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BIRTH ORDER AND PERSONALITY TRAITS, STYLE, AND STRUCTURE:
Differences Reflected by Projective Tests

A Dissertation Presented
By
BRIAN HUNTTING STAGNER

Submitted to the Graduate School of the University of Massachusetts in partial fulfillment of the requirements for the degree of

DOCTOR OF PHILOSOPHY
May 1982

PSYCHOLOGY
BIRTH ORDER AND PERSONALITY TRAITS, STYLE, AND STRUCTURE:
DIFFERENCES REFLECTED BY PROJECTIVE TESTS

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By
BRIAN HUNTTING STAGNER

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ABSTRACT

Birth Order and Personality Traits, Style, and Structure: Differences Reflected by Projective Tests

May 1982

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The present study attempted to reformulate an area of personality research, birth order effects, in such a way that it would admit to both object relational and social psychological conceptualizations. First the history of the study of birth order and intelligence is presented, illuminating the methodological and conceptual obstacles in birth order research. Second, several major reviews of the birth order and personality literature are examined. Finally, specific areas relevant to the present study are reviewed: need achievement (nAch), need affiliation (nAff), psychopathology, and projective assessment.

The theories of birth order effects are reviewed and hypotheses are developed suggesting that two levels of personality structure are involved: the intrapsychic self (the preoedipal aspects of the personality), and the social self (more interpersonal and cognitive dimensions). At the level of the intrapsychic self, it is proposed that there will be differences in the quality of object relations. At the level of the social self, Adlerian and social psychological literature
predict that firstborns will show higher need achievement, need affiliation, nostalgia, pessimism, and conventional thinking.

Fifteen pairs of sisters, each either the eldest or youngest child in her family of origin, participated in the study, which included a brief questionnaire, the Thematic Apperception Test (TAT), and the Rorschach inkblots. The TAT was scored for achievement and affiliation imagery, pessimism, and time perspective. The Rorschach was scored according to standard procedures to obtain indices of cognitive and perceptual style. In addition, three object relations scales were employed with the Rorschach protocols.

The results provide significant evidence for a birth order effect for object relations variables and indicate positive trends for nAch and nAff. The Adlerian predictions of birth order differences on pessimism, time perspective, and cognitive style were not supported. A discriminant analysis indicated that the lastborn subjects had more elaborated and well-articulated object representations on the Rorschach and were less likely to exhibit pathological ideation.
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CHAPTER I

EMPIRICAL EVIDENCE FOR BIRTH ORDER EFFECTS ON INTELLIGENCE

The research literature on birth order effects is a surprisingly vast labyrinth. Much of it is uncharted and a complete tour is of improbable benefit and impossible magnitude. A more fruitful approach must be selective. The first two chapters review the record of research in several areas which have been most extensively investigated and in areas of particular relevance to the present study. Various theoretical formulations will be mentioned only incidentally here and treated more extensively in chapter three.

First the history of the investigation of the relationship between birth order and intelligence will be reviewed. Although not directly pertinent to the present project, this area of research has been the most extensive and the most successful. Attention to the history of these inquiries reveals several methodological problems inherent in birth order research and provides criteria against which to evaluate other research efforts.

Birth Order and Intelligence

Scientific interest in birth order effects began in the late nineteenth century, but this interest reflected a popular awareness and valuation of birth order status which has probably endured since before
recorded history. Entitlement by primogeniture is cross-culturally nearly as ubiquitous as is patriarchy or the incest taboo. Not only do firstborns receive more, they are also thought to contribute more to the family. In an archival study involving data from 39 different cultures, the birth of the first child was found to be more important than later births in increasing the parents' status and in stabilizing the parents' marriage (Rosenblatt and Skoogberg, 1974). This innate worthiness of the firstborn, especially the firstborn male, went unquestioned until the turn of the last century (Zajonc et al., 1979). Thus the early investigations of birth order effects focused on the superiority of firstborns, and the early evidence tended to support this view. Galton (1874) first observed a preponderance of first or only children in the biographic directories of English scientists. Similar distributions were reported for world leaders (Yoder, 1894), British scholars (Ellis, 1904), Italian university professors (Gini, 1915), and the entries in the American Who's Who (Ogburn, 1927). In studies of undergraduate populations, firstborns were found to comprise more than half the student body at Dartmouth (Bender, 1928) and Mount Holyoke colleges (Hays, 1938).

In the early 1920's investigators became sophisticated to the possible confounding of birth order and family size and began to report that firstborns were overrepresented among American scientists (Catell and Brimhall, 1921), gifted children (Terman, 1925), and Rhodes Scholars (Apperly, 1939) regardless of family size. These studies all utilized a simple head count methodology: having identified a population, investigators simply tallied up the number of firstborns in the
sample, and compared the totals with chance expectations. Thus Apperly (1939) found that, among 230 Rhodes Scholars from three-child families, 44% were firstborn, significantly higher than the expected 33%.

There are two major problems with the head count method. The well-established relationship between socioeconomic status and achievement makes it difficult to ascertain whether the esteemed scholars and scientists reached the top by virtue of their ordinal position or their social position. Socioeconomic factors favor the firstborn both because upper-class families tend to have fewer children—these families produce proportionately more firstborns than do larger, less advantaged families—and also because the custom of primogeniture favors the firstborn with a disproportionate share of the family resources.

The second problem is posed by the failure of these studies to account for historical changes in the demographics of birth order. Price and Hare (1969) have demonstrated that historical fluctuations alter the proportions of the different birth ranks in the general population. When examining a particular group for overrepresentation of firstborns it is crucial that the appropriate comparison group or expected proportion be derived from demographically accurate data. (For example, because of the postwar baby boom, firstborns are overrepresented among those born in 1947 and underrepresented among those born in 1952. Suppose a researcher discovers that a 1970 sample of college students from three-child families was comprised of 40% firstborns. Such a finding is difficult to interpret. If the sample was mostly seniors, 40% is actually less than expected, but if the sample was mostly freshmen, then 40% is strikingly high. ¹
Additionally, the head count does not really enable one to determine just what is being measured. Shelving the aforementioned criticisms, let us assume that firstborns are overrepresented among scientists, professors, and Rhodes scholars. What is the causal link? Are they overrepresented by virtue of superior abilities or is their dominance a product of some sort of self-fulfilling prophecy, linked to labeling phenomena and the cultural view of primogeniture? Clearly the head counts permit no inferences on this.

Thurstone and Jenkins seem to have been the first to compare the actual abilities of the various birth ranks, using standardized tests. They found that later born children are brighter than firstborns and that the rise of intelligence with birth rank continues through even the eighth child (1929). These are the first of a long series of contradictory findings on the relative intellectual strengths of the birth ranks. Laterborns were shown to be superior by Steckel (1930), Arthur (1926), Commins (1927), Hill (1936), and Koch (1954). On the other hand, eldest children gave superior performances on scholastic or intelligence tests in studies reported by Altus (1965), Bayley (1965), Breland (1974), Belmont and Marolla (1973), Lunneborg (1968), Nichols (1968), Record et al. (1969), and several more. Still others reported no relationship (Bayer, 1966; McCall and Johnson, 1972), an unstable relationship (Hsiao, 1931) or a relationship which changes with age (Koch, 1954; Start and Start, 1974; Bayley, 1965).

Breland (1977) suggests that the early studies of test scores of the different birth ranks were probably flawed by scaling problems in the earlier tests and the most flagrant contradictions in the
earlier literature may be attributed to these obstacles. Nevertheless, these studies were an important methodological improvement over the head count studies of Galton, Gini, and Cattell. By comparing the actual performance of different birth ranks, these investigators avoided the pitfalls of the prevalency studies.

Other improvements in design also emerged in the 1920's and 1930's. The investigators of the late nineteenth century focused on primogeniture and compared firstborns against all other birth ranks. Soon they began to divide the firstborn category into eldest and only child categories. Eventually studies were published which distinguished two categories of laterborns: middle child and last child. Contemporary standards for birth order research call for at least these four categories, although these standards are frequently ignored (see, e.g., Wagner et al., 1979).

The next major methodological improvement in birth order research was contributed by Koch (1954), who has been credited with improving the precision of this research by at least one decimal place (Wagner et al., 1979). In addition to the usual controls for race, economic status, and urban-ness, she controlled for sibship size, age of index case, sex of index case, sex of siblings, age spacing, and ordinal position. The reduction in error variance produced by these measures led to their implementation by a variety of researchers; soon the white, suburban sibship of two was the prototype case for the birth order researcher (Bigner, 1972; Cicirelli, 1974; Rosenberg and Sutton-Smith, 1964).
Methodological improvements notwithstanding, the findings on birth order and intelligence continued to be considered unreliable or spurious by a variety of observers until relatively recently (Altus, 1966; Sampson, 1965; Schooler, 1972; Warren, 1966). This is a marked contrast to the accepted conclusions about family size and intellect. The inverse relationship between intelligence and family size was well documented and appeared to be quite stable, although it approaches nonsignificance in the upper socioeconomic brackets (Anastasi, 1956; Kenneth and Cropley, 1970; Wagner et al., 1979).

Given the mixed results in the birth order literature, Schooler (1972) argued that there was no clear evidence of birth order effects and that those which have been reported for variables including social behavior, psychopathology, and intelligence are specious conclusions based on hasty interpretation of the data and systematic oversight of several confounds. The rejection of birth order effects hinges on two criticisms. The first refers to the problems with the head count studies outlined above. Citing the work of Price and Hare (1969), Schooler demonstrates that many of the positive results of the prevalence studies are attributable to demographic changes in the general population being reflected in the research sample. For instance, Nichols' (1968) observation that firstborns are overrepresented among National Merit Scholarship finalists is criticized on the grounds that most of the students eligible to take that exam would have been born in 1947, a peak year for new marriages when 43% of the births were first children. He then cites a study of striptease dancers (Skipper and McCaghy, 1970) and a survey of talented young scientists (Datta, 1967)
from the same age group. Firstborns were overrepresented in both groups, leading Schooler to speculate that "some of the excess representation of firstborns among stripteasers in this study occurred because some members of the postwar baby boom did not become scientists when they grew up" (p. 116).

The second criticism of the birth order literature is directed at those studies which compare different birth ranks on some variable of interest. While Schooler fairly effectively demolished the head count studies, this second critique is much less substantial, consisting primarily of a review of some studies which contradict some of the accepted findings on birth order and affiliation, conformity, need for achievement, intelligence, and psychopathology. Schooler concludes by recommending more rigorous attention to such confounds as socioeconomic status, family size, density (spacing) of siblings, and sex of index and siblings.

Schooler's article has attained a curious notoriety. Several major investigators of birth order and intelligence cite this article as if it is a review of birth order and intelligence research, which it is not, or else they imply that Schooler entirely rejects the possibility of birth order effects (Belmont and Marolla, 1973; Belmont et al., 1977; Breland, 1973; Cicirelli, 1978; Zajonc, 1976; Zajonc et al., 1979).

First, Schooler does not reject the possibility of birth order effects out of hand; he simply believes that the investment required to conduct an adequately rigorous investigation is not worth the payoff of relatively minimal findings (Schooler, 1973). Second, the initial
(1972) paper is not a review of the IQ literature, but an overview of several areas of birth order research. As Breland (1973) notes, Schooler has overlooked several large sample studies \( (500 < n < 50,000) \) which control for family size, maternal age, and socioeconomic status and which show a clear relationship between birth order and intelligence. In reply, Schooler quibbles about the adequacy of the control measures and the size of the effects but he is unable to dismiss them entirely (1973). Finally, while the recommendations to control for family size and density, sex of siblings, age of index case and socioeconomic factors are all valid, they are nothing new. Koch demonstrated the utility of these controls nearly twenty years earlier (1954). Schooler's major contribution was to promote Price and Hare's (1969) analysis of the pitfalls of the prevalency studies which had characterized much of the earlier work on birth order.

In any case, doubts about the relationship between birth rank and intelligence were soon dispelled by two large-scale archival studies. The first used the induction examination records of the Netherlands armed services (Belmont and Marolla, 1973). The sample included 386,114 nineteen-year-old males, virtually the entire nineteen-year-old population of the Netherlands. Intellectual ability was measured by the Raven Progressive Matrices task, which avoids the problems of verbally based measures (Zajonc et al., 1979). The raw scores had previously been grouped into six categories by the Dutch military. Using the occupation of the subject's fathers, three categories of social class were derived. Family size was rated 1-9, representing one through eight and nine or more children, respectively. A variety of
analyses were performed with the six-point intelligence scale as the dependent measure. Intelligence was shown to be inversely related to both birth order and family size. (Laterborns and children from larger families tended to be less intelligent.)

