and Openness to Experience were not a straight deduction from Sulloway's model, but came from other published findings (Zweigenhaft, 2002; Rubinstein (2005), Stevens & Ash, 2001).

Family-size and personality. A comparison of the personalities of participants in two child families with those from families with three or more children was undertaken. This examination was exploratory and hence no specific pattern of results were hypothesized, although higher levels of openness to experience in siblings from

families with 3 or more children has previously been observed by Zweigenhaft (2002).

Birth order, gender and family size. The interaction between birth order, gender, and the size of their family on the composite variables Conscientiousness and Openness to Experience was examined. This examination of interaction effects was exploratory with no explicit underlying hypotheses. Furthermore, the strength of influence that each of these factors exerted on an individual's personality was also examined. Following Sulloway's (1996) claim on this matter it was hypothesized that the effect of birth order should be approximately two thirds as large as that of gender.

Method

Participants

Selection criteria. Same sex, firstborn and secondborn sibling pairs were selected where there was an age gap between them of no less than 18 months and no more than 5 years. All pairs were born to the same parents and shared the same family environment for the majority of their early, pre-teen, development. No broken families, especially where one parent was absent, were allowed. Also mixed families with step-, half- or adopted- siblings were not considered. A minimum age of 17 years was placed on the youngest sibling and no upper age limit was set for the eldest.

Also selected for participation was a friend or workplace peer of each sibling respondent. Each sibling participant nominated one friend or peer who had been acquainted with that sibling for at least one year but who did not know the respondent's sibling; this served as the only peer selection criterion for inclusion in the current research.

No geographical bounds were set on the location of sibling upbringing, though all were raised in modernized western societies, the majority being from New Zealand with the rest from England, United States of America, Belgium, South Africa and Australia. The majority of sibling respondents no longer lived within the unit of family upbringing and were dispersed in various locations around the world. This fact limited the administration of questionnaires to mailout packs.

Demographics. Participants were recruited by answering advertisements posted at universities in Christchurch, New Zealand and Queens, New York, as well as Christchurch hospital, buses within Christchurch, as well as being disseminated by contacts in a variety of workplaces and universities in locations around the world, such as England, Belgium and South Africa (Appendix 2). The majority of participants were from Christchurch, New Zealand. Prospective participants alerted the researcher by email or telephone of their desire to participate in the study. During this initial contact or through further email correspondence checks were made to ensure participants matched the sample selection criteria, and to confirm they were each able to nominate a friend or workmate from whom personality ratings of the participant would be obtained.

In most cases only one sibling initially viewed the research advertisement directly and this sibling sought approval from the other sibling for participation and communicated this to the researcher. Questionnaire packs, including postage-paid return envelopes, were sent to all prospective participants. Initially 162 questionnaire packs were sent out (81 sibling pairs). This total was reduced to the working sample of 68 pairs as in some cases only one sibling returned the questionnaire packs or neither sibling completed the packs.. All participants from New Zealand who returned

questionnaire packs were provided with NZ\$15 worth of grocery vouchers, participants in other locations were given the equivalent of NZ\$15 in local currency. A full breakdown of age and gender pairs is given in Table 3.

The procedure for this study was approved by the University of Canterbury Human Ethics committee.

Table 3
Mean age in years, standard deviation and N for participants by birth order and gender pair (Study2)

| | Siblings Combined | | | 1 st Born | | | 2 nd Born | | |
|--------------------|-------------------|-------|---------|----------------------|-------|---------|----------------------|-------|---------|
| | N | Age | Std Dev | N | Age | Std Dev | N | Age | Std Dev |
| Gender Pair | | | | | | | | | |
| All | 136 | 30.76 | 9.57 | 68 | 32.99 | 9.61 | 68 | 29.52 | 9.44 |
| Female-Female | 90 | 32.01 | 10.47 | 45 | 33.44 | 10.43 | 45 | 30.55 | 10.43 |
| Male-Male | 46 | 28.35 | 6.99 | 23 | 29.13 | 7.12 | 23 | 27.57 | 6.94 |

Measures

Ranking Data. A 14 item within-family ranking questionnaire (“Family Ranking Questionnaire-2”, Appendix 6) was used to examine, for each item, where within their family the two participating siblings viewed themselves. The format of the ranking questionnaire used in this study differed from that used in Study 1 in minor detail. Extra items relating to all categories of the Big-5 personality trait taxonomy were included on the ranking questionnaire in this study. Also fewer slots to rank family members were provided; conceivably 10 family members could be ranked in Study 1 whereas only 4 could be ranked in this study. Participants were required to provide a rank for all family members on each questionnaire item. The

sibling within the family who best fitted the item description was to be scored ‘1’, the sibling who next-best fitted the description was to be scored a ‘2’, and so on until all family members were given ranks or until no room was left on the questionnaire for subsequent sibling rankings. All single items within each Big-5 personality dimension were candidates for combination into composite variables of their respective Big-5 categories. The method of recoding and combining all single items into composite variables was identical to that employed in Study 1 and therefore an explanation will not be repeated here.

Rating Data. Ratings of personality were gathered for each sibling participant on anchored, paired adjective, 7-point Likert scales. This rating-scale questionnaire was comprised of 18 adjective items, with each item relating to one of the Big-5 personality taxonomy categories. Both siblings within the participating sibling pair provided a rating on each item for their sibling and for themselves (“Self and Sibling Rating Questionnaire”, Appendix 7). All single items within each Big-5 category were candidates for combination into composite variables. In order to obtain the composite variables for the Big-5 categories all relevant single items were summed per participant and divided by the number of summed items; for example a participant who gave his- or her- self a rating of ‘5’ on “unachieving – achieving” and a ‘6’ on “irresponsible – responsible” would end up with a final score on the composite variable Conscientiousness of 5.5. Where necessary recoding of all single items was done prior to combination to ensure a high score on the item reflected the adjective associated with the relevant Big-5 category.

In order to obtain ratings of each sibling from a source outside the sibling’s family an adapted rating questionnaire was constructed for the sibling selected peer

("Friend/Peer Rating Questionnaire", Appendix 8). This questionnaire was identical in measurable content to that given to the sibling participants (the same 18 items were included). Its instructional form, however, was altered to take into account the fact that each sibling-nominated peer was to provide ratings of only the sibling who nominated them. Rating data obtained from this source were combined with the self- and sibling-ranking data in the construction of the composite variables for the Big-5 categories as described above.

Court case summaries. Four scenarios in the form of actual court case verdict reports ("Court case summaries", Appendix 9) were constructed for this study. Each court case summary presented a synopsis of a judges finding for a mock court case, including verdict, and two – two part - questions for participants responses. Once the court case synopsis was read participants were required to indicate if they believed the guilty part in each scenario should receive either, a prison sentence including the length of the sentence if they responded in the affirmative, or a monetary fine including the fine amount if they believed a fine was warranted.

Procedure

The first form in the questionnaire pack was the "Initial Information Sheet" explaining both the study and the confidentiality of information provided (Appendix 3), followed by the "Consent Sheet" (Appendix 4) where participants offered their signed consent for their data to be utilized in this study. Following the consent form was the "Demographic Questionnaire" (Appendix 5) which gathered information about the age, education and background of the participant. The next administered questionnaire was the "Family Ranking Questionnaire-2" (Appendix 6). This required each participant to write in order for all siblings, the age, initial, relation to the

respondent (full, half or step sibling) and to give each sibling a rank on the included single-item personality markers. Following the “Family Ranking Questionnaire-2” was the “Self and Sibling Rating Questionnaire” (Appendix 7). On this questionnaire the respondent sibling gave a self rating for each item as well as a rating for their sibling.

The next questionnaire “Friend/Peer Rating Questionnaire” (Appendix 8) was to be given to a nominated friend or workplace peer of the respondent. The peer-rating questionnaires were packaged with a postage-paid return envelope (addressed to the researcher) so-as to ensure the peer/friend of the target sibling could respond to the questionnaire confidentially and in their own time. The next four questionnaires were single sheet Judge’s court case summaries, where some were adaptations of actual proceedings in New Zealand courts and some were wholly constructed. These court case summaries were presented to participants in a manner whereby they could offer sentencing terms to suit the particular crime. The summaries were grounded in everyday activities, for example settling a dispute between landlord and tenant (Appendix 9-1) or of an ideological nature involving the right to protest (Appendix 9-2 & 9-4) and also touching on acts of civil disobedience (Appendix 9-3).

Results

The current study obtained questionnaire data for all categories of the Big-5 trait taxonomy. Only data for the categories Openness to Experience and Conscientiousness are reported in the following analyses. For the three remaining Big-5 categories Extraversion, Agreeableness and Neuroticism either reliability checks precluded the combination of the item-level markers into composite variables for further analysis, or no statistically significant birth-order effects were observed in

any combination of gender pairs or family size analyses. This was found for both the family ranking data and the sibling/peer rating data.

To achieve a comparative overview two forms of the questionnaire were used in this study, one providing within-family rankings from both participating siblings in each pair, and the other using anchored 7-point self-rating and sibling-rating scales for each sibling. Separate analyses were conducted for both the dichotomous ranking and the continuous 7-point rating composite variables. Within each analysis of ranking and rating data three separate analyses were conducted. The first analysis was for all participant cases, irrespective of gender. The second was for all female-female sibling pairs and the third for all male-male pairs. This served as a control for the possible effect of gender. Furthermore these three analyses were broken down into families with only two children and those with three or more children.

All analyses that relate to the within-family ranking data are presented first, followed by the within-family rating data – using only the self-rating and sibling-rating data sources. Analyses of the court-case data and an examination of conformity and its relationship to gender and family size are then presented. Next the within-family rating data is used to examine interactions between and relative strength of effect of birth order, family size and gender. Finally the peer-rating data source – a non-within family data source - is utilized to provide an examination of the ratings of target sibling's personality.

Ranking Data: 1st Born vs 2nd Born Composite Variables

Composite Variable Construction

All single items relating to the Big-5 categories Conscientiousness and Openness to Experience were considered for aggregation into composite variables. The single items were initially grouped by their respective Big-5 categories. Reliability analyses were conducted on the single items and then the remaining suitable items were summed and averaged per participant. The ranking scores for each sibling within the sibling pair were treated as separate cases.

From the items reflecting the Big-5 category Conscientiousness, a reliability analysis revealed that “responsible/organised” and “lazy” (reverse coded) were suitable for combination in the composite variable ($\alpha = .62$). The item “academic” was excluded owing to a low item-total correlation with the other two items ($r = .17$).

The single items for Openness to Experience “rebellious”, “conventional” (reverse coded), “nonconformist”, and “liberal” were combined for the composite variable following a reliability analysis ($\alpha = .74$). Owing to a low item-total correlation with “rebellious”, “conventional” (reverse coded), “nonconformist”, and “liberal” the item “open to new experiences” ($r = .10$) was excluded from the composite variable.

For all following analyses of the composite variables derived from the family ranking data, single sample t-tests were employed as tests of statistical significance unless otherwise noted. All statistically significant findings were as hypothesized and/or in the hypothesized direction unless stipulated. All statistics for the ranking data composite variable analyses are presented in Table 4.

Personality Differences by Birth Order: Ranking Data

All Gender Pairs Combined. For all analyses where gender pairs were combined, as hypothesized, firstborn siblings were always ranked higher on the Big-5 measure Conscientiousness whereas secondborn siblings were always ranked higher on the measure Openness to Experience. The difference in sibling rankings was statistically significant for all family sizes combined and for siblings from 3 child families. While the analyses for families containing only two children indicated the predicted trends the differences did not reach significance.