Since family size and birth order covary, it is important to consider the two independently. When birth order effects were examined within each family size (e.g., all three-child families), firstborns always scored better than laterborns in every family size. Additionally, there was a gradient of declining scores such that in 86% of the comparisons each successive birth rank scored worse than the previous one. Family size was also found to be strongly related to intellectual performance, although this tended to be less true in the upper socioeconomic strata. Thus the effect of birth order on intellectual performance was independent of both social status and family size.

The second large study examined the scores of nearly 800,000 participants in the 1965 National Merit Scholarship examinations (Breland, 1974), with mother's age and education and father's education and income used as covariate controls. Scores declined with increasing family size, and within each family size scores declined with increasing birth rank. As with the Dutch study, the rate of decline decreased with successive birth orders, although it remained significant. (Thus, the difference between first and second children was larger than between fourth and fifth children.) Both studies showed a discontinuity for only children and for twins (Breland, 1974).

In an attempt to clarify the role of birth order and family size in intellectual development Zajonc and Markus (1975) proposed the
confluence model. They postulate that an individual's intellectual development is constrained by the intellectual vigor of the environment, that is, the family's aggregate intelligence. This is conceptualized as the average mental age of the family. A numerical example will be helpful here, but the reader is cautioned that the actual numbers are hypothetical and bear no significance beyond the illustrative.

Consider the first child of parents of normal intelligence. Before the birth the average mental age of the family is 30 (Mom's 30 plus Dad's 30 divided by two). After the child is born the average mental age is 20 (30 plus 30 plus the baby's 0 divided by three). When the baby is four, a second child appears, lowering the family mental age to 16 (30+30+4+0÷4). Thus the second child is born into a less intelligent family and has less opportunity for intellectual growth. The observed differences in intellectual capacity across birth ranks is thus attributed to the differential effects of family size and sibling spacing. Large spacing between children is most beneficial to the younger children and most detrimental to the eldest, while increased family size is detrimental to all.

This is a robust model. It can be shown that this model may account for the effect of family size and of birth order on intellectual performance. It can explain the declining rate of the birth order by intelligence gradient reported in the Dutch and National Merit studies. It predicts differences in trends for intelligence scores in different countries with high and low birth rates. It accounts for the finding that twins and the children of fatherless families do less well than expected from a simple linear model (Zajonc, 1976).
The exception to this impressive list of successes is the intellectual performance of the only child which is not predicted by the model. If intelligence decreased monotonically with family size, the only child should be the most intelligent. In fact, only children score lower than persons from two-child families. Zajonc suggests that the only child is denied the opportunity to teach younger siblings and postulates this teaching function as an additional determinant of intellectual ability (1976). With the addition of the teaching function, the confluence model appears to account for a variety of observations which had hitherto obscured or contradicted the relationship of birth order and intelligence. Since it is assumed that the teaching function will have different impact at different ages (a four-year-old has little to teach a two-year-old sib, but the twelve-year-old is a cosmopolitan savant for the neophyte of ten) the opposing forces of family size and the teaching function will have different effects on intellectual performance at different ages. This seems to account for a variety of observations of negative relationships, curvilinear functions, or nonsignificant findings which had seemed to deny the existence of birth order effects (Zajonc et al., 1979). This revised confluence model accounts for birth order effects and illuminates the environmental factors which contribute to these effects.

The confluence model is certainly vigorous but it has not gone unchallenged. One group theorizes that intellectual development is determined by the amount of parental attention enjoyed by the child; the more children the less attention per child, and the lower the socioeconomic status the greater the effect. A combination of father's
occupational level, inverse subsize (the reciprocal of the number of children), and the product of the two variables was as effective in accounting for variance in intelligence scores as an analysis using birth order and other complex variables (Marjoribanks et al., 1975; Walberg and Marjoribanks, 1976). A similar regression study, using sex of index subject, sex of next oldest sibling, and spacing between them compared to a regression constructed of family size, sibling spacing, and birth order information—the confluence model—showed both to be inferior to the inverse sibship/socioeconomic model of the Marjoribanks group. The latter model even fared better than a combination of sex of index subject, and nearest sibling, family size and birth order variables, although then the Marjoribanks model only accounted for six percent of the variance in the intelligence measure (Cicirelli, 1976). These findings reaffirm Anastasi's conclusion (1956) that family size is an important determinant of intelligence, especially among lower socioeconomic groups, but they promote skepticism about the magnitude and practical significance of birth order effects.

Some suggest that part of the discrepancy may be due to Zajonc's reliance on aggregate data. His findings are neither spurious nor marginal. However, the original model was not validated with individual families. Grotevant and his colleagues argue that such a model does not represent individual patterns of development, nor does it account for other clearly significant sources of individual differences, such as the presumably random distribution of genetic differences with respect to birth order. In a study of one hundred families with both biological and adopted children, utilizing intelligence data on parents
as well as children, the confluence model predicted only two percent of the variance in intellectual abilities (Grotevant et al., 1977). The authors conclude that, while the confluence model is an important predictor of population trends, it reveals little about growth patterns in intellectual development within a given family and that it overestimates the significance of birth order, family size, and sibling spacing at the expense of genetic and other environmental contributions to intelligence. A further test of the confluence model using family size and birth order data on a small (n=29) sample provided no support for the model (McCutcheon, 1977).

Other studies which fail to confirm birth order effects on intellectual performance or achievement are reviewed by Cicirelli (1978), who indicates several factors which may impinge on the relationship between intelligence and family constellation. Among these are the sex of the subject, the sex of the siblings, the cultural setting, and different impact of family variables at different ages.

Given the jumbled history of a century of research on family constellation variables and intellectual achievement, what conclusions may be endorsed with certainty? The most stable and reliable finding is that, excluding the case of the one-child family, family size is inversely related to intelligence and this relationship is attenuated in the upper socioeconomic classes. Birth order is also related to intellectual ability and achievement, and this relationship obtains within a given family size for all but the one-child family and with negligible regard for socioeconomic status. Sex of siblings and spacing of siblings have both independent and interactive effects as well. Finally,
"all other things being equal," family size, birth order, sibling spacing, and sex of sibling can interact to account for as much as 94% of the variance in intelligence scores (Cicirelli, 1978; Zajonc et al., 1975, 1976, 1977, 1979).

All other things can be equalized experimentally by randomly distributing all potentially confounding extraneous variables across experimental conditions. This is easy when theory or experience identifies a few discrete confounds. In the case of intelligence the list of known confounds is extensive, the list of possible confounds is more so, and their interactive impact is probably unknowable. In such a case the size of the sample can be increased until all other things are, if not equal, then at least as random as they are in the population. On the other hand, this procedure reduces the interference of experimental noise. On the other hand, with super sample sizes, minor or even relatively negligible effects may achieve the lofty status of statistical significance. Thus, "all other things being equal, there is a significant relationship between birth order and intellectual achievement" is a very relative truth. The relationship is probably more powerful for socioeconomic status, parents' IQ, and perhaps for as yet unexamined variables such as birth weight, parents' age, and goodness knows what else. To divine the import of this empirically significant relationship between birth order and intelligence, we must ask some larger questions about how we think intelligence operates and develops. This is essentially the position of Grotevant et al. (1977): the confluence model predicts population trends (between group) quite well, but does not account for appreciable amounts of the variance
between individual scores. In reply, Zajonc's group notes, accurately, that the Grotevant group did not use the revised model, and that their calculations were made without using any estimates of population parameters. They cite the work of Berbaum and Moreland (1978), in which the revised model accounted for nearly half the variance in individual scores of 257 children from fifty families. Finally the Zajonc group reminds us that birth order differences are small—less than one tenth of a standard deviation in some cases.

In short, the effects are there, but their significance may be overrated. Certainly, the confluence model merits further research—any social science model which predicts 94% of the variance between groups is noteworthy, even if the actual between-group variance is relatively small. The next section will review the epistemological, theoretical, and methodological lessons of the birth order and intelligence puzzle.

Birth Order and Intelligence—Epistemology

The relationship between birth order and intelligence has been investigated periodically and sporadically over the last century, with contradictory and mixed findings. The history of this research is illuminating for contemporary efforts for two reasons. First it is a history of methodological improvements gone unnoticed (e.g., in 1972 Schooler was suggesting experimental controls which Koch had already demonstrated in 1954 and which continue to be ignored). Second, and more important, this literature exemplifies the pitfalls of induction.

With the exception of the confluence model, the preceding review covers data only, and this reflects the tenor of this entire
literature--research on birth order and intelligence was predominately inductive. Galton's *English Men of Science* did not begin as an investigation of birth order, but as a fishing expedition and one item in the catch was the discovery of the predominance of firstborns. The same is true in the other head counts of famous men: findings were generated by happy accident or following the lead of previous findings. Theories to account for the data, when offered at all, were post hoc explanations which generally went untested. This process has continued to the present; for all its heruistic value, Zajonc's confluence model is a post hoc induction of theory from observation. Attempts to verify the model deductively have thus far achieved mixed results, probably because the predicted effects are smaller than is generally appreciated.

In any case, the confluence model is simply one instance of the predeliction for induction among birth order researchers. Before examining the various levels of explanation which have been invoked, it will be useful to quickly review the historical changes in the nature of these data. For present purposes this history is compressed into three eras. The first, the great man era, is characterized by the findings of Galton (1874), Yoder (1894), and Cattell and Brimhall (1921) and others who pursued the early head count methodology. These investigators reaffirmed the innate superiority of the eldest. They were followed by Arthur (1926), Commins (1927), Thurstone and Jenkins (1929, 1931) and others who demonstrated once and for all that later born children have the advantage--the later the better. Then, in the 1960's, the pendulum swung back again with the mammoth studies of Breland (1974) and Belmont and Marolla (1973). The grandeur of the
firstborn is restored. None of these eras has a discrete chronology with clear beginning and end points. In fact the first two ran a parallel course well into the 1960's, when some promulgated the Thurstone and Jenkins (1929, 1931) findings favoring the later born (see Berelson and Steiner, 1964; Oberg, 1966), while others championed the eldest (e.g., Altus, 1964, 1966; Schachter, 1963, and others). These competing findings prompted many reviewers in the 1940's and 1950's to conclude that birth order has no relationship to intelligence (e.g., Jones, 1954).

All this raises several questions. Why, given competing findings, did nobody attempt to test the varying results in the 1950's? It was somehow easier to point to mixed, that is contradictory and significant, results and to see no results whatsoever. Further, given the conclusion of the 1950's--no effect--why the resurgence of interest in the 1960's?

Conceivably the body of research on birth order and intelligence is equally indicative of social history as of scientific progress. The initial findings of Galton, that firstborns are overrepresented among great scientists, seemed to suggest that firstborns have some sort of advantage for intellectual development. This was the era of the aristocrat scholar who pursued pure knowledge secure in the material comforts of the ancestral manor. Men of science were esteemed, upper-class fellows steeped in the inherent correctness of Victorian institutions. Among these institutions were the tradition of primogeniture and the belief in the innate (biological) superiority of the upper class. Thus, while Galton himself recognized the sociological basis of
his discovery, his interpretation of it (a result of primogeniture) was frequently ignored while the fact itself was publicized. In this light, the discovery of overrepresentation of firstborns offered splendid affirmation of the inherent correctness of the social order. No wonder it was embraced.

By the 1920's things had changed a great deal. Primogeniture and class boundaries were longer the inviolable axioms of social order. Mobility, social and geographical, was growing. The mental testing movement continued to grow, viewed by some as a response to industry's need to control the labor force. Along came Thurstone and Jenkins (1929, 1931) applying this new technology to demonstrate the intellectual advantage of the later born. This seems to argue for larger families. It is interesting to speculate whether analysis of population and economic trends from the end of the 1920's through the end of the depression would reveal that scientific endorsement of larger families was consistent or incongruent with the social and economic imperatives of the times.

The relation of family size to intelligence was examined steadily into the 1950's. Anastasi's review and summary (1956) of this literature is still regarded as the definitive statement in this area: smaller families have smarter kids. The timing of her report is striking. Data encouraging a more limited family size was consistent with the socioeconomic necessity of constraining the baby boom. The baby boom was relatively devoid of research on birth order, and with Anastasi's article on family constellation and intelligence appeared to have been settled.
The impetus for reexamining birth order effects is obscure. Given the earlier consensus that there are no effects, one would suppose that the new wave of studies of the sixties and seventies was prompted by startling new data. This does not seem to be the case. Rather, people just seem to have started writing about it again. Part of the unconscious motivation for this work may have been the developing controversy over the heritability of intelligence. Since any genetic advantage should presumably be randomly distributed across birth positions, demonstration of a birth order effect would provide both affirmation and heuristic direction for the "nurture" side of the argument.

This may not have been the original inspiration for the third wave of birth order research. At least some of this work was initiated in the late fifties when Anastasi had declared the nature/nurture controversy a moot issue (1958), somewhat prematurely as it turned out. However, the appearance of the confluence model must certainly be some comfort to the environmentalists in the current version of this debate.

It was not always so. Breland (1977) has reviewed a variety of hypotheses which have been offered to account for birth order effects. Biological explanations have focused on presumed deterioration of the uterine environment with successive births, resulting in increased incidence of perinatal asphyxia or anoxia, nutritional deficiencies, or hormonal imbalances. This reasoning has apparently been refuted by the observation that birth order effects are fairly consistent for intelligence across both biological and adoptive samples (Scarr and Weinberg, 1977). Economic hypotheses have focused on the presumed greater access to familial resources of the firstborn, but Bayer (1967) has shown that
such hypotheses fail to account for observed differences between only
and firstborn children and between children of different spacing. The
demographic hypotheses propounded by Schooler appear to have been
superseded by Breland's (1974) and Belmont and Marolla's (1973) large-
scale survey work and by the Zajonc group, but for a time these were
the state-of-the-art concepts on birth order.

In fact it is the case that each of these somewhat contradic-
tory theories and the data offered in their support represented the
acme of some segment of scientific judgment on birth order effects.
The persistence of such diverse views suggests that birth order research
has been responsive to a variety of sociocultural influences, at least
to the same degree as it has been the result of systematic inquiry.
The foregoing review of these changes in birth order theory and data is
offered as a speculation, not proof. A more rigorous attempt to demon-
strate the sociocultural bases of birth order research might begin by
focusing on the parallel, but independent development of Galton's and
Thurstone's findings. Which groups cited Galton's observation of the
advantages of being first? Which endorsed Thurstone's view that later
is greater? What can account for the persistent belief in the gener-
ality of two such divergent conclusions and of such a variety of theo-
ries when, evidently, each camp remained in ignorance of the other?
Such an investigation would eventually involve analysis of lengthy
records of citations, but it would best begin with a review of the
story of the blind men and the elephant.

This historical review of the literature on birth order and
intellectual performance renders several important methodological
lessons. The first is the need to balance inductive and deductive reasoning, something only recently essayed in this area. Data generated in the absence of theory are a sort of scientistic Rorschach; findings become stimuli to elicit theory. Deduction has its problems too, of course, but must not be eschewed.

The second problem is demographic. Differences in head count or prevalency studies may be attributed to historical changes in birth rates, rather than birth order effects. Differences in family size across socioeconomic strata may confound birth order with social class. Differences in the distribution of the sexes in the family constellation interact with birth order effects. Finally, the spacing between siblings has an important influence on observed differences between birth ranks.

The third problem is categorization. Initially, people were divided into "firstborn" and "other." Subsequent refinements, based largely on Adler's (1931) views, render five categories of birth order: only, first, second, middle, and last. This is not the only possible nomenclature, but it reflects those positions about which most theoretical and empirical work has been done. Using fewer categories (e.g., earlyborns vs. laterborns) sacrifices the presumed specialness of certain birth ranks, while more categories are probably not justified by the increased investment in research time.

Given the development of the confluence model, one may conclude that, in the case of intellectual performance, while birth order effects certainly exist, they are derivative of other family constellation variables which impact on the psychosocial environment of the
maturing child. As we look to the literature on birth order and other variables, it will be useful to bear in mind the following questions:

1) Is this finding offered as a confirmation of a deduction or the genesis of further induction?

2) What specific categories of birth rank have been shown to differ?

3) Is this a difference in birth order or could this observation reflect the confounds of family size, sibling spacing, gender distribution in the family, or socioeconomic factors?

The importance of these considerations is relatively well established for birth order and intelligence research. As we move from intellectual functioning to personality traits we will see that, despite extensive activity, most research on birth order and personality variables has shed little light on these questions. This will be illustrated in the following chapter.
CHAPTER II
EMPIRICAL EVIDENCE FOR BIRTH ORDER EFFECTS ON PERSONALITY VARIABLES

This chapter begins with a broad overview of birth order effects which have been reported for various personality variables. Much of this material is gathered from several previous reviews which are summarized here. Following this, four areas of birth order research of particular relevance to the present study are reviewed in detail: need for achievement, need for affiliation, psychopathology, and projective tests.

A Review of Reviews

Synopsis and integration of the research on birth order and personality variables is a formidable task. The findings have been so inconsistent that one investigator tried unsuccessfully to explain birth order effects as simple experimenter effects, a product of the birth orders of the researchers (Rubin, 1970). The problem begins with the great diversity of this literature, in which all levels of methodological sophistication, several theoretical perspectives, and a multitude of target variables are represented. This is typical of investigations of complex phenomena where the predicted effects are expected to be in the small to moderate range. Findings which are contradictory and confusing to begin with are further obscured by the difficulty of comparing the results of studies which began with such
diverse methods. The brief reviews of a few particular areas which appear later highlight this problem.

In addition to the contradictions in the research, the sheer magnitude of birth order research has proved nearly overwhelming. Bibliographic compilations of the birth order literature, derived primarily from Psychological Abstracts, list 119 items published between 1963 and 1967 (Miley, 1969), 272 entries between 1967 and 1971 (Vockell et al., 1973), and 375 items between 1970 and 1976 (Forer, 1977). Allowing for some overlap, this represents over fifty articles per year on birth order alone. Furthermore, in 1976 one group identified a thousand references on sibling constellation effects (Schubert et al., 1976). Four years later, they compiled a second thousand items (Schubert et al., 1980). All this might indicate that a fertile field of research has been discovered, but appearances are deceiving; the field is not so much fecund as it is cheap and easily tilled. Several writers have noted that birth order is an intuitively enticing variable on which it is shamefully easy to gather data by adding three questions to your study. This process, reminiscent of the atheist who prays "just in case," contributes not only to the plethora of birth order findings and non-findings but also to the general absence of any good explanations to account for birth order effects.

The reviews of research on birth order and personality deserve the reader's indulgence, as they attempt a complex task. Reviews may be grouped into three broad categories, on the basis of their breadth and depth. The first is the introductory review, offered to substantiate the need for the study being reported. These vary widely in
scope and comprehensiveness. At the more dismal extreme, one investigator begins by noting that while four or five people have shown that birth order is closely related to self-esteem (there are at least twenty such studies and the results are equivocal), nobody has yet studied the relationship of birth order to self-actualization, so here goes (citation withheld, out of mercy). At the other extreme, many authors do provide concise but penetrating analyses of the problems with previous research or theory which their study will attempt to resolve, but these are less plentiful than would be hoped (see, e.g., Miller ad Maruyama, 1976; Ring et al., 1965; Schwab and Lundgren, 1978). The more usual introductory review is a truncated, uneven discussion of previous research which often omits central contradictions in the literature. Often, the theoretical significance of the work seems tacked on in the discussion section.

The second species of review in this arbitrary typology is the topical review. This includes reviews which stand alone and those which, by virtue of their thoroughness, could do so. In either case, these focus on the relationship between ordinal position and some clearly defined, fairly extensively studied area of interest. The introductions to Zajonc's papers on intellectual performance would be an example. Schachter's (1963) work on achievement and higher education and his studies of need for affiliation (1959) would also qualify. Each includes a fairly thorough discussion of existing literature and a critical evaluation of methodological and theoretical approaches to the problem at hand. These are quite rare.
Finally, there is the general review of birth order effects per se, several of which have appeared over the past fifteen years. Most research reports of the last decade acknowledge one or two of these reviews in the introductions. It will be useful to examine some of the more often cited of these reviews; in many ways they help define the area of birth order research.

The earliest of these broad reviews (Sampson, 1965) begins with the assertion that "everybody, regardless of scientific bent, would undoubtedly be willing to agree that birth order plays a role in influencing personality and behavior" (p. 175), and suggests that such influences derive from unspecified differences in parent-child interactions. The paper briefly reviews the pre-1950's interest in birth order research, noting the inconsistent and inconclusive results of that period. Sampson suggests that the modern era of birth order research, characterized by improved methodologies, began with Koch's studies of the mid-fifties (first use of sibsize, sex, and social class variables in a systematic way) and is most clearly exemplified by Schachter's (1959) work on affiliation. He discusses several methodological problems in this area and offers a fairly dispassionate discussion of most of the theoretical models which purport to account for birth order effects by attributing them to differences in family size, parent-parent interactions, parent-child interactions, and inter-sibling relationships. Although he omits consideration of the possible impact of cultural stereotypes (labeling theory) on birth order differences, his is nevertheless a thorough review of social psychological approaches.
Sampson divides the research on birth order effects into studies of intervening variables and studies of outcome variables. The former group includes primarily intelligence and personality variables while the latter encompasses behavioral differences such as alcoholism, achievement, and conformity. While the overall review presents an "overwhelming array of inconsistency," Sampson finds cause for optimism in the emergence of some fairly stable findings. On the basis of the literature he concludes that the firstborn or only child is more likely to achieve intellectually, more likely to affiliate with others under stress, and to benefit from affiliation, less generally sociable, less overtly aggressive, and more conflicted about dependence/independence than are later children. This is an accurate, appropriately conservative view. A variety of findings in other areas, conformity or need achievement, for example, offer a mixture of strong and weak support for birth order effects. Further, Sampson notes that the sex of the subject and family size interact with or confound the effects of ordinal position in several areas including conformity, sociability, and intelligence.

This is a comprehensive effort. Of all the reviews to be discussed here, this offers the only treatment of research on birth order and personality before 1950. While a few studies may have been overlooked, no major area of investigation has been omitted. The findings are presented objectively and with balance and conclusions are proposed in a conservative tone, with explicit sensitivity to the methodological inadequacies of a large part of the research and careful attention to the data. The author criticizes the tendency of post hoc
explanation which seems to characterize the field, and cautions others to use more systematic methods and to ask not only what effects birth order has, but also how they are produced. In this respect, Sampson's distinction between intervening and outcome variables is a useful first step.

It is unfortunate that Sampson's work appeared in an annual rather than an APA journal. One has the impression that his paper is less widely read than the two other reviews of that period by Altus (1966) and Warren (1966). Neither is equal to Sampson's review, in terms of accuracy or comprehensiveness of scholarship, although both are more frequently cited. Altus' paper appeared as a major article in Science, and emphasizes that birth rank has been shown to relate to "significant social parameters." These were divided into four groups: intelligence, college attendance, achievement, and personality. The first three areas are covered more or less adequately; while the survey of the literature was by no means exhaustive, the general history of the literature and the conclusions presented by Altus are a valid reflection of the field at that time.

The discussion of birth order and personality is another matter altogether. While several findings are reported (e.g., firstborns have greater conscience, lastborns are more affectionate, no differences on a liberal/conservative dimension), the findings are not tied together in any heuristic or theoretical way. Further, each study is reported in isolation, one study per topic. For example, where Altus could have offered a variety of studies regarding psychopathology, he chose to select one or two illustrative of the general point that birth order
influences personality development. After mentioning that family size, sibling spacing, and sex of sibling may also be important, Altus concludes that personality is related to birth order but that we really don't understand the reasons for the relationship. He proposes that the causes are social and derive from differences in parent-child interactions across different birth ranks. While he made some effort to cover the birth order literature on intelligence and achievement, Altus has not really told us anything about birth order and personality, nor did he do justice to the several theories then available to explain the findings.

Warren (1966) did considerably better, though still not as well as Sampson. Warren does acknowledge both biological and social explanations for birth order effects and describes the problem of the failure to adequately define birth order or to control for sex, sibling spacing, and family size. He then presents a fairly comprehensive review of birth order effects in the areas of college attendance, affiliation, conformity, dependence, volunteering, empathy, delinquency, alcoholism, and schizophrenia. This omits peer popularity, anxiety, and self-esteem, but is, within each area covered, relatively balanced and complete. For the most part, Warren finds the results confusing and cloudy, and he makes no attempt to account for the discrepancies in the data. He concludes that "overwhelming evidence" indicates that firstborn attend college more, are more responsive to social pressure, are more dependent, and, among females, are more likely to affiliate with others when anxious than are laterborns. This
judgment seems valid, but there is little attempt to review or evaluate the various explanations of these effects.