Female-Female Pairs. In general, for female-female sibling pairs, as hypothesized, firstborn siblings were given higher ranking for Conscientiousness and secondborn siblings were given higher ranking for Openness to Experience. For Conscientiousness, the difference in sibling rankings was statistically significant for siblings from families with three or more children and when all family sizes were combined; however the difference in two child families did not reach significance. While second borns were rated significantly more often as being open to experience in families with three or more children, no statistically significant difference between siblings was found for two child families or for the combined family size. The mean difference for the all families' analysis was in the predicted direction; however that for two child families was not as hypothesized as first borns were slightly more often rated as open to experience.

Male-Male Pairs. As hypothesized in all analyses of male-male sibling pairs firstborn siblings were given higher rankings on the Big-5 measure Conscientiousness and secondborn siblings were given higher rankings on Openness to Experience. For Conscientiousness the difference in sibling rankings only reached significance where all

family sizes were combined and in families with three or more children. The Openness to Experience analyses only reached significance when all family sizes were combined.

Table 4**Ranking Data: Single-sample *t*-tests for composite variables Openness to Experience and Conscientiousness (Study 2)**

| | All Family Sizes | | | | Two child families | | | | Three or more children | | | |
|----------------------------|------------------|------|-----------------|-------------|--------------------|------|-----------------|-------------|------------------------|------|-----------------|-------------|
| | N | Mean | <i>t</i> -value | Effect Size | N | Mean | <i>t</i> -value | Effect Size | N | Mean | <i>t</i> -value | Effect Size |
| All Cases | | | | | | | | | | | | |
| Conscientiousness | 131 | .36 | -3.96** | .35 | 54 | .41 | -1.60 | .22 | 77 | .32 | -3.90** | .44 |
| Openness to Experience | 130 | .56 | 1.93* | .17 | 53 | .51 | .28 | .04 | 77 | .60 | 2.31* | .26 |
| Female-Female Cases | | | | | | | | | | | | |
| Conscientiousness | 85 | .37 | -2.92** | .32 | 32 | .41 | -1.18 | .21 | 53 | .35 | -2.84** | .39 |
| Openness to Experience | 84 | .54 | .95 | .10 | 31 | .46 | .60 | .11 | 53 | .58 | 1.69* | .23 |
| Male-Male Cases | | | | | | | | | | | | |
| Conscientiousness | 46 | .34 | -2.70** | .40 | 22 | .41 | -1.10 | .23 | 24 | .27 | -2.70* | .55 |
| Openness to Experience | 46 | .60 | 2.01* | .30 | 22 | .59 | 1.20 | .26 | 24 | .61 | 1.62 | .33 |

Note. Values of composite variables range from 0, indicating firstborn siblings ranked more often on the relevant measure, to 1, indicating secondborn siblings ranked more often. The further the mean value deviates from .5 in either direction the more often the relevant sibling was ranked as displaying the trait. Single-sample *t*-tests assumed no difference in sibling rankings thus the mean value is tested against the population mean of .5. Negative *t*-value indicates firstborn siblings ranked more often. All tests are one-tailed.

* $p < .05$; ** $p < .01$

Rating Data: 1st Born vs 2nd Born Composite Variables

Composite Variable Construction

Composite variables for both Big-5 categories Openness to Experience and Conscientiousness were constructed by combining and averaging the ratings for the single items within these Big-5 categories. Furthermore, for the two Big-5 categories, separate composites were created for each of the two sibling-pair data sources and for the peer rating data source. Reliability checks were conducted before any composite variable construction was undertaken.

Reliability Checks for Composite Construction

Conscientiousness – Self Ratings and Sibling Ratings. Reliability checks were conducted separately for the two data sources, self ratings and sibling ratings. The single-item anchored adjectives “responsible – irresponsible”, “achieving – unachieving” and “ambitious/hardworking – aimless” (all reverse coded) were combined following the reliability analysis to form the composite variable Conscientiousness ($\alpha = .83$ for both self and sibling ratings). The single-item adjective pair “not impulsive – impulsive” (reverse coded) was not considered for the composite variable Conscientiousness for either data source. This adjective pair was excluded from the self-rating data composite construction owing to a low item-total correlation with the other single items ($r = .29$). For the sibling-rating data the adjective pair “not impulsive – impulsive” (reverse coded) was excluded as its removal from the reliability check lead to a significant increase in Cronbach’s Alpha (from $\alpha = .71$ to $\alpha = .83$).

Conscientiousness – Peer Ratings. The single-item anchored adjectives “responsible – irresponsible”, “achieving – unachieving” and “ambitious/hardworking – aimless” (all reverse coded) were combined following the reliability analysis to form the composite variable Conscientiousness ($\alpha = .81$). The single-item adjective pair “not impulsive – impulsive” (reverse coded) was not considered for the composite variable Conscientiousness from the peer rating data. This adjective pair was excluded owing to a low item-total correlation with the other single items ($r = .26$)

Openness to Experience – Self Ratings and Sibling Ratings. To form the composite variable Openness to Experience for each data source the single-item adjective pairs “conservative – liberal”, “conventional – unconventional”, “untraditional – traditional” (reverse coded) and “rebellious – conservative” (reverse coded) were combined following a reliability analysis ($\alpha = .72$ for self ratings and $\alpha = .73$ for sibling ratings). The single-item adjective pair “conforming - independent” (reverse coded) was not used in the Openness to Experience composite variable for either data source. This adjective pair was excluded from the composite variable for both self ratings and sibling ratings owing to a low item-total correlation with the other single items ($r = .28$ for self ratings and $r = .30$ for sibling ratings).

Openness to Experience – Peer Ratings. To form the composite variable Openness to Experience for the peer rating data the single-item adjective pairs “conservative – liberal”, “conventional – unconventional”, “untraditional – traditional” (reverse coded), “rebellious – conservative” (reverse coded) and “conforming - independent” were combined following a reliability analysis ($\alpha = .70$). None of the

single-item adjective pairs relating to the Big-5 category Openness to Experience were excluded in peer rating data composite construction.

Pre-Analysis Data Source Inter-correlations for Rating Data

Correlations between the self-, sibling- and peer-rating data were calculated to investigate inter-rater reliability. Previous research (Funder & Dobroth, 1987; Funder, 1995; Funder, Kolar & Blackman, 1995; Russell & Zickar, 2005) has provided strong evidence for inter-rater agreement in measures of personality in a target individual. To test this within the current data set the ratings provided for each birth-order position - self, sibling and nominated peer - were correlated for each composite Big-5 category. The self and sibling ratings showed statistically significant correlations for both targeted birth-order positions and for two composite Big-5 variables Openness to Experience and Conscientiousness. The ratings provided by nominated peers did not show statistically significant correlations with self- or sibling-ratings for either birth-order position or Big-5 composite variable except when a secondborn sibling was being rated on Openness to Experience (see Table 5).

Table 5***Correlations by birth order of rated target showing inter-rater agreement between self, sibling, and peer ratings (Study 2)***

| 1st Born Rated | 1 | 2 | 3 |
|--------------------------------------|----------|----------|----------|
| <i>Conscientiousness</i> | | | |
| 1. Self Rating | - | | |
| 2. Sibling Rating | 0.28* | - | |
| 3. Peer Rating | 0.20 | 0.23 | - |
| <i>Openness to Experience</i> | | | |
| 1. Self Rating | - | | |
| 2. Sibling Rating | 0.28* | - | |
| 3. Peer Rating | 0.14 | 0.12 | - |
| 2nd Born Rated | 1 | 2 | 3 |
| <i>Conscientiousness</i> | | | |
| 1. Self Rating | - | | |
| 2. Sibling Rating | 0.41** | - | |
| 3. Peer Rating | 0.09 | 0.23 | - |
| <i>Openness to Experience</i> | | | |
| 1. Self Rating | - | | |
| 2. Sibling Rating | 0.33* | - | |
| 3. Peer Rating | 0.41** | 0.27* | - |

* $p < .05$; ** $p < .01$.

Personality Differences by Birth Order: Rating Data

For all following analyses of the composite variables derived from the family rating data – self and sibling - matched pair t-tests were employed as tests of statistical significance. All statistics for the self- and sibling-rating data composite variable analyses are presented in Table 6.

All Gender Pairs Combined. For all analyses of combined gender pairs, as hypothesized, firstborn siblings were given higher ratings on the Big-5 measure Conscientiousness whereas secondborn siblings were give higher ratings on the measure Openness to Experience. The difference in ratings between siblings was statistically significant for all analyses when gender pairs were combined.

Female-Female Pairs. In all analyses of female-female sibling pairs, as hypothesized, firstborn siblings were rated higher on the Big-5 measure Conscientiousness and secondborn siblings were rated higher on Openness to Experience. The difference in ratings between firstborns and secondborns was statistically significant on both Openness to Experience and Conscientiousness when all family sizes were combined in families with 3 or more children. The difference in ratings between firstborn and secondborn siblings was not statistically significant for families with only 2 children.

Male-Male Pairs. For all analyses of the male-male sibling pairs firstborn male siblings were given higher ratings on Conscientiousness whereas secondborn siblings were given higher ratings on Openness to Experience. The difference in ratings given to siblings was statistically significant across all analyses.

Table 6*Self and Sibling Rating Data: Matched Pairs t-tests for composite variables Openness to Experience and Conscientiousness (Study 2)*

| | All Family Sizes | | | | Two child families | | | | Three or more children | | | |
|----------------------------|------------------|---------------------------|---------|-------------|--------------------|---------------------------|---------|-------------|------------------------|---------------------------|---------|-------------|
| | N | Mean Difference (±SEM) | t-value | Effect Size | N | Mean Difference (±SEM) | t-value | Effect Size | N | Mean Difference (±SEM) | t-value | Effect Size |
| All Pairs | | | | | | | | | | | | |
| Conscientiousness | 133 | .59 (± .14) | 4.23** | .46 | 54 | .44 (± .23) | 1.90* | .31 | 79 | .69 (± .17) | 4.00** | .60 |
| Openness to Experience | 134 | -.85 (± .14) | -6.10** | .75 | 55 | -.56 (± .23) | -2.42** | .49 | 79 | -1.05 (± .17) | -6.17** | .96 |
| Female-Female Pairs | | | | | | | | | | | | |
| Conscientiousness | 88 | .33 (± .15) | 2.19* | .32 | 33 | .08 (± .24) | .33 | .07 | 55 | .48 (± .19) | 2.50** | .47 |
| Openness to Experience | 89 | -.60 (± .18) | -3.25** | .51 | 34 | -.26 (± .33) | -.79 | .21 | 55 | -.80 (± .22) | -3.73** | .69 |
| Male-Male Pairs | | | | | | | | | | | | |
| Conscientiousness | 45 | 1.09 (± .27) | 4.03** | .75 | 21 | 1.00 (± .44) | 2.30* | .66 | 24 | 1.17 (± .34) | 3.39** | .88 |
| Openness to Experience | 45 | -1.36 (± .18) | -7.46** | 1.54 | 21 | -1.05 (± .28) | -3.81** | 1.18 | 24 | -1.63 (± .23) | -7.00** | 1.91 |

Note. Negative *t*-value indicates higher ratings for secondborn siblings.* $p < .05$; ** $p < .01$.