The articles described above were concerned primarily with enumerating the findings of various studies. While Adams (1972) continued this focus, he was more interested in considering the theoretical and methodological issues of birth order research. His review describes six categories of birth order theories (physiological, only-child specialness, dethronement, anxious parent, sibling influence, and economic) and gives a critical evaluation of each type of theory. He continues with an overview of findings which he presents as illustrative of the state of the field, rather than exhaustive.

Adams' analysis of the methodological difficulties of birth order research remains the most incisive in the field. He describes two basic types of birth order studies: those addressing "developmental aspects of the individual, such as anxiety, conformity, dependence, and responsibility" and those focused on an event, such as college attendance, hospitalization, or appearance in Who's Who (p. 249). These are roughly equivalent to Sampson's (1965) distinction between intervening and outcome variables. According to Adams, the developmental or intervening variable studies are vulnerable to problems of research bias and inadequate controls while the event or outcome studies are susceptible to demographic and cohort difficulties. The necessary controls include age of subject, siblings, and parents, sex of subject and siblings, number of siblings, and spacing of siblings. Demographic problems result from the failure to account for variations in population characteristics such as marriage and birth
rates as described by Price and Hare (1969) and Schooler (1972) and earlier in this chapter. Cohort problems result from mixing cohort conceptions. Adams describes a situation where first and later born children of the same age (first cohort) were presumed to come from families which are temporally and structurally similar (second cohort). While the first cohort is cohesive and homogeneous--same age, educational level, etc.--the second is not, as parents age, career development, and aspirations may be quite different. Thus the parents of lastborn college freshman may be as much as ten years older than the parents of firstborn freshmen.

Adams concludes with several concrete suggestions for improving birth order research. First he endorses earlier suggestions (Sampson and Hancock, 1967) that investigators study siblings from the same families. Second, he argues for elaboration of the theoretical assumptions which inform the research to include consideration of parental age, number of siblings, and sex. Finally, he calls for more robust statistical procedures to enhance experimental controls and to advance theoretical precision.

Contemporary with Adams' cautiously encouraging review, Schooler (1972) took the opposite tack. As described earlier, he argued that most of the findings on birth order effects are unreliable and flawed by demographic problems, primarily the failure to consider historical fluctuations in marriage and birth rates. He concludes that the investment required for adequately controlled studies is not warranted by the size of the effects (if any) to be discovered, in contrast to Adams' more optimistic assessment, viz. the technology is
there to do the studies properly. Schooler is by far the more cited of
the two. Presumably this is partly due to his iconoclastic tone and
partly to the fact that he published in a more mainstream journal
(Psychological Bulletin vs. Sociometry for Adams). Schooler has evi-
dently had some impact; since the article appeared, there have been
very few event/outcome type studies and those which are reported have
attempted to use appropriate controls for demographic variation.
Adams' work has been cited primarily for his review of the findings.
The major thrust of his evaluation, emphasizing theory and method, has
largely been ignored.

The most recent review of the birth order literature was done
by Wagner, Schubert, and Schubert (1979). It is the most inclusive
compilation, and considers separately studies of sibling spacing,
family size, and ordinal position. The studies on birth order are
organized by birth rank rather than by target variable. This is handy
if one wishes to make predictions about individuals on the basis of
their ordinal position. Some clinicians may find such an arrangement
desirable. It is less so for researchers, for two reasons. First, it
is not heuristically useful in understanding the processes underlying
birth order effects. Second, as presented by the Wagner group, contra-
dictions and inconsistencies in the literature are hard to identify.  
However, the biggest problem with the Wagner group's review is its
over-inclusive nature. The desire to cover all areas of research has
consumed their ability to sift and evaluate. In fact, they appear to
have missed little published in the United States. The authors ac-
knowledge several times that a particular research literature may be
flawed by uneven quality (indeed this appears to be invoked when the authors wish to explain inconsistent findings). It is unfortunate that they have made no effort to discriminate between studies. As their review demonstrates, there is now a sufficiently large literature that careful reviewers will benefit from setting certain minimal standards for inclusion of findings in a review. Unfortunately, Wagner et al. elected not to do so, providing the reader with an extensive but unfiltered bibliography.

Taken together, the overinclusiveness and the method of listing studies by birth rank give the impression that a great deal is known about birth order. At least one introductory text (Lindgren and Harvey, 1981) has adopted the same format and presents nearly five pages of information on birth order differences. Thus it is possible to cite studies which indicate that firstborns are more conservative, have a higher need for achievement, more likely to be depressed rather than schizophrenic, and unlikely to exhibit substance-abuse problems. In turn, it is easy enough to list as characteristic of lastborns their lower self-esteem, greater susceptibility to schizophrenia, and smaller tendency to affiliate under stress than firstborns. However, organizing the literature in the other direction, that is by dependent variable rather than by birth rank, produces no instance of a clear and unequivocal birth order effect for any of these variables, although there are some fairly strong trends.

One other facet of the Wagner group's review is relevant to the present project. This is the only review which discusses differences in parent-child interaction patterns for different birth ranks. The
firstborn infant receives more interaction time (McBride, 1974), more interactive vocalization (Jacobs and Moss, 1976) and more smiling from parents (Barker and Lewis, 1975) than do later born infants. The presumed positive effects of this are ameliorated by the fact that firstborns are more often interrupted during feeding (Gerwitz, 1948), and that the secondborn generally enjoys a more permissive and relaxed attitude from the parents than does the firstborn (Lasko, 1954; Rothbart, 1971; Sears et al., 1957).

The foregoing survey suggests that the extensive investment in birth order research has not paid off for personality variables nearly as well as it has in the case of intelligence. Mostly the results are favorable but certainly equivocal. Even in areas of relatively consistent findings, neither the limits on the generality of the conclusions nor the underlying causal mechanisms have been elucidated. Thus, while there is general agreement that firstborns achieve more, we remain uncertain as to why or in what domains this achievement occurs. Inattention to methodological precautions and omission of theoretical integration of data have clouded the field with too many inconsistent findings. The area seems to be growing on its own confusion. New studies surface each year which perpetuate the problem, either by ignoring the contradictions in earlier work or by repeating the methodological errors of the past. The next sections review in greater detail three of the more well-researched areas of birth order effects, yet even in these areas the record is not unblemished.
Need for Achievement

Research on the relationship between birth order and achievement motivation (nAch) has been approached from two directions, with similar predictions. Some (e.g., Altus, 1965; Schachter, 1963; Wolkon and Levinger, 1965) point to the well-established finding that firstborns are overrepresented among achievers (statesmen, authors, scientists, and so forth) and predict that first children will be more motivated to achieve. Others begin with Winterbottom's (1958) suggestion that the need for achievement is related to early training in independence and responsibility and Rosen's (1961) hypothesis that firstborns receive such training earlier and with more intensity than laterborns. In this view, the attainment of eminence by firstborns is confirming rather than heuristic. In either view, the firstborn is presumed to possess a greater need for achievement.

The evidence is equivocal, but seems to tend to support rejection of the null hypothesis. Starting with Rosen's (1961) hypothesis, Sampson (1962) reported a higher nAch among firstborns on a projective task, with a stronger relationship among females. Rosenfeld (1966) reported five studies using projective measures of nAch, only one of which supported Sampson's findings. These studies did show an interaction between nAch, sex of subject, and sex of figures in the projective stimuli, leading Rosenfeld to hypothesize that nAch may vary with birth order only under certain, as yet undetermined experimental conditions, or that the relationship may be an artifact of different testing procedures. This picture was further complicated when Sampson and
Hancock (1967) reported a sex by birth order interaction on a self-report measure of nAch but no significant relationship on a projective measure.

On the other front, investigators of nAch as the explanation for birth order differences on achievement level are equally inconsistent. Wolkon and Levinger (1965) briefly describe nAch self-report data collected as part of another study. Noting the absence of a birth order effect in these data, the authors postulate that while different birth ranks manifest different levels of actual achievement, these differences are not the result of motivational differences. Given this, it would be expected that alternative explanations of firstborn eminence would gain credence. However, a study of 370 fourth- and fifth-grade children suggests that 1) firstborn children of this age do achieve more than laterborns and 2) when motivation levels are controlled for statistically (using behavioral and self-report measures of motivation as covariates), the birth order effect disappears, both for measures of achievement (GPA) and ability (standardized tests), suggesting that motivational differences contribute to birth order effects on both intellectual performance and academic success (Adams and Phillips, 1972).

Other studies are divided about equally, with some finding a higher nAch for firstborns (Bartlett and Smith, 1968; Fakouri, 1974; Sinha, 1967), some finding no relationship (Moore, 1964; Munz et al., 1968) and one finding an interaction with social class (Elder, 1962). This muddle is most parsimoniously understood if one assumes that 1) there is a birth order effect for nAch which 2) is small and 3) inter-
acts with intra-subject characteristics such as sex, family size, and social class and 4) situational variables such as area of achievement. This is a bit complex, but as Zajonc (1965) has observed, if birth order effects were simple we would already have identified them. This set of assumptions is at least supported by the data and should instruct researchers to control for family size, density and social class, and sex of subject and siblings, and to tightly specify both birth order and area of achievement. Such controls are infrequently employed in this literature. Most significantly, not even birth order is well defined; in all studies reported, firstborns were compared with laterborns, and while some excluded only children from the firstborn group, it is not clear whether this was done in all cases. This sort of classification was recognized as insufficient in the intelligence literature as much as fifty years ago, but the logical improvements have not yet permeated the achievement literature. Furthermore, few studies restricted the family size of the subject population and no study analyzed within family size. Future research, employing more rigorous sampling procedures and experimental controls will clarify the extent of the relationship between nAch and birth order.

Need for Affiliation

After intelligence and achievement, need for affiliation (nAff) is certainly the most frequently studied variable in the birth order literature. The first report of a birth order effect appeared in Schachter's (1959) monograph on the determinants of affiliative behavior in response to experimentally induced anxiety. He observed that
firstborn females were more likely to prefer to wait for threatening events (e.g., experimental procedures such as an electric shock) in the company of others than were later born females. Schachter argued that this difference was the result of differences in the need for anxiety reduction and the need for self-evaluation. In this view earlyborns are expected to rely more on others for self-evaluation and anxiety reduction because inconsistent parenting has left them more dependent than laterborns. The initial monograph presents several studies which support his hypothesis.

Subsequent investigations have complicated the picture immensely. This literature varies along three methodological dimensions: The subject population, the definition of birth order and the measurement of affiliation motives. Most of the later research employs Schachter's procedure of categorizing subjects into two birth order groups, only and first children versus laterborns. Most studies ignore other related family constellation variables such as family size, sibling spacing, and so forth. Studies which diverge from these procedures are difficult to compare to the original research; although they may be more rigorous they are less comprehensive. The second dimension, measurement of nAff, is equally confusing. Affiliative behavior has been observed directly in the laboratory and indirectly in the field (studies of the preponderance of firstborns in social clubs, fraternities, etc.). Affiliative motive has been investigated with both projective and standardized tests. Finally, the subject populations have ranged from children through the elderly and include normal
through schizophrenic persons, and have sometimes included both sexes
and at other times reported data for the sexes separately.

In addition to this methodological diversity, nAff has been
conceptualized in many ways, ranging from psychoanalytic approaches,
through social comparison and social learning theories, to radical
behavioral analysis. Thus Schachter's contribution has been criticized
and reformulated by those who wish to bring either his findings or his
explanations into accord with their own views.

Given such a variety of methodological and conceptual ap-
proaches, one is not surprised to discover that Schachter's findings
have been both supported and refuted by subsequent investigations.
Further, this same variety of approaches makes comparison and analysis
of these several results an arduous, if not impossible task. The
present discussion will follow Schachter's initial hypotheses and
survey the later evidence which appears to define the conditions under
which his observations and deductions are valid.¹

It is generally conceded by most observers that first and only
women tend to affiliate more than later born women (Adams, 1972;
Warren, 1966). The results for men are much less clear; this apparent
sex difference has not been pursued. Among women, the greater affili-
ative behavior of firstborns has been observed under both laboratory
conditions (Gerard and Rabbie, 1961; Schachter, 1959; Wrightsman, 1960)
and in field observations (MacDonald, 1967; Murdoch, 1966), but there
are a few exceptions. Baker and O'Brien (1969) found greater frater-
nity membership among laterborns and Dauphinais and Leitner (1978)
found that laterborns were more likely to join encounter groups.
However, as Adams (1972) notes, it is fraternities which choose members, not the other way around. Thus Baker and O'Brien's data confirm the greater popularity of laterborns (cf. Miller and Maruyama, 1976; Schachter, 1964) and are irrelevant to affiliation. Encounter groups are also a rather special case; participation in such groups may reflect all sorts of dynamics beyond simple affiliation. In short the preponderance of evidence suggests more affiliative behavior on the part of firstborns, at least for women.

The role of stress in this relationship is uncertain. Stress has been shown to be directly related to affiliation, regardless of birth rank (Warren, 1966), and there is some evidence that firstborn women are more sensitive to stressful situations than later born women (Staples and Walters, 1961; Suedfeld, 1969). If firstborns affiliate more because of their greater susceptibility to tension or anxiety, either dissonance theory or balance theory would suggest that the behavior is more information seeking than it is affiliative (Warren, 1966). Furthermore, it is not clear that stressful conditions mediate the affiliation/birth order relationship.

This is implied by observations of a birth order effect in the absence of stress. Of special significance in this regard are those studies which focus on affiliative motive (nAff) rather than affiliative behavior. Four separate studies of responses to TAT pictures suggest that firstborns received higher nAff scores under presumably stress-free conditions (Conners, 1963; Dember, 1964; Sampson, 1962; and Staples, cited in Staples and Walters, 1961). However, Warren (1966) observes that problems of sample size and control procedures make these
data only tentatively meaningful. Specifically, the possibility that higher nAff scores for firstborns are due to the inclusion of only children in experimental samples cannot be ruled out. In addition, Rosenfeld (1966) reported a series of five TAT studies, four of which showed no relationship between birth order and nAff, although he suggests this failure to replicate Dember's (1964) results was due to using group rather than individual testing procedures. Thus the record does not provide clear support for a birth order effect for nAff, but it does justify further investigation.

Only one investigation has been reported which controls for other family constellation variables. Pointing to the somewhat inconsistent results for affiliative behavior and affiliative motive, Cornoldi and Fattori (1976) suggest that the spacing between siblings may be the most important determinant of any birth order effect for affiliation. Drawing on Mahler's (1968) observations on individuation and symbiotic dependency in infants, these investigators suggest that the arrival of a younger sibling before one reaches age three will interrupt the "normal" process of separating from mother. This will be manifested later as a higher need for affiliation and succorance, or as the authors term it, symbiotic dependence. Their data confirm a greater affiliative motive among those who experienced the birth of a sibling before age three. Thus sibling spacing may be an important mediator of affiliation. Other family constellation variables, such as family size and sex of siblings have not been examined.

To summarize, evidence for greater affiliative behavior by firstborns is plentiful, at least for women. The effect of stress on
this phenomena is unclear. Studies of affiliative motive in the absence of stressful presses suggest that stress is not a necessary part of the relationship between birth order and affiliation. Further, these studies offer tentative support for the hypothesis that there is a birth order effect for affiliative motives as well as behavior. Finally there is some indication that this relationship is mediated by sibling spacing, but this too awaits further conformation.

**Psychopathology**

The present project includes a study of pregenital personality variables as they relate to birth order. Since these pregenital aspects of the personality are thought to be related to certain manifestations of psychopathology, a review of this area is pertinent. Most relevant would be data on the birth order distribution of certain character disorders associated with early developmental disruptions, specifically the schizoid, borderline, and narcissistic personality disorders. Unfortunately, such data is not available at this writing. We are confined to three broadly defined areas of maladjustment: schizophrenia, alcoholism, and delinquency.

The results for schizophrenia are mixed. Several studies report that eldest (first and only) children are overrepresented among schizophrenic outpatients (Barry and Barry, 1967; Norton, 1957; Riess and Safer, 1973; Walker and Johnson, 1973). There is some indication that this is more valid for smaller families (Wagner et al., 1979). On the other hand, there are some reports that middle children are overrepresented (Barry and Barry, 1967). Finally there is evidence that
last children are overabundant among schizophrenics (Granville-Grossman, 1966; Gregory, 1958; Grosz, 1958; Schooler, 1972). One might conclude that there is no effect, but it is prudent to recall those who believed there was no birth order effect for intelligence because the data were contradictory. More decisive conclusions must await larger and better studies.

The findings on delinquency and alcoholism are also mixed, but the balance of studies suggest that laterborns are more likely to be identified among these groups than would be expected by chance. Lastborns are overrepresented in 20 out of 27 studies of alcoholics (Blane and Barry, 1973). Wagner et al. (1979) indicate that youngest are more likely to engage in minor delinquent acts, and eldest are underrepresented in delinquent populations in general.

Personality traits associated with psychopathology appear to have some relationship to birth order, although the literature in this area is perhaps too small to be more than suggestive. Specifically, there is some evidence that eldest children tend to be more obsessive (Kayton and Borge, 1967) while lastborns are overrepresented among hysteric and manics (Reiss, 1976; Ruff et al., 1975). This is consistent with the Adlerian predictions about birth order and suggests that cognitive and affective styles may vary across birth ranks.

In summary, the overall evidence suggests, at best, that later born individuals are more likely to exhibit adjustment problems and that both substance abuse and antisocial acting out may be related to birth order. These conclusions cannot be cast in stone, given the mixed results which have been reported but trends are apparent. Even
more equivocal are the findings for schizophrenia, where the safest conclusion is a deferred one. Finally there is some suggestion that later born individuals tend toward the hysteric end of the hysterical/obsessive dimension of cognitive style, with the converse also true. In short, the evidence from the psychopathology literature suggests that there is an uncertain relationship between birth order and personality. To say more would exceed the data.

**Projective Testing**

One way to further elaborate the relationship between birth order and personality is through the use of projective assessment tools. Given the abundance of research on birth order effects, the lack of such investigations is surprising. Some use has been made of thematic pictures but this has been confined to investigations of nAch and nAff as described earlier. No studies of adult populations have used projective drawings for birth order research, nor does it appear that such studies have been done with child populations.

Further, there have been no published reports of Rorschach studies of birth order differences. One investigator has looked at birth order information collected incidentally during another study, but found "nothing worth pursuing" (Exner, 1981). This lack of activity is remarkable; the Rorschach is a robust and wide-ranging sample of psychological functioning which is quite suitable for testing several types of birth order predictions. The absence of such studies may confirm a hunch about birth order research, to wit, that a large portion of published studies did not begin with birth order as a central
focus. Rather, many studies seemed to arise with the realization that it is easy to include birth order information in data collection. If an appreciable amount of birth order research is being done this way, the failure to apply the Rorschach to the birth order question is less startling.

In any event the present study ameliorates this oversight. First, however, chapter three reviews the various theories which have been constructed to explain birth order effects and outlines the framework of the present project.
CHAPTER III
THEORIES OF BIRTH ORDER EFFECTS

A variety of explanations for birth order effects have been reviewed by Adams (1972) and Breland (1977), ranging from biological to economic levels of analysis. Economic hypotheses have received little attention and less support (see, e.g., Bayer, 1967), and while biological theories may shed important light on the relationship between birth order and health or physical characteristics (Wagner et al., 1979 cover this area), the relationship between birth order and personality has been explained primarily at the psychosocial level.

The earliest theoretical discussion of birth order was Adler's. His predictions focus on the effects of both parent-child and sibling interactions and emphasized the importance of power relationships in the family, especially the experience of dethronement and the loss of opportunity to monopolize the parents. For Adler, the eldest child is the dethroned monarch, accustomed to the undivided attention of mother and father, then unseated and forced to accommodate the younger sibling. The second child may also be dethroned by a third, but the effect will not be as devastating, since the second has never enjoyed the complete attentions of the parents and will not be losing as much. The last child never experiences dethronement, but bears the burden of being the smallest and weakest member of the family; the last child is also the potential object of pampering by everyone else. In late adolescence
the lastborn has undiluted access to the parents which was enjoyed by the first child as a toddler.

Based on these differences in the psychosocial context of development, Adler made several predictions about the personality traits of different birth ranks. Firstborns are expected to long for past comforts and to be pessimistic about the future. They will be more conservative, traditional, conventional, and authority-oriented (Adler, 1932). Having lost the parents' attentions, they are more sensitive to others' approval, are more susceptible to social pressure, and tend to conform to conventional standards (Adler, 1927). Finally, pointing to their own personal successes, they find it harder to empathize with the disadvantaged (Forer, 1976).

The second child looks ahead at the pacemaker who came first and strives to catch up. Second children will choose to compete with others who are more advantageously placed, and are seen as being better placed to acquire competitive skills. However, they also will learn to compromise and to marshall outside forces, e.g., parents, against a superior opponent (Adler, 1927, 1932; Ansbacher and Ansbacher, 1956; Forer, 1976).

The lastborn is predicted to be the most lighthearted, optimistic, and popular child, as a result of never being dethroned and of the pampering of others. However, the last child may never become fully autonomous, and may appear to lack ambition. More specifically, the lastborn may wish to excel at everything and, having been pampered, expect to. The fact that everyone in the environment is older and more experienced may either stimulate or discourage ambition, depending on
other factors, but in general the lastborn is expected to be less competitive and more easygoing than his or her older siblings (Adler, 1932).

Other than Adler, and one exception to be discussed in a moment, the psychoanalytic approach has yielded very little discussion of birth order effects. A subject index of Freud's collected works does not even have a heading for siblings, let alone for birth order (Rothgeb, 1973), and other than Adler the post Freudian theorists virtually ignored sibling influences. However, if Freud emphasized the role of parents in his theory, his clinical reports evidence a great sensitivity to the impact of siblings. As Bank and Kahn (1980) demonstrate, Freud thought sibling relationships were fraught with harmful competition, underlying rage, and potentially dangerous erotic bonds. Bank and Kahn suggest that this negative perception of siblings was a product of the interaction between the parent-focused cultural definition of the family in nineteenth-century Germany and Freud's personal experiences as a brother. In any case, his distrust of siblings never achieved any theoretical importance, or even general recognition.

This is best illustrated by a paper on the only child written by Brill and published only ten years after Freud's death. Here the biases are reversed and it is the child without siblings who is presumed to suffer. He is, according to Brill, inevitably pampered, misses out on the chance to learn, via competition, to adapt to the struggle for existence, is abnormally attached to mother, and enters school and the outside world as a helpless, "pitiable . . . weakly brat." Arguing from poorly selected and unexplicated anecdotal
evidence, Brill suggests that the only child is the offspring of selfish parents who "not only unfit the child for life's battle but prevent him from developing into normal manhood, thus producing sexual perverts and neurotics of all descriptions" (1949, p. 249). (Evidently Brill had never met a female onlyborn.)

While neither Freud nor Brill have added much to our thinking about birth order, they echo Adler's emphasis on the effects of sibling rivalry as it facilitates or impairs parent-child interactions. Contemporary theories of birth order effects have generally treated these two dynamics separately (Falbo, 1981).

Theories emphasizing parent-child interactions have been most commonly propounded for dependency, achievement, and affiliative needs. This perspective has provided several specific explanations, all focusing on the fact that the firstborn is coping with rookies. Roberts (1938) suggested that inexperienced, anxious parents of firstborns are overly protective and indulgent, thus impeding independence. Sears (1950) also predicted increased dependence for the first child, but blamed it on heightened frustration resulting from inept handling of nursing and weaning by inexperienced mothers. Schachter (1959) combined the two views: new mothers are more anxious and are more easily flustered by the first child, but they are also more available and immediately responsive to the child's need for anxiety reduction. This formulation suggests that the firstborn will exhibit more dependence due to different parent-child experiences and this dependence will result in higher need for affiliation under stress.
In the case of achievement, inexperienced parents are thought to be too demanding, expecting more mature behavior of firstborns than of later children. Thus, rather than impeding initiative and independence by holding the child back, the new parent is accused of pushing too much, too soon (Clausen, 1966; Falbo, 1981; Kammeyer, 1967). Note that the hypothesized causes of increased nAch and nAff are neither contradictory nor mutually exclusive; both are compatible with the more general hypothesis that first-time parents are less consistent with their children.

In contrast to these explanations which emphasize parent-child interactions, several hypotheses emphasize the effects of intersibling phenomena (or absence thereof, in the case of the only child). Adler (1970) suggested that sibling interactions would produce stronger leadership skills in firstborns, although the parents clearly facilitate this by the assignment of familial responsibilities to the eldest. Others suggest that, because of sibling interactions, later children will be more empathic (Stotland et al., 1971) and develop better social skills (Miller and Maruyama, 1976) than earlyborns, because the later child, being in a weaker physical position finds it advantageous to master the politics of getting along with others. The assumption that firstborns are often responsible for looking after laterborns and the fact that only children have nobody with whom to share blame or credit has been offered to explain the findings that first and only children show a more internal locus of control (Crandall et al., 1965; Falbo, 1981). Again, we see an intersibling explanation.
In addition, self-esteem differences between birth categories have been explained by versions of social comparison theory which emphasize sibling interactions. Zimbardo and Formica (1963) suggested that children compare themselves to those ahead of them, with firstborns and onlies using the parents as the standard against which to judge themselves. The child-child comparison used by the last child is expected to be less devastating than the parent-child comparison employed by firstborns. Firstborns are expected to have lower self-esteem. Falbo (1981) modified this position to accommodate contradictory data. The revision suggests that self-esteem is influenced by child-child comparisons, with both older and younger sibs involved in the comparisons. This formulation accounts for Falbo's findings that first children show higher self-esteem than later children.