Court case Scenarios: 1st Born vs 2nd Born

From the four court case summaries presented to participants, only data relating to the amount in fines the guilty party in each scenario should pay was analysed. Insufficient participant responses (3% of all participants) to the question asking if the guilty party should receive a prison sentence meant an examination of this question was not feasible. T-tests for independent means were used in the following analyses, with amount of fine as the dependant variable and birth order as the independent factor. Table 7 shows the sample sizes, means, *t*-values and estimates of effect size for all analyses.

1st born hypotheses. For the two court case scenarios intended to represent authority figures being punished (Court case summaries 1 & 3) firstborn siblings, as hypothesized, gave lower fines in monetary amounts for both scenarios. However, these differences in fines between siblings were not statistically significant for either scenario.

2nd born hypotheses. The court case summaries 2 and 4 were written to elicit identification with the down-trodden, or the underdog, and thus it was hypothesized that secondborn siblings would assign lower amounts in fines to the guilty party than would firstborn siblings. As predicted, for both court case summaries secondborn siblings ascribed significantly lower amounts in fines to the guilty parts than did their firstborn counterparts.

Table 7

Court case summaries: Independent means t-test on assigned prisons sentences by birth order, showing sample size, means, t-value, effect size and predicted direction (Study 2)

| | N | 1 st Born Mean | 2 nd Born Mean | t-value | Effect Size | Direction |
|------------------------------|-----|---------------------------|---------------------------|---------|-------------|----------------------|
| Firstborn Hypotheses | | | | | | |
| Court case 1 | 111 | 2880.18 | 4211.61 | -1.13 | .22 | 1 st born |
| Court case 3 | 80 | 2153.66 | 2784.62 | -1.05 | .34 | 1 st born |
| Secondborn Hypotheses | | | | | | |
| Court case 2 | 94 | 1646.66 | 951.04 | 1.05* | .38 | 2 nd born |
| Court case 4 | 105 | 1359.43 | 881.73 | 1.85* | .36 | 2 nd born |

* $p < .05$.

Ranking Data: 1st Born vs 2nd Born Conformity/Nonconformity

For the single item “nonconformist”, as hypothesized, secondborn siblings were more often ranked as displaying this characteristic than were firstborn siblings, except in female-female two-child families. This departure in female-female two child families from the expectation generated by the standard model of sibling niche differentiation is consistent with the more refined model. None of the differences found in sibling rankings of “nonconformist” were statistically significant (Table 8.)

Table 8

Percentage of times “nonconformist” was ranked as a 1st born or 2nd born characteristic within sibling pairs, significance levels for χ^2 , and observed direction (Study 2)

| Gender Pair | Nonconformist | | | | |
|----------------------|---------------|---------------------------------------|--------------|----------|----------------------|
| | N | 1 st % – 2 nd % | Difference % | χ^2 | Direction |
| Female-Female | | | | | |
| 2 children | 33 | 57.58 – 42.42 | 15.15 | .38 | 1 st born |
| 3 or more | 53 | 43.40 – 56.60 | -13.21 | .92 | 2 nd born |
| Male-Male | | | | | |
| 2 children | 22 | 40.91 – 59.09 | -18.18 | .73 | 2 nd born |
| 3 or more | 24 | 45.83 – 54.17 | -8.33 | .17 | 2 nd born |

Note. As an artifact of presentation a negative percentile difference implies rankings in the second born direction.

Rating Data: 1st Born vs 2nd Born Conformity/Nonconformity

Results of the analyses for the single-item adjective pair “conforming – nonconforming” in all gender-pair and family size combinations are shown in Table 9. In all analyses, except female-female two-child families, secondborn siblings as hypothesized were given higher ratings on “conforming – nonconforming”. For female-female two-child families pairs no mean difference was found.

Table 9

Matched Pairs t-tests for single-item adjective pair “conforming – nonconforming” (Study 2)

| Gender Pair | “conforming – nonconforming” | | | | |
|----------------------|------------------------------|---------------------------|---------|-------------|----------------------|
| | N | Mean Difference (±SEM) | t-value | Effect Size | Direction |
| Female-female | | | | | |
| 2 children | 34 | .00 (± .40) | .00 | .00 | No Difference |
| 3 or more | 55 | -.29 (± .28) | -1.03 | .21 | 2 nd born |
| Male-Male | | | | | |
| 2 children | 21 | -.57 (± .44) | -1.30 | .45 | 2 nd born |
| 3 or more | 24 | -.63 (± .42) | -1.49 | .45 | 2 nd born |

Note. Negative *t*-value indicates higher ratings for secondborn sibling

Interaction Effects: Birth Order, Gender and Family Size

As a breakdown of birth-order effects for gender pairs and family size has already been provided the following exploratory analyses will focus on the interaction(s) between these three variables. Main effects will be reiterated where applicable and Table 10 should be consulted for an examination of relevant group means. Furthermore, only rating data (self-ratings and sibling-ratings) were examined in these analyses.

Two repeated measures ANOVAs were conducted, one for the composite dependant variable Conscientiousness and one for the composite dependant variable Openness to Experience. For both ANOVAs the within-subjects factor was birth-order (of person being rated, 1st born vs 2nd born); as these were matched per participant the

order of matching was different depending on the birth order of the sibling providing the ratings. The firstborn sibling of each pair provided a self rating for the 1st born level of birth-order and a rating of their sibling for the 2nd born level, conversely the secondborn sibling had their rating of their sibling included in the 1st born level of birth-order. Two between-subjects factors, gender and family size were also included.

Conscientiousness

Main effects. For the within-subjects factor birth-order, firstborn siblings, as hypothesized, were given higher ratings on the composite variable Conscientiousness than were secondborn siblings, $F(129) = 41.50, p < .01$. Main effects of the two between-subjects factors were also found. As hypothesized for gender, $F(1, 130) = 30.12, p < .01$, females received higher ratings compared to males; and for family size, $F(1, 130) = 9.15, p < .01$, higher ratings were given to participants who came from families with three or more children.

Interaction effects. On the composite variable Conscientiousness a significant interaction between birth-order and gender was found ($F(1, 129) = 9.38, p < .01$) with the ratings given to males in male-male sibling pairs changing (decreasing as the levels of the factor birth-order change from 1st born to 2nd born) at a rate that was greater than the rate of change for females (Figure 1).

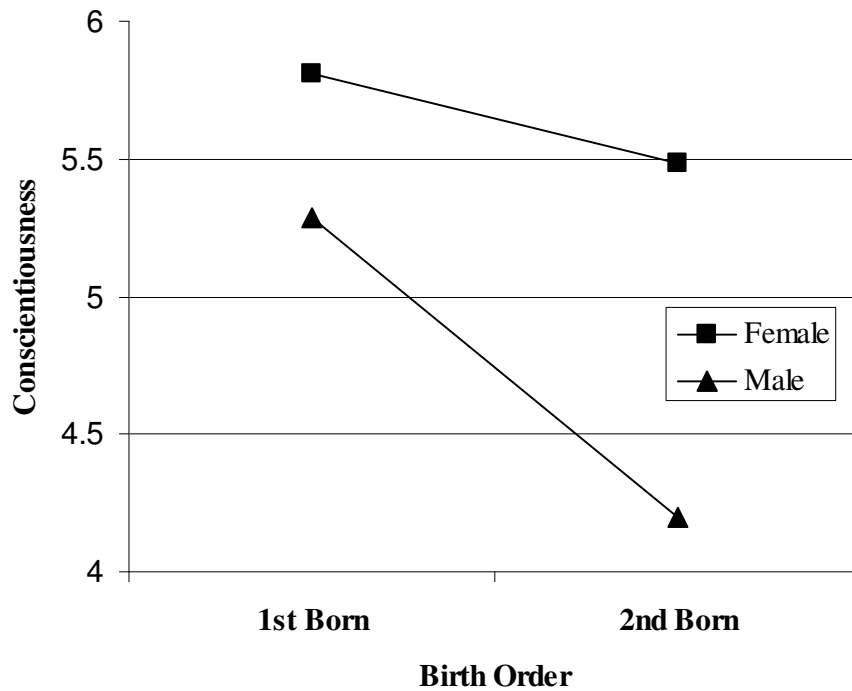


Figure 1. *Interaction of gender and birth order on the composite variable Conscientiousness*

Openness to Experience

Main effects. A significant main effect for the within-subjects factor birth-order was found, $F(1, 130) = 41.51, p < .01$, with secondborn siblings, as hypothesized, receiving higher ratings than their firstborn counterparts. Of the two between-subjects factors only gender had a statistically significant main effect, $F(1, 130) = 9.83, p < .01$, with males receiving higher ratings than females.

Interaction effects. The interaction between birth-order and gender was statistically significant for the composite variable Openness to Experience, $F(1, 130) = 7.72, p < .01$ (Figure 2), where secondborn males in male-male pairs were given higher

ratings compared to firstborn males than were secondborn females in comparison to their firstborn sisters. A marginally nonsignificant interaction between birth-order and family-size was also found, $F(1, 130) = 3.76, p = .055$ (Figure 3).

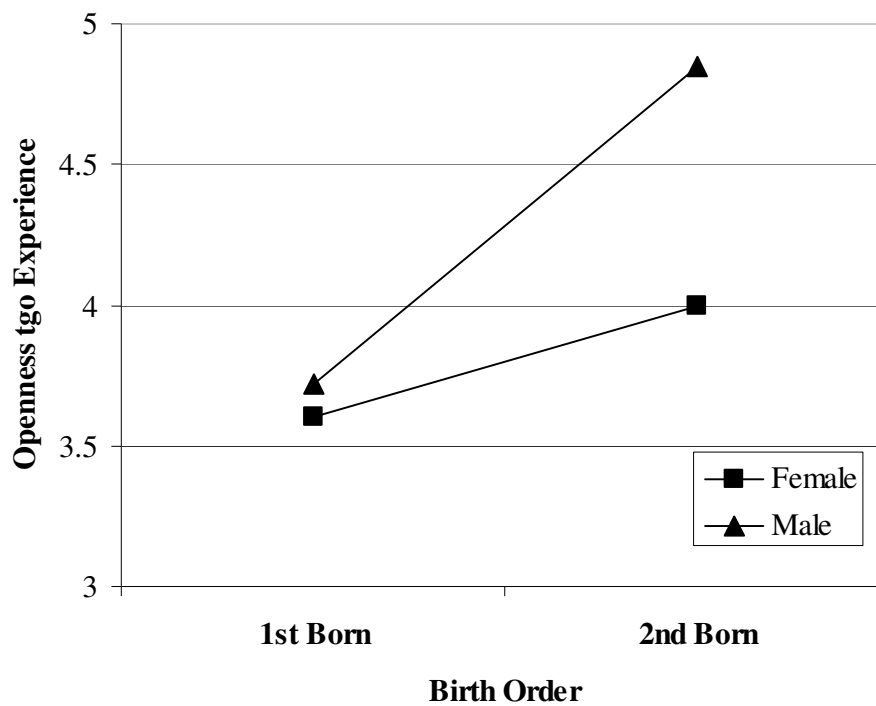


Figure 2. Interaction of gender and birth order on the composite variable Openness to Experience

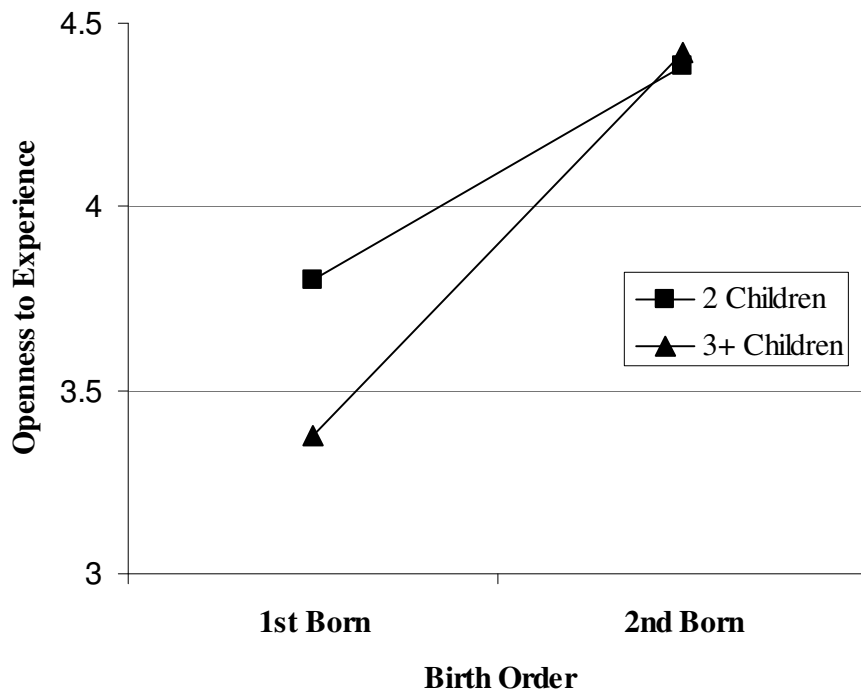


Figure 3. Interaction of family size and birth order on the composite variable Openness to Experience

Table 10

*Rating Data: Means, standard deviations and sample size for composite variables
Openness to Experience and Conscientiousness (Study 2)*

| | | Conscientiousness | | | | | |
|--------|--------------|----------------------------|----------|-----|----------------------------|----------|-----|
| Gender | Family Size | 1 st Born Rated | | | 2 nd Born Rated | | |
| | | Mean | Std. Dev | N | Mean | Std. Dev | N |
| Female | 2 children | 5.56 | 1.03 | 33 | 5.48 | 1.15 | 33 |
| | 3 or more | 5.96 | 0.88 | 55 | 5.49 | 1.12 | 55 |
| | Total | 5.81 | 0.95 | 88 | 5.48 | 1.13 | 88 |
| Male | 2 children | 4.83 | 1.37 | 21 | 3.83 | 1.66 | 21 |
| | 3 or more | 5.69 | 1.01 | 24 | 4.53 | 1.58 | 24 |
| | Total | 5.29 | 1.26 | 45 | 4.20 | 1.64 | 45 |
| Total | 2 children | 5.27 | 1.21 | 54 | 4.83 | 1.58 | 54 |
| | 3 or more | 5.88 | 0.92 | 79 | 5.19 | 1.34 | 79 |
| | Total | 5.63 | 1.09 | 133 | 5.05 | 1.45 | 133 |

| | | Openness to Experience | | | | | |
|--------|--------------|----------------------------|----------|-----|----------------------------|----------|-----|
| Gender | Family Size | 1 st Born Rated | | | 2 nd Born Rated | | |
| | | Mean | Std. Dev | N | Mean | Std. Dev | N |
| Female | 2 children | 3.68 | 1.18 | 49 | 3.94 | 1.15 | 49 |
| | 3 or more | 3.55 | 1.20 | 74 | 4.03 | 1.11 | 74 |
| | Total | 3.60 | 1.19 | 123 | 4.00 | 1.12 | 123 |
| Male | 2 children | 4.02 | 1.01 | 28 | 4.70 | 0.99 | 28 |
| | 3 or more | 3.48 | 0.97 | 35 | 4.97 | 1.00 | 35 |
| | Total | 3.72 | 1.01 | 63 | 4.85 | 0.99 | 63 |
| Total | 2 children | 3.80 | 1.12 | 77 | 4.22 | 1.15 | 77 |
| | 3 or more | 3.53 | 1.13 | 109 | 4.33 | 1.16 | 109 |
| | Total | 3.64 | 1.13 | 186 | 4.29 | 1.15 | 186 |

Strength of Effect of Birth Order, Gender and Family Size

A simultaneous multiple regression analysis was employed to ascertain the influence that birth order, gender and family size each have on the composite variables Conscientious and Openness to Experience. Squared semi-partial correlations between each of the dependant composite variables and the independent variables are reported. Only self- and sibling rating data were used in this analysis (Table 11).

Table 11
Standardized Regression Coefficients for Big-5 Composite Variables Openness to Experience and Conscientiousness Testing the Influence of Gender, Birth Order and Family Size (Study 2)

| | N | R | Zero-order r | B | t | Semi-partial r^2 |
|--------------------------------------|-----|-------|----------------|------|--------------------|--------------------|
| Big-5 Composite | | | | | | |
| <i>Conscientiousness</i> | 268 | .41** | | | | |
| Gender | | | -.32 | -.31 | -5.80** | 0.10 |
| Birth order | | | -.22 | -.22 | -3.91** | 0.05 |
| Family size | | | .18 | .15 | 2.66** | 0.01 |
| <i>Openness to Experience</i> | 270 | .40** | | | | |
| Gender | | | .17 | .16 | 2.83** | 0.03 |
| Birth order | | | .36 | .36 | 6.47** | 0.13 |
| Family Size | | | -.08 | -.07 | -1.15 ^a | 0.01 |

^a $p > .10$. ** $p < .01$.

Conscientiousness. The regression model for Conscientiousness contained the significant predictors ($p < .10$ cut-off) gender, birth-order and family-size. Of these gender accounts for the greatest amount of unique variance 10% (semi-partial $r^2 = .10$),

followed by birth-order 5% (semi-partial $r^2 = .05$) and, family-size 2% (semi-partial $r^2 = .02$).

Openness to Experience. For the composite variable Openness to Experience the significant predictors birth-order and gender were retained ($p < .10$ cut-off) in the regression model. The greatest amount of unique variance explained was by birth-order 13% (semi-partial $r^2 = .13$) followed by gender 3% (semi-partial $r^2 = .03$).

Peer-ratings of Sibling Personality

A descriptive analysis of the peer rating composite variable Openness to Experience and Conscientiousness revealed that they violated assumptions of normality; K.S. (120) = .223, $p < .01$ for the composite variable Conscientiousness, and K.S (120) = .092, $p < .05$ for the composite variable Openness to Experience. Standard data transformations of the peer data scores also failed to achieve a normal distribution. Nonparametric statistical tests (Wilcoxon Signed Ranks Test) for matched samples were therefore employed for all analyses of the peer rating data that follow. Owing to small samples sizes when the peer rating data were subdivided by gender and then family size, the peer rating data analyses were limited to examinations of all female-female pairs, all male-male pairs and all gender pairs combined. Effect size estimates were subsequently calculated from descriptive analyses of the peer rating data ($M_1 - M_2 / \sigma$ pooled).

Personality Differences by Birth Order

All Pairs Combined. No significant difference in the peer ratings of firstborn and secondborn siblings was observed on either the composite variable Conscientiousness, WC-Z (52) = -.20, $p = .42$, E.S. $d = .04$, or the composite variable Openness to

Experience, $WC-Z (52) = -.40, p = .35, E.S. d = .10$. For both composite variables the difference in ratings by birth order was in the expected direction, with firstborns receiving higher ratings on Conscientiousness and secondborns receiving higher ratings on Openness to Experience.

Female-Female Pairs. No statistically significant difference, where $\alpha = .05$, between the peer ratings of firstborn and secondborn siblings was found for the composite variable Conscientiousness, $WC-Z (34) = -1.50, p = .07, E.S. d = .23$ nor for the composite variable Openness to Experience, $WC-Z (34) = -.49, p = .31, E.S. d = .10$. The difference between siblings on peer ratings of both Conscientiousness, rated as a firstborn characteristic, and Openness to Experience, rated as a secondborn characteristic, were in the expected direction.

Male-Male Pairs. Similarly, in male-male pairs no statistically significant difference was observed in the sibling ratings for the composite variable Conscientiousness, $WC-Z (18) = -1.38, p = .08, E.S. d = .53$, or for the composite variable Openness to Experience, $WC-Z (18) = -1.10, p = .14, E.S. d = .43$. However, the differences in sibling ratings were in the expected direction for both composite variables.

Discussion

This study tested hypotheses about differences in personality between firstborn and secondborn siblings using multiple data sources (self, sibling and peer) and differing styles of stimulus materials (rankings, ratings, and real world scenarios). All hypotheses were derived from the functional birth-order model of sibling niche differentiation (Sulloway, 1996), some of those being refinements to the model, and novel predictions

derived from it, previously untested in the birth-order literature. In general the results of this study were as hypothesized, though no confirmatory evidence was found for the hypothesis that birth-order differences in personality would be observed when personality assessments were provided by individuals with little prior knowledge of the target participant's family environment.

Personality Differences by Birth Order: Ranking and Rating Data Only.

Conscientiousness. As hypothesized, in all analyses conducted in this study firstborn siblings were considered the more conscientious of the two siblings, regardless of the gender of the sibling pair or the size of their family. The average estimated effect size for all birth-order comparisons (ranks and ratings combined, $d = .43$) was of a similar magnitude to those found in previous research (Sullo way, 1996; Healey & Ellis, 2007.) Effect sizes and patterns of all main findings were consistent across the different stimulus materials used in this study (rankings and ratings), suggesting both styles are effective ways of uncovering birth-order differences in conscientiousness.

The majority of the observed differences between sibling personality appraisals on the composite variable Conscientiousness were statistically significant. The notable exception was when siblings from families with only two children were compared; in these comparisons two thirds of analyses were not statistically significant and the average effect size was half that ($d = .28$) of the average effect size for comparisons of siblings from families with three or more children ($d = .56$). A further note-worthy finding in regard to family size comes from the examination of all personality ratings with size of family as an independent factor; here, it was observed that participants from families with

two or more children were given higher ratings on the composite variable Conscientiousness than were participants from families with only two children.

These findings combined suggest that while there is a consistent effect of birth order on the conscientiousness of siblings within the family, in families with only two children the difference between the siblings is less pronounced than in families with more than two children. Furthermore the mean ratings given to firstborn and secondborn siblings within each family size category showed that the conscientiousness of firstborn siblings increased more than that of secondborn siblings as the size of the family became bigger. A plausible explanation for this phenomenon is that the arrival of a third child into the family unit, one who is more likely to differentiate in relation to the secondborn and thus adopt a similar resource gathering strategy to the firstborn, causes not only an exaggeration of the differentiation employed by the incumbent siblings but also a more pronounced exaggeration in the strategy of the firstborn sibling. In other words when a new sibling enters the family everyone becomes more conscientious with the firstborn leading the way.

When comparing sibling differences across same-gender sibling pairs this study found no noteworthy differences in the pattern of findings, with firstborn siblings regardless of the gender of the sibling pair being given higher ratings than secondborn siblings. Where a difference between gender pairs was observed it took the hypothesized form of higher mean ratings given to females in female-female pairs, irrespective of birth order. This indicates that conscientiousness is considered a female attribute, rather than a male attribute and it is a finding that support results from past research (Rubinstein, 2005 and Stevens & Ash, 2001 both found females to more conscientious than males).