These theories have all focused on birth rank as an isolated phenomena. Where birth order effects have been mediated by family size, gender, or social class, explanations have been offered, post hoc, which attempt to reconcile these differences with the general theory. The only exception to this is Toman's (1969) work on sibling constellations. Toman argues that both birth order and spacing and sex of siblings are important determinants of personality variables and emphasizes the role of intersibling interactions in this process. Thus an older sister of two brothers will have different personality characteristics than an older sister of sisters, and so forth. One of Toman's interests is in how these sibling constellation variables determine compatibility of friendships or marriages. For example the eldest sister of brothers will be most happily married to the youngest
brother of sisters and least happy with an older brother of sisters. This compatibility model has been examined by several investigators, with very little verification (Birtchnell and Mayhew, 1977; Levinger and Sonnheim, 1965). While more rigorous definitions of sibling constellation, including sex and spacing of siblings as well as birth order have been productive. Toman's specific predictions about resulting personality patterns have not been supported (Croake and Olson, 1977).

Other than the occasional reference to Toman's work (by Bowen, primarily), the field of family therapy has not produced any systematic discussion of birth rank. It could be approached from a structural model or from a consideration of individual and family life cycles. While some work has been done on the impact of the arrival of the first child (Senn and Hartford, 1968, e.g.) there seems to be no analysis, in systems terms, of the impact of the second child. The second child creates a whole new interpersonal subsystem in the family. Where the only child lives in a triangular world (me and the parents), the second child adds a new dimension (the kids and the parents). The significance of this for parental, marital, and sibling interactions is largely unexplored yet it certainly influences relationships at all levels and probably alters the boundaries between the family and the outside world. Similarly, the impact of different birth categories on family homeostasis should differ as family members face different life cycle tasks. Thus launching a firstborn into adulthood will alter family interactions differently than launching a last or an only child.
Again while therapists are undoubtedly sensitive to these issues, no formal analysis has appeared.

Dividing the psychosocial explanations of birth order effects into theories of parent-child versus child-child influences is useful, but further theoretical analysis may enable us to specify more closely what sort of personality differences we may expect from birth order. Prior to describing the etiology of birth order effects on personality, a brief explication of assumptions about personality is necessary. The present study adopts a developmental perspective and embraces the object relations perspective as the model for early development. In this view the core structure of personality develops in the context of the interaction between the infant and the primary caretaker. From the infant's perspective, the world is dyadic; until about age two, there exists only "me" and the gradually integrated "good mother/bad mother." Between two and three, if all goes well, the child begins to have the capacity for multiple relationships. By this time, a core psychic structure will have been formed, characterized by a relatively stable sense of identity and the capacity for object constancy.

It is not a benign world, and it is implausible that early development occurs as smoothly as the foregoing suggests. Few arrive at their third birthday with an unshakable sense of self and an unwavering patience for the temporarily absent maternal object (e.g., object constancy is well developed, but not unlimited). There is clearly a continuum, ranging from the schizoid detachment of the autistic child through the precocious child whose false self-adjustment belies the lack of underlying structural resilience, to the relatively
mature three-year-old. Some will be better prepared for multiple relationships than others, but ready or not all must face triadic crises, including oedipal conflicts and sibling rivalries.

Although psychic structures should be relatively well formed by this point, personality development does not cease. However, the nature of this development must change. The present formulation suggests that, beginning at about age three, the focus of personality development shifts away from internalization of the intrapsychic self and towards the development of the social self. The latter term refers to those facets of personality which characterize the surface layers of social interactions, including attitudes, values, style of life, and most of what are called traits (the exception being those traits, such as free-floating anxiety, that are exhibited regardless of context). This social self develops in the matrix of social, triadic relationships rather than the dyadic crucible of the intrapsychic self. Thus the development of the social self is mediated by the familial and cultural context.

This distinction between intrapsychic self-representation and social self is illustrated by the development of sexual identity. Current thinking distinguishes between gender identity (I am male) and sex role identity (I am masculine). Gender identity is thought to be relatively well established by the time the child reaches the oedipal crisis. Indeed, achievement of gender identity is essential to experiencing the oedipal crisis as Freud outlined, and to arriving at the genital stage. Sex role identity on the other hand, continues to develop at least through late adolescence and includes the acquisition
of the attitudes, values, and skills which enable an individual to establish a position with respect to masculine/feminine traits. Both gender identity and sex role identity may be associated with psychopathology. Adler first suggested that conforming to culturally prescribed sex roles may lead to neurotic difficulties for women; this proposition has been more fully articulated by feminist analyses of the impact of sex roles on emotional stability. By contrast, recent thinking on disturbances in gender identity, including hermaphrodites and transsexuals, suggests that gender dysphoria reflects a failure to develop an accurate core gender identity at the preoedipal level of development (Stoller, 1979). (In line with this, one researcher (Murray, 1981) is investigating the hypothesis that transsexuals exhibit a borderline personality organization.) Thus, the intrapsychic self-representation of gender is presumed to be fixed relatively early in life, while sex role identifications begin later and continue developing throughout childhood and adolescence.

The distinction between intrapsychic and social self may seem to be a somewhat arbitrary division of personality development, based on a presumed quantum jump from the internal world to the outer reality. However, the quantum difference is a reflection of our best estimation of the infant's phenomenological world. The emerging capacity for ambivalent relationships with whole objects and the ability to carry on different relationships with different people is qualitatively different from the preoccupation with the dyadic world of part objects which characterizes earlier stages. The discovery that father and
mother are each both good and bad, necessary for triadic relationships, is a quantum leap in the infant's understanding of reality.

However, it is artificial to view it as a discrete point of development. Far from being an "aha!" experience, whole objects are integrated gradually and repeatedly through trial and error during early development. Further, from the researcher's vantage point it is impossible to ascribe particular phenomena to either intrapsychic or social-self dynamics with absolute certainty, because the same event may have very different meanings for different individuals. For instance sexual promiscuity may represent neurotic rebellion against parental or societal controls for one individual (social self) and a symbolic attempt to reestablish symbiotic connections with a love object (intrapsychic self) for another. In theory, it is possible to identify for a given individual the psychological significance of a particular behavior and to ascertain whether it reflects the work of the intrapsychic or the interpersonal self. Usually it will be a mixture of the two, and for an individual case it will be possible to ascertain which are the more salient dynamics. However, it is impossible to make general statements about the psychic meaning of promiscuity which would apply across instances.

Despite this limitation, the distinction does have heuristic value in those instances where evidence or prior theory pinpoints a chronological timetable for development of a given characteristic. In such cases, this perspective helps focus our attention equally on the earlier, core self variables as well as the later, more familiar social self variables. Returning to the two types of theories of birth order
effects, we will consider first those founded on sibling interactions as the most straightforward. Clearly sibling interactions cannot have an impact unless the individual is capable of such interactions. Presumably their impact will appear at the level of the social self. Most of the Adlerian predictions fall into this group, including differences in leadership, conservatism, conformity, competition, and popularity. Also in this social self group of traits are the differences in empathy, social skills, locus of control, and self-esteem; as noted earlier, these birth order differences are presumed to be the result of intersibling interactions.

Birth order differences which are attributable to parental influences are less easily assigned to social or intrapsychic levels of personality development. While the primary caretaker is the only person in the infant's life and is the critical "other" in the dyadic development of core psychic structure, the influence of the parents does not stop at age three. Rather parents continue to have direct influence on their children and indirect influence as they mediate sibling interactions. Thus parent-mediated birth order differences could occur at either the level of the social or the intrapsychic level of self-representation.

Those theorists who suggest that birth order effects are mediated by differences in dependency appear to imply that birth order effects may be found at pregenital levels of development (e.g., Schachter, 1959). In this view, first children are presumed to be more dependent than laterborns because they have experienced inconsistent relationships with their parents. Presumably this inconsistency began
with the child's birth. Therefore, the firstborn should have experienced more inconsistency during the dyadic phase of development. Thus, models which assume that birth order differences are the product of differences in parent-child interactions from birth through infancy will accommodate predictions of birth order differences in personality structure. These predictions might be proposed as differences in stability of self/other boundaries, body image and gender identity, ability to test reality, capacity for object relations, or primitiveness of defenses.

The original impetus for the present research was the inspiration that the study of personality could be divided into two qualitatively different domains. In earlier formulations the distinction was drawn between personality style and personality structure. That nomenclature has been replaced here by the terms social self and intrapsychic self, respectively. The earlier formulation has endured another, much more substantial transformation. It was predicted that birth order effects would be found only in the more superficial layers of the personality, in the social but not the intrapsychic self. This position concealed an unrecognized bias in favor of an intersibling model for birth order effects, and is therefore consistent with most of the Adlerian and some of the social psychological models for birth order effects. However, there are clear grounds for parent-focused explanations of birth order differences. Indirectly, parents variously contribute, mediate, or are the goal of the intersibling interactions postulated to account for birth order effects. Thus, it is the parents who leave the firstborn in charge of younger sibs, a position alleged
to increase the sense of responsibility in the eldest, and it is the parents' attention which is presumed to be the reward for the victor of sibling competition. Direct parent-child interactions offer even more firm support for parent-focused explanations, and where parent-infant interactions vary with birth order, one is led to predict differences in structural or intrapsychic aspects of personality as well as the level of the social self. Given the evidence that firstborn neonates experience qualitatively different mothering than do laterborn (Gerwitz, 1948; Lasko, 1954; Rothbart, 1971; and Sears et al., 1957), such predictions are inevitable. Hence, earlier predictions of no birth order effects at the level of core self variables have been withdrawn; it is hypothesized that differences in parent-child interactions during infancy may produce birth order differences on intrapsychic self variables which are thought to develop during the preoedipal stages.

Implicit in this prediction is a division of parent-child sources of birth order effects into preoedipal and oedipal-social effects. The first group, the preoedipal, includes those aspects of the personality which develop in the context of dyadic relationships, and which reflect core self and object relationships. The social-oedipal level variables include all variables which are not necessarily a direct product of preoedipal development. This includes attitudes and values acquired late in development, such as cultural norms, as well as attitudes, values, and behavior patterns which are derived from (or extensions of) developmentally earlier psychodynamics. By way of illustration, the body image belongs to the first group, as it is presumably acquired early as the infant develops stable self-other
boundary differentiations. Gregariousness, on the other hand, is in the second group; it may reflect both social learning (in the context of familial and cultural experiences) and an underlying search for lost objects (a preoedipal dynamic). Thus gregariousness could be a product of triadic experiences and while it is not necessarily without its dyadic, or preoedipal components, it is the possibility of social, triadic influences which place it in the domain of the social self.

In the present study, two types of birth order effects are predicted. The first type, differences in intrapsychic self are expected as a result of different parent-child interactions during infancy. These differences might include any of the basic components of the intrapsychic self: object relationships, self/other boundaries, primitive defenses, object constancy, and so forth. Birth order differences have never been investigated in object relational terms, so the present study is a pioneer effort. Hence, there are no specific predictions which may be derived from previous work. While evidence suggests that firstborns experience more inconsistency but more contact with their parents than do later children, it is impossible to predict the particular direction of any effects of this, although some impact is expected. The present study attempts to clarify these differences.

Two indices of intrapsychic self functions were selected for this study, pathological thinking and object relations. The presence of pathological thinking on the Rorschach Inkblots Test is presumed to reflect primitive reality testing and defensive operations, and is therefore an index of incomplete or uneven development of character structure, here referred to as intrapsychic self. Development of
object relations, the capacity to interact with whole objects and to experience ambivalence, is seen as a direct indication of maturity of ego functioning.

The second set of birth order effects under scrutiny are those which derive from the Adlerian perspective, broadly defined to include the domain of the social self. Three subcategories are examined here: outlook, needs, and cognitive style. Recall that Adler held that the firstborn is generally more pessimistic and nostalgic for the past than is the last child. Pessimism and retrospection comprise the subcategory of "outlook" variables. While the so-called "needs" for achievement and affiliation may possibly have preoedipal determinants, they may also be influenced by later triadic experiences, thus fitting the criteria for inclusion in the social self (which emphasized the possibility of development of a characteristic after the purely dyadic phase but does not rule out the possibility of earlier influences).