Accompanying the main effects of gender and birth order on the composite variable Conscientiousness, an interaction between these two factors was also observed in this study. Secondborn males were markedly less conscientious compared to firstborn males than secondborn females are compared to their firstborn counterparts. An examination of the strength of effect exerted by birth order, gender and family size on conscientiousness in this study provided evidence for the hypothesis that the influence of birth order is about two thirds that of the influence of gender. The current study found the influence of birth order (accounting for 5% of variance in ratings) to be half that of gender (10%) and more than double the influence of family size (2%).

Openness to Experience. As hypothesized, secondborn siblings were considered as more open to experience than their firstborn counterparts. The average observed effect size for the ranking and rating data combined was larger than that typically observed in previous birth-order research ($d = .56$). While comparisons of differences in birth order in all combinations of gender pairs and family sizes in data derived from both forms of stimulus materials (rankings and ratings) showed that secondborn siblings were more open to experience than firstborn sibling, one noteworthy difference emerged. In male-male sibling pairs the birth-order effect size from rating stimuli was five times larger than that from the ranking stimuli ($d = .30$ for ranks and $d = 1.54$ for ratings).

When the rating data was examined in more depth a different relationship between birth order, gender and family size was uncovered for the composite variable Openness to Experience than that found for Conscientiousness. Secondborn siblings on average were considered more open to experience when compared to firstborns and males on average more open to experience than females. The interaction between gender and

birth order revealed that, like the composite variable Conscientiousness, the rate of change in ratings for Openness to Experience across birth order was greater for males than for females. In particular secondborn males received far higher ratings on Conscientiousness overall.

When comparing across family sizes a similar finding emerged; namely, while there was no statistically significant main effect of family size, the interaction between birth order and family size approached statistical significance ($p = .055$). The difference between firstborn and secondborn siblings in families with three or more children was greater than that between firstborn and secondborn siblings in two child families, even though there was no difference in openness to experience between secondborn siblings in either family-size category. In short, when the size of family increases firstborn siblings become less open to experience. The results of the gender and personality analyses of this study are in line with those of Zweigenhaft's (2002) research which found that males are more open to experience than females.

A further examination of the factors influencing openness to experience revealed that birth order was the strongest influencing factor (13% of variance accounted for) followed by gender (3%). The influence that size of family had was negligible. In this study the hypothesized strength of effect of birth order was expected to be approximately two thirds that of gender. The observed strength of effect of birth order was in fact four times that of gender.

Personality Differences by Birth Order: Court case summaries

Previous birth-order literature (Sulloway, 1996; Rohde et al., 2003; Zweigenhaft & Von Ammon, 2000; Zweigenhaft, 2002) found that examinations of birth-order differences in personality are more readily observed when scenarios of real world events and issues (i.e., examining acts of rebellious or subversive behavior or acceptance/rejection of standard cultural values) are presented to participants as opposed to pen-and-paper personality inventories. Using mock court case summaries to replicate real world scenarios the results from this study in part supported the findings in previous birth-order literature.

As hypothesized, firstborn siblings identified with the protagonist more than secondborn siblings when the protagonist was a person of authority or in a position of status, whereas secondborn siblings identified with the protagonist when the protagonist in the scenarios was the under-dog or man on the street. However, only in the scenarios designed to elicit favorable responses from secondborn siblings were the differences in sibling responses statistically significant. All estimates of effect size were of a magnitude similar to those found in the pen-and-paper style personality questionnaires used in this study ($d = .28$ for firstborn hypotheses and $d = .37$ for secondborn hypotheses) and in other studies in the within-family birth-order literature (Paulhus et al., 1999; Healey & Ellis, 2007). However, when compared with between-family pen-and-paper oriented research ($d = .10$ on average for all measures) the differences in effect sizes was more than double for the real-world scenarios. The claim by Sulloway (2007) that these real-world scenarios will typically generate effect size estimates close to double those obtained from pen-and-paper personality questionnaire was supported in this study only

when real-world scenarios were compared with data from between-family pen-and-paper approaches.

Personality Differences by Birth Order: Conformity

While there were no statistically significant differences between firstborn and secondborn siblings on the single item “nonconformity” in the ranking data and “conforming – nonconforming” in the rating data, the hypothesized pattern consistently emerged. Secondborn siblings were considered the nonconformist of the two siblings in all comparisons of gender pairs and family size except for female-female two child families. This finding provides some evidence, albeit tentative, for Sulloway’s claim that in female-female two child families, secondborn females having their older sister as a role model will develop exaggerated female typical traits, for example cooperation and conformity in relation to their older sister.

Personality Differences by Birth Order: Peer Ratings

Some evidence was found in this study to back up the claim that birth-order differences in personality can be observed by individuals with no prior knowledge of the family environment of the sibling being rated. It was assumed that nominated peers have little or no knowledge of the specific family dynamics of the rated target sibling. While this point may be contentious, (in everyday social interaction people often share family-specific information with peers), the results were still not significant. More specifically, for all analyses of the peer data the firstborn siblings were considered more conscientious and secondborns more open to experience, yet no statistically significant difference between siblings was found on either composite variable. The failure to achieve statistical

significance is most likely owing to the low statistical power of the nonparametric test used in the peer rating analyses since the direction of effect for both Big-5 composites is in the hypothesized direction, and the effect size approximations were of a similar magnitude to those found in data derived from within family comparisons made by siblings.

Many possible avenues exist for further research in this matter. Perhaps a replication of the method of this study with tighter control over peer responses is needed, for example by having a researcher supervise the responding peer in a laboratory environment. Alternatively future research might employ more rigorous and formalized personality scales (i.e., *NEO PI-R* or *NEO-FFI* Scales) although given that both the ranking and rating scales used in this study provided consistent results it would appear the problem of statistical significance lies not in the tools used.

Conclusions

The efficacy of different stimuli materials (rankings, ratings and, real world scenarios) and data sources (self reports, sibling reports and, peer reports) was tested in this study. The hypothesized findings emerged in ranking and rating data and also in self reports and sibling reports. Strong evidence for real world scenarios as a way of eliciting birth-order differences in personality was not found in this study, despite the results of past research suggesting birth-order differences in personality should be more apparent when real world scenarios as opposed to pen-and-paper questionnaires are presented to siblings. While, no statistically significant findings emerged in the independent peer ratings, the trend in the data suggests possible transference of within family personality expressions to outside family contexts.

Chapter Four: General Discussion

The current research tested and extended Sulloway's (1996, 2001, 2007) sibling niche differentiation model of birth-order differences in personality, which suggests that the adoption of early developmental strategies to minimize conflict between siblings carry through to adult life in the form of stable and enduring personality traits. The core expectations derived from Sulloway's theory have found increasing empirical support within psychological research since the publication of *Born to Rebel: Birth Order, Family Dynamics and Creative Lives* in 1996. Seemingly a dead research field following Ernst and Angst's damning 1983 meta-analytic review of a half century of disparate, diverse and contradictory findings; Sulloway's theory has given the study of birth order a new lease of life and resulted in a wealth of research.

The findings in the current research were generally consistent with the hypotheses and provide further confirmatory evidence for Sulloway's model. In addition, they go some way toward ruling out alternative explanations for birth-order effects, and extended data collection to non-family members.

Novel Predictions and Model Refinements

A number of novel predictions were formulated and tested in the current research. These were issues either not yet touched upon theoretically and empirically in the birth-order literature, or were theoretical suggestions that up to this point have not been tested.

First, tests of conformity/nonconformity in sibling pairs and across family sizes were conducted in both studies. These were undertaken to investigate an interaction between birth order, gender and family size predicted by Sulloway (1996), but not yet

tested in within-family birth-order and personality research until now. Sulloway suggests, citing research by Helen Koch amongst others (Koch, 1955; Sutton-Smith & Rosenberg, 1970; Bragg & Allen, 1970, all cited in Sulloway, 1996), that in female-female sibling pairs who are the only two children in the family, the secondborn female having their firstborn sister as their main role-model will develop exaggerated female qualities such as a tendency to conform. This in turn will lead the firstborn sister to be seen as the more nonconforming of the pair.

Partial support was found for this notion, as the difference in sibling rankings for female-female pairs, while not statistically significant, ran counter to that predicted by the standard model of sibling niche differentiation; firstborn sisters in female-female pairs from two child families are the more conforming and not the secondborn as the general hypotheses predict. This finding provides an important testable extension to Sulloway's model of sibling niche differentiation and opens the way for more in-depth examinations of different personality traits across gender pairs and family size.

The second novel prediction and extension to the birth-order literature involved tests of Beer and Horn's (2000) hypo-masculinization hypotheses (PHH). Beer and Horn in their 2000 study offered an hypothesis that could be tested in future birth-order research as a way of ruling out either their own explanation for birth-order differences in personality or Sulloway's model. Their hypothesis, as derived from PHH, was that secondborn males in female-male pairs would be no different than males in male-female pairs on personality measures; in short PHH suggests that firstborn males are always firstborn males regardless of their ordinal position in the family. Whereas Sulloway's model hypothesizes a difference in personality between males in male-female and

female-male sibling pairs based on their birth order without appeals to the frequency or birth order of other male siblings; the firstborn male that enters the family as the first child is a firstborn and will thus display firstborn characteristics (Sulloway, 2007).

A previous test of Beer and Horn's (2000) hypothesis by Healey & Ellis (2007), owing to limitations in their sample, was unable to compare mixed-gender pairs. Study 1 of the current research was able to test PHH and Sulloway's model by comparing males in male-female and female-male gender pairs. The results supported Sulloway's model, at the expense of PHH. The examination of PHH was only conducted in Study 1 for two reasons; first, the decision to restrict Study 2 to same gender pairs meant the proper tests of PHH using mixed gender sibling pairs would not be possible, and second, the evidence gathering against PHH, from the current research and the birth-order literature (Healey & Ellis, 2007) was deemed sufficient to not warrant further investigation of this hypothesis.

Study 1 collected data from mixed gender sibling pairs which allowed for a cursory examination of gender in all its possible combinations of sibling pairs. Furthermore family size information was also extracted from the ranking questionnaires used in Study 1 and when combined with the gender pair data allowed for a refined examination of the interaction between birth order, gender and family size. These analyses revealed a number of interesting and important findings which should provide firm ground upon which to base future birth-order research, primarily the differing nature of the interactions between birth order, gender and family size, for the Big-5 category Conscientiousness compared to its Big-5 counterpart Openness to Experience. From the results of Study 1 it appears Conscientiousness is heavily gender influenced with females – when comparing female-male and male-female sibling pairs - considered the more

conscientious regardless of birth order, whereas underlying Openness to Experience is a subtle interplay of gender and family size – with second born males who have an older sister considered the most open to experience and in male-female, and male-male sibling pairs no significant difference between siblings was observed. Furthermore in families with two same gender children the expected pattern of results was reversed – with the first born sibling considered the more open to experience of the two.