Achievement and affiliation comprise the second subgroup. The third subcategory, cognitive style, also includes characteristics which may be rooted in pregenital development but are not strictly confined to that level. This group includes conventional, constricted, and oppositional thinking as well as the preference for ideational versus affective strategies for conflict resolution, and the tendency to see the world as comforting or discomforting.

While earlier research has examined many of these variables with mixed results, the present study is unique in its application of projective instruments and in its sampling procedures. The Thematic Apperception Test (TAT) is used to assess the needs and outlook
dimensions outlined above. Several Rorschach indices are employed to assess pathological thinking and capacity for object relations as described above. In addition several Rorschach scores are used to evaluate differences in cognitive style. While the specific details of the measures are covered in a later chapter, a general summary of the hypotheses is appropriate here.

**Hypotheses**

I. Intrapsychic Self

Differential treatment of first and later infants will produce differences at the pregenital level of the personality. No specific direction of effects is predicted but it is predicted that there will be differences on the Rorschach indices of

a) pathological thinking  
b) object relations.

II. Social Self

Adlerian theory and previous research provide the following predictions

a) Outlook: Firstborns will reveal more pessimism and a greater past orientation on the TAT.

b) Needs: Firstborns will produce TAT stories which reflect higher nAch and nAff.

c) Cognitive style: Firstborns will manifest more conventional, constricted, and non-affective thinking on the Rorschach.

While previous research has used the TAT or other thematic pictures, such use has generally been confined to nAch or nAff. No other use of thematic pictures has been reported. Similarly, no use of the Rorschach has been discovered. The present project attempts to
demonstrate the application of projective instruments to birth order research.

Finally, the present research employs methodological refinements which have been much praised but little used in the past. Gender effects are avoided by limiting the study to females, a fairly common procedure. To control for the influences of family size and sibling spacing, a weighted measure of family density is employed as a covariate. Finally, the most significant refinement is that the present study adopts the suggestion of Bayer (1967) and Sampson and Hancock (1967) and examines sibling pairs from actual families. This produces a sample of pairs which are matched on all family of origin variables (e.g., parents' education and income, religion, etc.). Although Adams (1972) endorsed the within-family designs suggested by Bayer (1967) and Sampson and Hancock (1967), this author has discovered no other acknowledgment of this procedure, let alone the use of it. Yet it is certainly a major improvement in the control of potential confounds which might obscure birth order effects.\(^5\)
Fifteen pairs of sisters between the ages of eighteen and thirty-three served as subjects for this study. Subjects were recruited through undergraduate psychology classes at a large, urban, Midwestern university. Students were given a screening questionnaire in which they were asked to list their age, sex, and birth order in their family of origin and to provide the same data for their siblings. Then they were asked to identify those siblings currently residing in the same city. These questions were part of a subject screening form given to approximately 600 psychology students, and included questions relevant to other experimenters looking for particular subject groups.

From this screening, a population of 70 potential subjects was identified, according to the following criteria:

1) All were female.

2) All were either first or last born.

3) The first or last born sibling of each student was also female, and lived in the same city.

4) The student and her sibling were between 18 and 35 years of age.

5) The sibling pairs had not suffered the loss of a parent or sibling before the youngest was 15.

6) An effort was made to recruit an equal number of subjects from two-, three-, and four-child families.
Student subjects were contacted by phone and asked if they were interested in participating in a study of "how family life affects people's personality." If they expressed interest, they were informed that the experiment would involve the sisters of the subject as well. Students were asked to contact their (eldest/youngest) sisters to explain the study and obtain permission for the experimenter to contact them directly. When both eldest and youngest from a given sibship had agreed to participate, arrangements were made for each to be tested. The final group of subjects ranged from eighteen to thirty-three years of age ($\bar{x}=22.8$). Six of the undergraduates were firstborn and nine were lastborn. The average age of the firstborns was 25.6 years, for the lastborns, 20.1 years. Subjects were compensated either with cash or experimental credits (their choice). (See Appendix.)

**Procedures**

All subjects were tested individually by the same examiner, who was blind to birth order status until the testing was completed. Subjects were given a questionnaire which included items on the socio-economic, educational, and religious status for themselves and their family of origin. Then the vocabulary subtest of the Wechsler Adult Intelligence Scales (WAIS) was administered. Following this, cards 1, 2 3BM, 4 6BM, 7GF, 8BM, 10, 13MF, and 17 of the Thematic Apperception Test (TAT) and the standard ten cards of the Rorschach test were administered. Finally, subjects were interviewed regarding their perceptions of the vicissitudes of being first or last born (What was it like for you, being the oldest/youngest in your family?). Subjects were
debriefed and were asked to refrain from discussing the study until after their siblings had participated.

Scoring

All scoring was performed by the experimenter unless otherwise noted. All materials were coded in such a way that the birth order of the subject was concealed from the experimenter.

**WAIS Vocabulary Subtest.** This instrument was scored according to the standard criteria appearing in the WAIS manual. Each subject's score is simply the raw score from this test; this raw score was used in all subsequent statistical analyses.

**Rorschach.** The Rorschach responses were scored in accordance with Exner's (1974, 1978) comprehensive system. Each protocol was scored twice, with a minimum of one week between scorings. Intra-rater scoring reliability was computed at .86. To insure conformity with the Exner system, those 75 responses for which there was ambiguity, plus 50 other randomly selected responses were scored by an independent rater. Inter-rater reliability was .83. Inter-rater disagreements were settled consensually.

**TAT.** Subjects' TAT stories were evaluated for the presence of several thematic contents (see below, under Measures). Again, each story was scored twice, with a minimum of one week between scorings. Intra-rater scoring reliability was computed at .91. Since the measures used were considerably more straightforward than the Rorschach scoring system and
judgments are less open to subjective distortion, only one rater was used.

**Measures: Covariate Variables**

**Family size, sibling spacing.** It was not possible to locate a sufficiently large sample to conduct separate analyses within each family size, even when family size was limited to a maximum of four-child families. Therefore, it was necessary to use statistical controls for family size. Likewise, it was also desirable to control for sibling spacing. While family size is an uncomplicated variable, sibling spacing can be calculated a number of ways.

For example, a score can be computed for each family, based on the mean age difference between siblings. This has the advantage of giving the same score for each family member, facilitating some analyses, but for the present study it had two disadvantages. On the practical side it turned out to be a fairly gross measure. Most subjects can easily report the ages of their siblings but have difficulty reporting accurate birth dates or calculating the months between siblings. Frequently pairs of sisters gave conflicting information about their siblings' ages. Thus, in the interest of reliability the age in years of each sibling was used to compute the mean sibling spacing score, producing a very crude score.

This measure is also inadequate in a phenomenological sense, as it does not capture the psychological reality of family density. Consider a family with three children, aged 28, 26, and 20. The eldest two were much more age mates during childhood, while the youngest two
were presumably more conscious of their age difference. Thus the firstborn experienced a more dense sibling constellation than did the last child. Clearly an average score, in this case 2.66, does not reflect this difference. The second way of measuring sibling spacing attempts to correct this problem. It is simply the age difference between the subject and the nearest sibling. In the example, the firstborn would receive a score of two while the lastborn would get a six. (Middle children should probably receive some sort of weighted score but development of such a statistic is fortunately beyond the needs of this project.)

Having found no adequate measure of sibling spacing alone, we may turn to the broader concept of family density. This includes both spacing and number of siblings to convey a sense of how closely and densely a family is packed with children. Waldrop and Bell (1964) devised such a measure which includes a weighted sum of the number of children, the average spacing between children, and the spacing between the subject and the next older and next younger sibling. For the present study, this weighted measure of family density was used as a statistical control for the possible confounds of both family size and sibling spacing.

Measures: Dependent Variables

Intrapsychic self. The observation that parents treat first and later children differently as infants suggests that there should be birth order differences among core personality dimensions which are presumed to develop during the preoedipal stage. Growing case study literature
confirms the proposition that an intrapsychic self, ongoing and relatively unshakeable in an adult, is an integration of unconscious representations of partial and whole objects.

We have not yet reached the state of the art where this intrapsychic structure can be thoroughly and reliably measured. The difficulty in surveying or assessing an individual's personality structure is threefold: it is quite complex, it is by definition unconscious, and it is described by a theory and terminology which are still evolving. Thus, while we can compare the character structure of two individuals quite easily, given sufficiently rich clinical data, such comparisons are largely qualitative. The ability to fully describe and compare groups of individuals at this intrapsychic level does not yet exist.

What we can do is assess some components of intrapsychic functioning which comprise this more global sense of self. For the purposes of the present study, two components have been chosen: object relationships and pathological thinking.

Pathological thinking. This refers to a continuum of ideational idiosyncracies, ranging from the odd turn of phrase to the markedly bizarre concept. In theory, when a subject is unable to manage unsettling or undefined stimuli (either in the Rorschach blots or in the emotional reaction to the cards), the subject may retreat to a more regressed form of thinking. Generally, the more primitive the thought processes, the more impaired the character structure (Kernberg, 1967, 1970). Five Rorschach scores were used to evaluate pathological thinking: DV, ALOG, INCOM, FABCOM, CONTAM. These five special
scorings have been developed and refined by Exner to provide replicable and clear indices of the unusual responses characteristic of disordered thinking. Research has demonstrated that a high degree of inter-rater reliability can be obtained using these scorings (Exner, 1974; Exner et al., 1976) and that these scorings successfully differentiate non-patients, outpatients, and inpatient schizophrenics (Weiner and Exner, 1978).

- Deviant verbalization (DV) indicates idiosyncratic or distorted use of language: "An X-ray of somebody's self."
- Autistic logic (ALOG) indicates arbitrary or circumstantial reasoning: "It's human because it has ears."
- Incongruous combination (INCOM) indicates the condensation of separate details into an incongruous percept: "Two men with breasts like women."
- Fabulized combination (FABCOM) indicates a response which implies implausible relationships between percepts: "A lion eating a Christmas tree."
- Contamination (CONTAM) indicates the fusion of two details into a percept which defies reality: "The face of a snake-woman."

Each subject received one score representing the sum of the special scorings received in the protocol.

Object relations. In clinical settings, assessment of character structure usually relies heavily on projective material, especially the Rorschach. As noted earlier, attempts to systematize the application of the Rorschach for this purpose are still in the first
stages of exploration. These efforts have taken two directions. The first, exemplified by a recent collection of papers on the Rorschach and the borderline personality (Kwawer et al., 1980), focuses primarily on the significance of the standard Rorschach scores and content categories as indices of character structure. Such efforts attempt to articulate or elaborate the ways in which gifted clinicians combine Rorschach data to arrive at diagnostic conclusions, and/or to shed further light on primitive mental states. These contributors focus on relatively complicated interplay between various Rorschach scores. For example, Sugarman (1980) notes that it is not the relative preponderance of particular responses but the manner in which responses are used. Thus, not all borderline patients will refer to the color black in their protocols, but those who do will respond in a relatively unmodulated fashion (e.g., "It's a black mask, all black and it reminds me of a scary black wolf. Ugh."). Alternatively, however, other borderlines betray their inability to experience depressive affect by avoiding references to black altogether, even when the color is clearly congruent with the percept (e.g., "What made it look like two Africans dancing around a kettle at night?" "Just the shape of it."). Clearly this is very valuable information for the clinician who is evaluating a particular protocol. For a comparison between groups, however, this approach is unmanageable.

The alternative is to dispense with the formal scorings and re-evaluate the responses according to some other criteria. Several scales have been developed which assess the object relations aspects of Rorschach responses. The earliest was developed by Pruitt and Spilka
(1964) to evaluate the capacity for empathy and object relationships. The scale was constructed on the assumption that the quality of human movement responses reflects the individual's capacity and mode of relating to others. The scale rates responses along an 18-point dimension ranging from "animal objects in human type action" to "human movement with sex specified and in proper temporal-spatial setting."

The authors presented evidence which suggests that the scale is sensitive to changes in group therapy, that it is a reasonably good measure of the style of perception, and that it is acceptably reliable. This scale was designed to assess the capacity for object relationships. While this capacity is constrained by the degree to which inner object representations are well developed and integrated, the emphasis of the scale is on other-perception. By contrast, the object relations point of view emphasizes the consistent manner of experiencing self and other together, with equal emphasis given to the relations as to the objects. Thus the scale developed by Pruitt and Spilka omits important dynamics of the internal object world.