The results of Study 2 give a more nuanced breakdown of the interaction between birth order, personality, gender and family size. An almost identical pattern of results across all separate analyses of the ranking data for both Study 1 and Study 2 was found and the same pattern of findings were observed in the rating data for Study 2. The continuous nature of the variables obtained from the rating data in Study 2 allowed for more complex investigations than those conducted on the ranking data; and provided the current research with a breakdown of the influence birth order, gender, and family size have on Conscientiousness and Openness to Experience that is lacking in the birth-order literature so far. These investigations revealed main effects of both gender and family size for the composite variable Conscientiousness, as well as an interaction between gender and birth order. These results were as hypothesized and are in line with findings from previous research (Rubinstein, 2005; Stevens & Ash, 2001). A possible explanation for these findings is that quadratic or zig-zag effects, as described by Kidwell (1981), are manifest in the strategies siblings adopt when more than two children occupy the same family environment which cause firstborn siblings to play the game they know best (i.e., being acquiescent or conscientious) harder than they had done previously.

Interpretation of the results reveals that Conscientiousness is a female characteristic more than a male one; firstborn siblings display it more on average than do their secondborn counterparts; and when family size changes from two children to three or more children the differences between firstborn and secondborns becomes more pronounced.

Irrespective of the underlying cause(s) the current research found gender, as the most influential factor in personality ratings of Conscientiousness, exerting an effect twice that of birth order and five times greater than the influences of family size. As predicted in Study 2 and in the birth-order literature (Healey & Ellis, 2007; Paulhus et al., 1999; Sulloway, 2007; Zweigenhaft, 2002), the Big-5 factor Openness to Experiences is on average a secondborn sibling characteristic, and more a male rather than a female characteristic. It also has a rather complex interaction between birth order, gender and family size underlying it. The interaction between birth order and gender found in this study suggests that while there is only a small difference between firstborn females and firstborn males on Openness to Experience, the difference between secondborn males and all other sibling and gender combinations is considerably larger indicating that secondborn males are the most open to new experience and rebellious.

Furthermore, the interaction between family size and birth order, found in this study, suggests that the change in family size from two siblings to three or more has no effect on secondborn siblings for the composite variable Openness to Experience; but it shows reduced levels of Openness to Experience in firstborn siblings as family size increases. Based on Sulloway's (1996) prediction, the strength of effect of factors influencing Openness to Experience was hypothesized to show the effect of birth order as

two thirds that of gender. In fact Study 2 found the strength of influence birth order has on the Openness to Experience is four times greater than that attributable to gender.

The set of results for the peer rating data are puzzling. No significant differences were found in any of the peer rating data, even though all differences were in the hypothesized direction of birth-order effects for each composite variable. Furthermore it may be that the success of within family birth-order research comes from its ability to tap into family context dependant within-family roles that in everyday life are not manifest as stable personality constructs in individuals across contexts and situations. The context sensitive nature of personality expression is well known (Cervone & Shoda, 1999) although the current study and others (Salmon & Daly, 1998; Rohde et al, 2003) provide some evidence that birth-order effects do manifest outside a within-family context. A clue to where and why these seemingly within-family derived birth-order effects do manifest in other contexts and situations lies in the inter-rater correlations of the current study. Past researchers have found strong correlations between self and peer ratings of personality (Funder & Dobroth, 1987; Funder, 1995; Funder, Kolar & Blackman, 1995; Russell & Zickar, 2005) whereas the current study found only significant correlations between peer and self ratings, and peer and sibling ratings for Openness to Experience when the person being rated was the 2nd born sibling. Marginally non significant correlations were also found between peer and self, and peer and sibling ratings for Conscientiousness when the person being rated was the 1st born sibling. This suggests that peer raters are better judges of the targets personality when the trait being rated is that which the target's birth order suggests should manifest more than the other trait; peers more accurately rate a first born

on Conscientiousness whereas they more accurately rate a second born on Openness to Experience.

In contrast to past research (Funder, 1995; Russell & Zicker, 2005) the low visibility trait Openness to Experience was more accurately rated by peers – in relation to the self and sibling ratings – than was the high visibility trait Conscientiousness. While the current study assumed peers had minimal knowledge about the target sibling's within family relationships, positing peers with this knowledge would help explain the inter-rater findings. A further explanation might involve similarity in personality between peer and rated siblings. Assuming people gravitate toward forming friendships at work with those who reflect their values and beliefs and, as research suggests (Christiansen, Wolcott-Burnam, Janovics, Burns and Quirk, 2005), those high in openness to experience are more accurate judges of personality, this would go some way to explaining the accuracy of Openness to Experience ratings over Conscientiousness. Even more so under the assumption that a degree of conscientiousness is taken for granted in one's work place associates.

What the current study lacks is more information about the peers; how do they see their own personality, how does the rated sibling see them, what is the level of similarity between the peers' and the rated siblings' personalities, and what depth of knowledge do the peers have of the targets siblings and family environment? Thus, future researchers may have their hands full teasing apart various sampling and assessment methodologies before a true consensus can be reached about the generalizability of within-family personality effects. It is well known that differing environments elicit different individual

responses (Cervone & Shoda, 1999) and thus personality within social groups, work environments and sporting activities should be compared.

Methodological Issues

In order to isolate the within-family conditions most likely to facilitate sibling niche differentiation a number of methodological refinements were employed. The methodological refinements common to both of the studies in this research were restricting the sample (usable-sample in the case of Study 1 and selected-sample in the case of Study 2) to firstborn and secondborn sibling comparisons, age-gap restrictions (no smaller than 18 months and no larger than 5 years), and the use of nuclear-families (no step-, half- or intervening siblings including blended families and infant mortality).

Data for Study 1 were gathered by asking a single sibling within a family unit to rank order all siblings on various single item personality measures. Employing a single data source for estimations of multiple siblings' personality has a number of associated issues (i.e., halo-effects or self-ranking bias). First and foremost the single data source in Study 1 could come from any sibling within the target family (though in actuality the overwhelming majority was either a firstborn or secondborn siblings). Ideally if comparisons are targeted at firstborn and secondborn it should be one or preferably both of these siblings making the comparisons.

Study 2 sought to remedy this problem and gather data exclusively from firstborn and secondborn siblings. The inclusion of a personality rating questionnaire alongside the ranking questionnaire (a ranking questionnaire used in Study 1 and in Healey & Ellis, 2007) allowed for two data sources (personalities appraisals of ones self and personality

appraisals of ones sibling) to be compared across different styles of stimulus material (ranking scales compared to rating scales). In general the pattern of results obtained from the ranking scales and the pattern of results obtained from the rating scales were consistent. The main strength of the rating scales was that they provided true continuous data sets which allowed for the use of a more diverse range of statistical techniques in the analyses.

The added benefit of gathering within-family anchored personality ratings of this sort was that it allowed each birth order position to be treated as a distinct case during the analyses (while controlling for individual differences within each sibling rater). In general, rating scales are the more preferable option when compared with ranking scales, as the data derived from rating scales (that contain both self and sibling ratings) are more reliable internally and give the researcher a great range of options at the time of analyses.

As has been observed in previous birth-order research (Healey & Ellis, 2007; Paulhus et al., 1999), both Study 1 and Study 2 found that firstborn siblings were ranked more often as the conscientious sibling within the family and secondborn siblings ranked more often as open to experience.

Sulloway and others (Zweigenhaft & Von Ammon, 2000; Zweigenhaft, 2002; Rohde et al., 2003; Sulloway, 2007) have observed that birth-order effects are more salient when participants are presented with real world scenarios tapping aspects of social injustice, deviance and rebelliousness. The effect size between siblings in real-world scenarios is typically twice that of the effect size estimates obtained through pen-and-paper questionnaires. The results of the current research provide supporting evidence for the claims made by Sulloway and others. The observed pattern of findings of the court

case summary analyses, for both firstborn and secondborn hypotheses, were in the hypothesized direction; however only for the secondborn hypotheses were these differences statistically significant. The effect sizes for all analyses are more than double those found in between-family pen-and-paper studies (Sulloway, 2007).

Limitations and Caveats

The main strength of the within family approach in birth-order research is also its greatest weakness. Systematic birth-order effects are consistently found irrespective of the source of the data or the method used to obtain it, *as long as the methodological refinements are implemented and the sample is selected strictly to these criteria*. Neat, clean and ordered comparisons of neat, clean and ordered family units is fine; however these types of family units are not numerous and are no longer the norm in modern societies. It is tempting to make appeals to ancestral or evolutionary environments as exemplars of environments most favorable to the systematic differentiation of sibling strategies as a means to reduce direct sibling competition. A good deal more evidence from evolutionary biology, zoology and anthropology is needed before the aforementioned methodological refinements can be said to truly represent the family environment as it existed in our collective evolutionary history.

The thrust of this caveat points toward the inability to generalize within-family birth-order findings to *all* firstborn siblings or secondborn siblings or even families as a whole. Further research in the birth-order field should take pains to refine the models so as not to be so restrictive in its sample collection. Undoubtedly it would be beneficial to include in the sample the methodologically refined cases, but a more inclusive approach would allow for a deeper understanding of the phenomenon. It would also allow for

stronger tests of theoretical models against true null-hypotheses derived from the extant population of all families and not from statistical models assuming no difference on average.

Conclusion

The existence of birth-order differences in personality ratings is fast becoming an established fact (under certain, restrictive and precise conditions); the current study has done nothing but reinforce this. However, the within-family birth-order literature says a lot about very few families. A broader perspective is needed to ensure future research can make broader claims. The general approach and methodology employed in this research is one tool among many in the scientist's toolbox. A more diverse range of methods, samples and alternative – and more refined - theories are currently lacking in the birth-order literature and without them within family birth-order studies run the risk of losing the ability to generalize results.

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Appendices

Measures used in Studies 1 & 2

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Family and Personality

The purpose of this questionnaire is to collect data on family composition and personality, which I plan to use in a forthcoming Psyc 211 lecture. I am also asking for contact information, because I may want to invite some of you to participate in subsequent research on this topic.

Thank you,

Bruce Ellis

Contact information

Name:

Contact Phone#:

Student ID#:

Email:

Please record the following information about your brothers and sisters in the table below:

Appendix 1: Family Ranking Questionnaire

- 1) Age and first initial. The age and first initial of each of your brothers and sisters (**including yourself**) from oldest to youngest in the spaces provided.
- 2) Gender. The gender of each of your brothers and sisters (**including yourself**) by placing either a G (for girl) or B (for boy) in the box directly underneath their corresponding age.
- 3) Relation. The biological relationship of each one of your brothers and sisters to you:

Me = For yourself, write "me"

Full = If you share the same two biological parents, write "full"

Half = If you share only one biological parent, write "half"

Step = If you have different biological parents altogether (including adopted brothers and sisters), write "step"

- 4) Residence. Whether you were *born **and** raised* together in the same home as your sibling. Y = yes (were born and raised in same home); N = no (not born and raised in same home).

Sample Table Only.

| Order ==> | 1 st Born | 2 nd Born | 3 rd Born | 4 th Born | 5 th Born | 6 th Born | 7 th Born | 8 th Born | 9 th Born | 10 th Born |
|-----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|-----------------------|
| Age and first initial | 44-J | 43-M | 41-S | 39-B | 23-R | 18-N | 18-G | | | |
| Gender | G | B | B | B | G | G | G | | | |
| Relation | Step | step | Full | Me | Half | half | half | | | |
| Residence | N | N | Y | Y | N | N | N | | | |

Appendix 1: Family Ranking Questionnaire

Please record your siblings details in the following table

| Order ==> | 1 st Born | 2 nd Born | 3 rd Born | 4 th Born | 5 th Born | 6 th Born | 7 th Born | 8 th Born | 9 th Born | 10 th Born |
|-----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|-----------------------|
| Age and first initial | | | | | | | | | | |
| Gender | | | | | | | | | | |
| Relation | | | | | | | | | | |
| Residence | | | | | | | | | | |

This questionnaire is for you to rate yourself and your brothers and sisters on a number of different personality characteristics. Please record the following information on the table below:

- 1.) Age and first initial. The age and first initial of each of your brothers and sisters (**including yourself**) from oldest to youngest in the spaces provided.
- 2.) Personality characteristics. Assign a "1" to the brother or sister (**including yourself**) who is best described by the personality characteristic; assign a "2" to the brother or sister (**including yourself**) who is next best described by the characteristic, and so on until you have ranked yourself and all of your brothers and sisters. Do **not** assign the same rank for more than one sibling.

Most 2nd most 3rd most
 stubborn stubborn stubborn

Sample Table Only.

| Order ==> | 1 st Born | 2 nd Born | 3 rd Born | 4 th Born | 5 th Born | 6 th Born | 7 th Born | 8 th Born | 9 th Born | 10 th Born |
|-----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|-----------------------|
| Age and first initial | 44-J | 43-M | 41-S | 39-B | 23-R | 18-N | 18-G | | | |
| Stubborn | 1 | 5 | 2 | 4 | 3 | 6 | 7 | | | |

Appendix 1: Family Ranking Questionnaire

| Order ==> | 1 st Born | 2 nd Born | 3 rd Born | 4 th Born | 5 th Born | 6 th Born | 7 th Born | 8 th Born | 9 th Born | 10 th Born |
|---|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|-----------------------|
| Age and first initial | | | | | | | | | | |
| 1. Rebellious | | | | | | | | | | |
| 2. Non-conformist | | | | | | | | | | |
| 3. Open to new experience | | | | | | | | | | |
| 4. Responsible/ Organised | | | | | | | | | | |
| 5. Scholastically achieving (for example, gets good grades) | | | | | | | | | | |
| 6. Liberal (for example, supports animal rights, opposes the death penalty, belongs to the Green Party) | | | | | | | | | | |

Participants needed for Personality Psychology Research.

Participants are required for research in the Personality Psychology field. The purpose of this research is to examine sibling personality differences. You and a sibling will be required to come into the Personality Psychology Research Laboratory to answer some questionnaires and take part in a video-taped discussion with your sibling. Siblings need to be older than 17, with an age gap no less than 18 months and no more than 5 years. The questionnaires and video-taping will take no more than 1 hour in total of your time. All participants will be given \$10 for their troubles upon the completion of the research questionnaires.

The project is being carried out by Matt Healey under the supervision of Professor Garth Fletcher for the purpose of fulfilling the criteria to obtain a Phd. For questions regarding participation in this project Matt Healey can be contacted during office hours on 364 2987 Ext 7845 or by email mdh49@student.canterbury.ac.nz

This project has been reviewed *and approved* by the University of Canterbury Human Ethics Committee.

Department of Psychology

University of Canterbury

Thank you for taking the time to participate in this research.

At this point little will be said concerning the nature of this research. This is to avoid personal biases or beliefs you might have on the research topic from influencing your responses to the tasks that follow. Overall your task as a participant will be to complete a number of questionnaires. One questionnaire (4b – Friend – Peers Rating Questionnaire) requires you to select a friend or workplace peer who has known you (but not your sibling) for a minimum period of 1 year. This friend then fills out the questionnaire themselves. A separate envelope is included for this particular questionnaire to be placed in so as to ensure the confidentiality of your friends responses. Please ensure it is returned with the other questionnaires.

When questionnaires ask you to rate your sibling this refers to the other target sibling who agreed to participate in this experiment. The only exception to this is on the questionnaire - Appendix 3: Family Ranking Questionnaire – where you are required to provide ranks (on various personality measures) for up to 4 siblings in your family including yourself.

Upon completion of the tasks and once all questionnaires are returned to the researcher (in the postage paid envelope provided) information concerning this research will be mailed back to you. At that time you may also ask the researcher, by email preferably, any questions concerning the research, or you may withdraw your consent. If you do wish to withdraw your participation all information you have given, be it personal details or questionnaire responses, will be destroyed.

All information that you provide will be kept confidential and stored securely in a locked filing cabinet. The only people with access to this information will be the researcher, Matthew Healey, and the research supervisor Professor Garth Fletcher.

By completing the questionnaires and providing your signature it will be understood that you have consented to participate in the project, and that you consent to publication of the results of the project with the understanding that anonymity will be preserved.

The project is being carried out by Matt Healey under the supervision of Professor Garth Fletcher for the purpose of fulfilling the criteria to obtain a Phd. For questions regarding this project Matt Healey can be contacted on 343 9823 or during office hours on 364 2987 Ext 3406.

This project has been reviewed *and approved* by the University of Canterbury Human Ethics Committee.

Department of Psychology

University of Canterbury

Sibling Personality Differences.

Participant Consent

I understand that I am free to withdraw from the study at any point without any prejudice to present or future treatment. This includes withdrawal of information I have provided should I choose to do so.

I have been assured that records relating to myself will be kept confidential and that no information will be released or printed that would disclose personal identity without my express permission.

I hereby consent to participate in this study and acknowledge that the results of the project may be published with my anonymity preserved.

Name of Participant.

Date.

Signature.

Demographic Questionnaire.

This questionnaire asks you to give details about yourself and your parents. Remember all information about you will be dealt with in the strictest confidence and WILL NOT be used for purposes outside the context of the current research nor will it be released to or shown to anyone outside the research team, so please try to answer all questions as honestly as possible.

Age: _____ Gender: M / F. (please circle)

High School Attended (specify country/region): _____

Level of highest educational achievement (circle number of category that applies)

1) Didn't finish highschool 2) Highschool graduate 3) Trade/technical course

4) University Degree 5) Postgraduate Study 5) Other _____

Mother's occupation: _____ Father's occupation: _____

Appendix 5: Demographic Questionnaire

Did both parents work during your childhood: Y / N. If “N” please indicate which parent worked during your childhood:_____

Has the occupation of either parent changed from your childhood: Y / N.

If “Y” then please list your parents’ occupation during your childhood.

Mother:_____ Father: _____

Current estimate of combined parental income:_____

Have you ever been a member of a political or ideological organisation (for example unions, animal welfare or religious groups): Y / N. If “Y” then please specify the organisation(s): _____

Have you ever committed anti-social or illegal acts for ideological reasons: Y / N.

Have you ever been incarcerated (for any reason what-so-ever): Y / N.

Has either parent been incarcerated during the course of their life: Y / N.

Appendix 6: Family Ranking Questionnaire-2

Please record the following information about your brothers and sisters in the table below (see the example table below):

- 5) Age, first initial and gender. The age, first initial and gender of each of your brothers and sisters (**including yourself**) from oldest to youngest should be recorded in the spaces provided (circle appropriate gender).

- 6) Relation. The biological relationship of each one of your brothers and sisters to you:
 - Me = For yourself, write "me"
 - Full = If you share the same two biological parents, write "full"
 - Half = If you share only one biological parent, write "half"
 - Step = If you have different biological parents altogether (including adopted brothers and sisters), write "step"

- 7) Residence. Whether you were *born and raised* together in the same home as your sibling. Y = yes (were born and raised in same home); N = no (not born and raised in same home).

- 8) Personality characteristics. Lastly can you please rate yourself and your brothers and sisters on a number of different personality characteristics. Assign a "1" to the brother or sister (**including yourself**) who is best described by the personality characteristic; assign a "2" to the brother or sister (**including yourself**) who is next best described by the characteristic, and so on until you have ranked yourself and all of your brothers and sisters. Do **not** assign the same rank for more than one sibling. If there are more than 4 siblings in your family please stop at the 4th.

| Order ==> | 1 st Born | 2 nd Born | 3 rd Born | 4 th Born |
|--|------------------------|------------------------|------------------------|----------------------|
| <i>1. Age, first initial & gender</i> | (Female) AB Male | (Female) JB Male | Female CB (Male) | Female Male |
| 2. Relation | step | full | me | |
| 3. Residence | N | Y | Y | |
| 4. Personality Characteristics: Rebellious | 2 | 3 | 1 | |

Example



 e.g. least rebellious e.g. most rebellious

Appendix 6: Family Ranking Questionnaire-2

Please record your details here

| Birth Order → | 1 st Born | 2 nd Born | 3 rd Born | 4 th Born |
|---|----------------------|----------------------|----------------------|----------------------|
| <i>1. Age, first initial & gender</i> | Female | Female | Female | Female |
| | Male | Male | Male | Male |
| 2. Relation | | | | |
| 3. Residence | | | | |
| 4. Personality Characteristics: | | | | |
| Rebellious. | | | | |
| Socially confident. | | | | |
| Warm/Kind | | | | |
| Lazy | | | | |
| Non Conformist. | | | | |
| Open to new experiences. | | | | |
| Nervous/Worries a lot | | | | |

Appendix 6: Family Ranking Questionnaire-2

| Birth Order → | 1 st Born | 2 nd Born | 3 rd Born | 4 th Born |
|--|----------------------|----------------------|----------------------|----------------------|
| Cold/Disagreeable. | | | | |
| Responsible/Organised. | | | | |
| Conventional. | | | | |
| Academic (for example, gets good grades). | | | | |
| Calm/Even-Tempered. | | | | |
| Talkative/Outgoing. | | | | |
| Liberal (for example supports animal rights, opposes the death penalty). | | | | |

Self and Sibling Rating Questionnaire.

Please rate yourself and your sibling on the following questions by putting a circle around the relevant number on the scale.

Treat each question as follows;

I see myself as some who is.....

I see my sibling as someone who is.....

| | A. Honest. | | | | Dishonest. | | | |
|---------|-------------------|---|---|---|-------------------|---|---|--|
| Myself. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | |
| Sibling | 1 | 2 | 3 | 4 | 5 | 6 | 7 | |

| | 1. Talkative. | | | | Quiet. | | | |
|---------|----------------------|---|---|---|---------------|---|---|--|
| Myself | 1 | 2 | 3 | 4 | 5 | 6 | 7 | |
| Sibling | 1 | 2 | 3 | 4 | 5 | 6 | 7 | |

| | 2. Stubborn. | | | | Flexible. | | | |
|---------|---------------------|---|---|---|------------------|---|---|--|
| Myself | 1 | 2 | 3 | 4 | 5 | 6 | 7 | |
| Sibling | 1 | 2 | 3 | 4 | 5 | 6 | 7 | |

Appendix 7: Self and Sibling Rating Questionnaire

Treat each question as follows;

I see myself as some who is.....

I see my sibling as someone who is.....

3. Secure.

Insecure.

| | | | | | | | |
|---------|---|---|---|---|---|---|---|
| Myself | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Sibling | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

4. Responsible.

Irresponsible.

| | | | | | | | |
|---------|---|---|---|---|---|---|---|
| Myself | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Sibling | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

5. Conservative.

Liberal.

| | | | | | | | |
|---------|---|---|---|---|---|---|---|
| Myself | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Sibling | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

6. Modest.

Arrogant.

| | | | | | | | |
|---------|---|---|---|---|---|---|---|
| Myself | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Sibling | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

7. Conventional.

Unconventional.

| | | | | | | | |
|---------|---|---|---|---|---|---|---|
| Myself | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Sibling | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

Appendix 7: Self and Sibling Rating Questionnaire

Treat each question as follows;

I see myself as some who is.....

I see my sibling as someone who is.....

8.Ambitious/hard working.

Aimless.

| | | | | | | | |
|---------|---|---|---|---|---|---|---|
| Myself | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Sibling | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

9. Stingy

Generous.

| | | | | | | | |
|---------|---|---|---|---|---|---|---|
| Myself | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Sibling | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

10. Not Impulsive.

Impulsive.

| | | | | | | | |
|---------|---|---|---|---|---|---|---|
| Myself | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Sibling | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

11. Assertive.

Unassertive.

| | | | | | | | |
|---------|---|---|---|---|---|---|---|
| Myself | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Sibling | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

12. Untraditional.

Traditional.

| | | | | | | | |
|---------|---|---|---|---|---|---|---|
| Myself | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Sibling | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

Appendix 7: Self and Sibling Rating Questionnaire

Treat each question as follows;

I see myself as some who is.....

I see my sibling as someone who is.....

13. Proud.

Humble.

| | | | | | | | |
|---------|---|---|---|---|---|---|---|
| Myself | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Sibling | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

14. Relaxed.

High Strung.

| | | | | | | | |
|---------|---|---|---|---|---|---|---|
| Myself | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Sibling | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

15. Dominant.

Submissive.

| | | | | | | | | |
|--------|---|---|---|---|---|---|---|---------|
| Myself | 1 | 2 | 3 | 4 | 5 | 6 | 7 | Sibling |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | |

16. Achieving.

Unachieving.

| | | | | | | | |
|---------|---|---|---|---|---|---|---|
| Myself | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Sibling | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

17. Conforming.

Independent.

| | | | | | | | |
|---------|---|---|---|---|---|---|---|
| Myself | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Sibling | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

18. Rebellious.

Conservative.

| | | | | | | | |
|---------|---|---|---|---|---|---|---|
| Myself | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Sibling | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

Appendix 8: Friend/Peer Rating Questionnaire

Friend/Peer Rating Questionnaire.

This questionnaire requires you to select one individual who has been a friend of yours (but not your sibling's) for at least 1 year. Your friend must complete this particular questionnaire themselves. A spare envelope has been included for this questionnaire to be placed in so as to ensure confidentiality. **Please return this envelope (with this questionnaire inside it) with the rest of the questionnaires.**

Name of Target Participant (who this form is about): _____

Name of Friend (who is filling this form in): _____

Age of Friend: _____

Gender: M / F

Birthorder of Friend: _____

Please rate your friend on the following questions by putting a circle around the relevant number on the scale.

Treat each question as follows;

I see my friend as someone who is.....

1. Talkative.

Quiet.

My Friend 1 2 3 4 5 6 7

2. Stubborn.

Flexible.

My Friend 1 2 3 4 5 6 7

Appendix 8: Friend/Peer Rating Questionnaire

Treat each question as follows;

I see my friend as someone who is.....

3. Secure.

Insecure.

My Friend 1 2 3 4 5 6 7

4. Responsible.

Irresponsible.

My Friend 1 2 3 4 5 6 7

5. Conservative.

Liberal.

My Friend 1 2 3 4 5 6 7

6. Modest.

Arrogant.

My Friend 1 2 3 4 5 6 7

7. Conventional.

Unconventional.

My Friend 1 2 3 4 5 6 7

Appendix 8: Friend/Peer Rating Questionnaire

Treat each question as follows;

I see my friend as someone who is.....

8.Ambitious/hard working.

Aimless.

| | | | | | | | |
|-----------|---|---|---|---|---|---|---|
| My Friend | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|-----------|---|---|---|---|---|---|---|

9. Stingy

Generous.

| | | | | | | | |
|-----------|---|---|---|---|---|---|---|
| My Friend | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|-----------|---|---|---|---|---|---|---|

10. Not Impulsive.

Impulsive.

| | | | | | | | |
|-----------|---|---|---|---|---|---|---|
| My Friend | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|-----------|---|---|---|---|---|---|---|

11. Assertive.

Unassertive.

| | | | | | | | |
|-----------|---|---|---|---|---|---|---|
| My Friend | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|-----------|---|---|---|---|---|---|---|

12. Untraditional.

Traditional.

| | | | | | | | |
|-----------|---|---|---|---|---|---|---|
| My Friend | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|-----------|---|---|---|---|---|---|---|

Appendix 8: Friend/Peer Rating Questionnaire

Treat each question as follows;

I see my friend as someone who is.....

13. Proud.

Humble.

| | | | | | | | |
|-----------|---|---|---|---|---|---|---|
| My Friend | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|-----------|---|---|---|---|---|---|---|

14. Relaxed.

High Strung.

| | | | | | | | |
|-----------|---|---|---|---|---|---|---|
| My Friend | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|-----------|---|---|---|---|---|---|---|

15. Dominant.

Submissive.

| | | | | | | | |
|-----------|---|---|---|---|---|---|---|
| My Friend | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|-----------|---|---|---|---|---|---|---|

16. Achieving.

Unachieving.

| | | | | | | | |
|-----------|---|---|---|---|---|---|---|
| My Friend | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|-----------|---|---|---|---|---|---|---|

17. Conforming.

Independent.

| | | | | | | | |
|-----------|---|---|---|---|---|---|---|
| My Friend | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|-----------|---|---|---|---|---|---|---|

18. Rebelliousness.

Conservative.

| | | | | | | | |
|-----------|---|---|---|---|---|---|---|
| My Friend | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|-----------|---|---|---|---|---|---|---|

Assigning Prison Sentences to court cases.

Case 1

The following is an altered transcript of a case summary written by the court Judge.

The guilty party has already been determined, it is your task to decide, based on the description of the crime, on the length of the prison sentence or amount of the fine given.

In the case of R. Wright verses the Crown, the Crown allege that on 15th May 1999 Mr Wright illegally entered the property of 15 White Street, Timaru while the occupants were not present and removed all items of furniture and other personal possessions from inside the premises to the street outside. The crown acknowledges that Mr Wright is the legal owner of 15 White Street Timaru and at the time leased the premises to Mr J. Taylor.

In his defence Mr Wright claims that the signed tenant at 15 White Street, Timaru Mr J. Taylor had not paid rent as per their signed contract for 3 weeks.

In summary it is my view that Mr Wright acted illegally in entering the premises for the purpose of evicting the current tenant. Mr Wright not only breached the rights of his tenant according to the Residential Tenancy Act 1986 but also is liable for damage to property owned by Mr Taylor.

Judge's Verdict: **Guilty**.

It is your task to determine the penalty that is handed down to the guilty party, which in this case is Mr Wright.

A) Do you think that Mr Wright should receive a prison term? Yes/No.

If YES: How Long? _____ years _____ months.

B) Do you think that Mr Wright should receive a fine? Yes/No.

If YES: How much? \$ _____

Assigning Prison Sentences to court cases.

Case 2

The following is an altered transcript of a case summary written by the court Judge.

The guilty party has already been determined, it is your task to decide, based on the description of the crime, on the length of the prison sentence or amount of the fine given.

In the case of J.Smith versus the Crown, the Crown allege that on the 15th May 1999 Mr Smith did cause a public disturbance by the holding and waving of a banner that contained content of a political nature that was deemed offensive and inappropriate for public display. The arresting officer Constable Jones twice asked Mr Smith to remove the offensive material from public view before the arrest took place. The crown also allege that Mr Smith did resist arrest, impede law enforcement officers in carrying out their duty and did assault the arresting officer Constable Jones.

In his defence Mr Smith claimed that his right to peaceful protest was taken away by the actions of the Police and he does allege that he was assaulted via forcible removal by Constable Jones before his arrest took place. In light of this Mr Smith agrees that a struggle ensued with the arresting officer.

In summary it is my view that Mr Smith lost the right to public protest by displaying offensive material. The Police were within their rights to ask Mr Smith to remove the offensive banner from display and when he twice refused to remove the banner the Police were left with no choice but to arrest Mr Smith.

Judge's Verdict: **Guilty**.

It is your task to determine the penalty that is handed down to the guilty party, which in this case is Mr Smith.

A) Do you think that Mr Smith should receive a prison term? Yes/No.

If YES: How Long? _____ years _____ months.

B) Do you think that Mr Smith should receive a fine? Yes/No

If YES: How much? _____

Assigning Prison Sentences to court cases.

Case 3

The following is an altered transcript of a case summary written by the court Judge.

The guilty party has already been determined, it is your task to decide, based on the description of the crime, on the length of the prison sentence or amount of the fine given.

In the case of Mr A.Jackson versus the Crown, the Crown does allege that on 10th June 1999, Mr Jackson, as vocalist for the band 'Socks', during an outdoor concert did incite the gathered audience to riotous acts. It is alleged that Mr Jackson encouraged the audience to take to the streets and commit acts of vandalism and public nuisance.

In his defence Mr Jackson claims that his comments to the crowd were no different in nature to those he makes at all concerts. Mr Jackson points to the treatment of the gathered crowd by members of the Police force who had arrived to facilitate a reduction in the noise levels made by Mr Jackson's band, following complaints by local residents. As evidence Mr Jackson cites the fact that arrests and disorderly crowd behavior were taking place before his comments were given.

In summation I am of the opinion that Mr Jackson has a responsibility in his role as musician and entertainer to act as a mediator between the Police and his audience. Mr Jackson's comments could be construed as inflammatory and inciteful and I believe were in part responsible for the ensuing riot.

Judge's Verdict: **Guilty.**

It is your task to determine the penalty that is handed down to the guilty party, which in this case is Mr Jackson.

A) Do you think that Mr Jackson should receive a prison term? Yes/No.

If YES: How Long? _____ years _____ months.

B) Do you think that Mr Jackson should receive a fine? Yes/No.

If YES: How much? _____

Assigning Prison Sentences to court cases.

Case 4.

The following is an altered transcript of a case summary written by the court Judge.

The guilty party has already been determined, it is your task to decide, based on the description of the crime, on the length of the prison sentence or amount of the fine given.

In the case of Mr R. Lyle versus the Crown, the Crown does allege that on 30th April 1999 Mr Lyle did refuse to move from a position blocking the entrance to the Penta Hotel. In the process Mr Lyle committed acts of public nuisance by refusing to allow hotel patrons entrance to the establishment. The manager of the Hotel Mr H. Riley asked Mr Lyle to remove himself from the hotel entrance and notified him that he was trespassing on private property.

In his defense Mr Riley claims that his actions were done in protest against Chinese government officials staying in the hotel. Mr Riley claims his actions were peaceful and that the actions of the Police in forcefully removing him violated his right to nonviolent civil disobedience.

In summary it is my view that as the Hotelier Mr Riley was entitled to ask for Police assistance in removing Mr Lyle. Mr Lyle's refusal to move constituted an act of public nuisance.

Judge's Verdict: **Guilty.**

It is your task to determine the penalty that is handed down to the guilty party, which in this case is Mr Lyle.

A) Do you think that Mr Lyle should receive a prison term? Yes/No.

If YES: How Long? _____ years _____ months.

B) Do you think that Mr Lyle should receive a fine? Yes/No.

If YES: How much? \$ _____