A more relationally focused scale was developed by Urist (1977) grounded in the theoretical work of both Kernberg (1980) and Kohut (1971). The scale assesses the mutuality and autonomy expressed in the relationship between figures in Rorschach responses. It consists of a seven-point continuum ranging from well-separated figures which indicate reciprocity and individuality at one end to fused relationships marked by overwhelming forces and unstable boundaries at the other. Scorable responses include all percepts involving multiple figures, including non-human and inanimate percepts. This is an improvement
over other scales which score only human movement responses; some age groups and some clinical populations may reveal a great deal about their inner object world through the medium of animal responses, although this is generally applicable only with more primitive or regressed individuals. In his report Urist provides data which suggest that the scale is quite reliable, especially considering the subjective nature of the ratings. An intriguing innovation is his use of several composite scores to reflect the subject's best or healthiest responses, the subject's weakest responses, and the average rating overall. In a study of 40 inpatient subjects he found that ward staff ratings of patients' mutuality tended to correlate best with their healthier Rorschach index, while independent ratings of mutuality in patient autobiographies correlated with the more pathological scores. He suggests that the best, worst, and overall scores be used together to delineate the capacity for object relationships, the stability of the internal structure on which that capacity is based, and the points of regression in that internal world. Given the need to restrict the number of dependent variables to a manageable level, only the best score (an average of each subject's best three responses) was used in the present study.

The mutuality scale balances Pruitt and Spilka's lack of attention to the relationship aspect of object relations theory, but it does so to the exclusion of evaluating the object representations themselves. Blatt et al. (1976) describe a scoring system which focuses on the developmental aspects of object representations in Rorschach responses. Their system scores all responses involving human or quasi-
human content according to several dimensions which theoretically contribute to the development of mature object relations, including differentiation, articulation, and integration of the response. Differentiation refers to the degree to which the subject perceives whole human figures, as opposed to parts of human or quasi-human figures. Articulation refers to the degree to which the subject specifies perceptual (e.g., clothing, size, posture, etc.) or functional (specific identity, role, activity, etc.) details. Integration of a response is measured in four ways: the motivation of the action (unmotivated, externally or internally motivated), integration of object and action (fused, incongruent, congruent), the content of the action (malevolent/benevolent), and the nature of the interaction (active/passive, active/reactive, or active/active). Finally, the perceptual accuracy of each response is evaluated, according to the usual form level criteria.

Three studies were conducted to evaluate this system (Blatt et al., 1976). A longitudinal study of 37 normal individuals given the Rorschach at ages 11, 14, 18, and 30 revealed that the quality of human responses was directly related to age, as expected. A study of 48 inpatients showed the quality of human responses to be inversely related to the presence of thought disorder, suggesting that the scales tap disordered object relationships which are associated with primitive mental conditions. Finally, a comparison between the two groups revealed that the normal sample gave more well-developed responses with accurately perceived figures while the inpatients gave more well-developed responses to inaccurately perceived figures, again suggesting
that the scales are tapping the disordered inner representations of the pathological group.

This system is rich, providing access to several dimensions of object relations. It seems especially robust in differentiating strengths and weaknesses within and between individuals (e.g., consider a record with well-articulated but unintegrated percepts in contrast to the reverse). It is useful in a clinical assessment and also appears to be useful as a research instrument. The major criticism of the system, acknowledged by Blatt (1981) is that it focuses entirely on the cognitive and structural aspects to the relative exclusion of the content.

For the present study these measures of object relations were modified to reduce the number of dependent variables to be analyzed. Differentiation was assessed two ways. First, a simple total of the human and quasi-human responses was computed. Second, a weighted sum of these scores was computed in an effort to distinguish between the amount and the differentiation of the human responses. The two measures turned out to be highly correlated (r=.83) so only the unweighted human total score was used in the study. The articulation of the human responses was rated according to the procedure outlined by Blatt et al. (1976). Each subject received one score representing the average number of features elaborated on the scored responses. The integration of responses was not assessed in the present study, since attempts to condense this information without sacrificing the richness of the data were unfruitful, and given the present sample size statistical analyses would be precluded if the four integration measures were used.
Mayman (1967, 1981) provides evidence to suggest that the manifest content dimensions of Rorschach and TAT responses, as well as dreams and early memories all provide clues to the nature of object representations. Mayman's approach to research with projective data is to place less emphasis on precise coding schemes and more on a global, naturalistic definition of the phenomena. He agrees that the emphasis on inter-rater reliability is necessary when unsophisticated raters are used but argues that a system relying on the "well developed, well disciplined judgment" of the practicing clinician will achieve acceptable levels of reliability without sacrificing important clinical data, an assertion he has supported with hard data (1967; Krohn and Mayman, 1974). While Mayman's approach does provide rich information, and although it attempts to assess the affective component of the content dimensions, his approach was judged to be beyond the scope of this study. The reliance on empathic clinical judgment presupposes that raters are available who are experienced Rorschach evaluators and who are both experienced and in agreement about object relations theory.

In summary, five Rorschach measures were used to assess the intrapsychic self functions. To represent the degree of pathological thinking, the total number of special scorings in each record was tabulated. Four measures were used to assess various aspects of the subjects' capacity for object relations. Overall capacity for object relationships was assessed with the object relations/empathy scale (OR-E) developed by Pruitt and Spilka (1964). The number of human and quasi-human responses was summed to provide a measure of the amount of differentiated human objects reflected in the Rorschach protocols.
The degree of mutuality in the relationships between internal objects was assessed with the best response index of the Ulrich mutuality scale (1977). The degree to which internal objects are clear and well elaborated was assessed by averaging the number of articulation features (clothing, sex, etc.) per response.

Social self. This group of variables refers to the higher order dynamics which, while they may be traced to parent/child interactions in infancy, reflect the continued effects of parent/child and intersibling interactions during subsequent development. The aspects of the social self examined here are divided into three clusters: needs, outlook, and cognitive style.

Needs. The present study employs the scoring system devised by McClelland et al. (1953) to measure nAch in the TAT stories. This system yields several scores for each story which are then summed to produce a score ranging from -1 (no achievement imagery) to +11 (achievement is a single, dominant, and fully elaborated theme for the story). The experimenter rates, in accordance with relatively explicit criteria, the following dimensions.

1) The presence of achievement imagery
2) Stated need for achievement
3) Achievement-related instrumental activity
4) Anticipatory goal states (story characters' expectation of success or failure)
5) Obstacles to success (internal vs. external)
6) Nurturant help (achievement supported by others)
7) Affect associated with achievement or failure
8) Achievement theme (achievement is the only theme)

The measure of nAff is taken from Heyns' et al. (1958) revision of Shipley and Veroff's (1952) original procedures for scoring TAT responses for nAff. The method is very similar to the procedure for nAch and again produces a single composite score for each story.

The present experimenter used the training manual developed by Smith and Feld (1958) to learn these scoring systems. The manual includes materials for about twelve hours of independent practice for each motive, as well as a self-evaluation component. Research by Feld and Smith (1958) indicates that inter-rater reliability of .87 may be achieved for both nAch and nAff for persons who have completed this training program. This rater reached a .89 reliability with the experts in the training manual.

Outlook. Adler suggested that the dethronement which accompanies the arrival of siblings leaves the firstborn more nostalgic for the past and in general more pessimistic. These outlook variables, time orientation and optimism, were measured by assessing the TAT stories. Epley and Ricks (1962) have devised a method of assessing the predominant time orientation in TAT stories, and have shown that differences on these projections of time orientation are related to a variety of other time-related variables including goal setting, anticipatory anxiety, and empathic involvement. Their scoring system, used here in its original form, assigns scores to each story for the degree of retrospection and of prospection displayed by the protagonist, ranging in each case from less than an hour to greater than a decade.
The scores were summed across all stories and each subject received a retrospection and a prospection score.

The pessimism/optimism dimension is presumed to be reflected in the pessimism projected onto the protagonist of the TAT stories. The scoring system for nAch devised by McClelland includes a standardized system to rate the anticipations for successful achievement. This portion of the nAch scoring system was applied to all the stories, not just achievement stories, to evaluate the general level of optimism manifested by the protagonists. Each subject received two scores representing the amount of pessimistic and optimistic imagery projected into the TAT stories.

Cognitive style. Several of the birth order differences described by the Adlerians imply differences in cognitive style between first and later children. The eldest is expected to develop a more conservative, conventional, and self-contained approach to the world. Five Rorschach categories were used to assess various attributes of the subjects' cognitive style: R, S, M, P, and T. The number of responses, R, reflects intellectual productivity and the degree of energy during the response process. Low R scores indicate constricted, depressed, or suspicious patterns, while high scores may reflect mania or overcompliance. The M score refers to the inclusion of human movement in the response and is associated with the capacity for inner control and the use of fantasy to delay gratification. In addition, it may represent the capacity for emotional independence. The popular response, P, when elevated, suggests overcompliance and when depressed may indicate counter-dependency. Similarly, the S response, referring
to the inclusion of the white areas of the card, may indicate stubborn-ness, negativism, or originality, all suggesting non-conformity. The texture response, T, is associated with affective needs and when elevated indicates a wish to see the world in terms of comfort. Rationales for the selection of these scores are taken from Gutman et al. (1979), and from Exner's extensive work with the Rorschach (Exner, 1974; Exner et al., 1978). In line with the Adlerian predictions, it was expected that firstborns would have lower R, S, and T than last-borns, and higher M and P.
CHAPTER V
RESULTS AND DISCUSSION

The design of this study involves one two-level independent variable, birth order, and several interval-level dependent variables, with the possibility of one or more covariates. There are several approaches to data analysis, each with implications for the probability of drawing incorrect conclusions for any given variable (the error rate per comparison) and the probability that among all the relationships examined, some will be spuriously significant (the experimentwise error rate). One may simply conduct a series of univariate analyses of variance or covariance, doing a separate analysis for each dependent variable. When the dependent variables are uncorrelated, the experimentwise error rate is $1 - (1 - \alpha)^p$ where $p$ is the number of dependent variables and where $\alpha$ refers to the usual Type I error rate for a single comparison. Unfortunately, the $p$ dependent variables are more usually correlated than not, in which case the experimentwise error rate is undetermined (Bock and Haggard, 1968). It has been shown in Monte Carlo studies that when the dependent variables are correlated the use of a series of univariate tests results in experimentwise error rates as high as thirty percent (Hummel and Sligo, 1971).

The second approach, first suggested by Morrison (1967), involves two steps. First an overall test of the significance of the relationship between the vectors of the $p$ variables of the first group and the vector of the same $p$ variables of the second group:
Rejection of the null hypothesis (via an overall statistic such as Hotelling's $T^2$) would trigger step two. The contribution of the dependent variables would be analyzed separately but simultaneously. This method deals with the problem of experimentwise error rates extremely well. However, as the number of variables increases, this approach becomes extremely conservative and is not recommended unless the cost of Type I error rates is ruinous (Hummel and Sligo, 1971). In the present study this procedure might limit the experimentwise error rate to less than .001; with such a conservative approach, acceptable experimental power could not be achieved without hundreds of subjects.

The third procedure, proposed by Cramer and Bock (1966), employs the overall multivariate analysis outlined above. When Hotelling's $T^2$ justifies rejection of the null hypothesis, the authors recommend conducting separate univariate analyses rather than the simultaneous analyses favored by Morrison. This combination of multivariate and univariate analyses holds the experimentwise error rate at a consistent level, regardless of the number of dependent variables or the relationship between them, and it is not overly conservative (Hummel and Sligo, 1971). Thus it is the preferred procedure for the present design.
The first step, the initial multivariate test, was performed on the four groups of variables (needs, outlook, cognitive style, and intrapsychic self) using Version VI of Finn's multivariance program (Finn, 1977) which computes Hotelling's $T^2$ and the relevant $F$ statistic for equivalent mean vectors. The Finn program provides for the use of covariates and two were employed in stepwise fashion: WAIS vocabulary scores and the family density measure developed by Waldrop and Bell (1964). The results of this analysis phase are given in Table 1. The only group where the null hypothesis can be rejected is the group of object relational variables ($T^2 = 21.61, p<.014$). Two other clusters, needs and cognitive style, showed trends toward significance but did not merit rejection of the null hypothesis. The fourth group, the outlook variables, could not even be called trendy ($p<.887$). Thus, there was a significant birth order effect for the object relations variables, a suggestion of trends for need for achievement and affiliation and for cognitive style, and no support for the Adlerian predictions about outlook. The magnitude and direction of these relationships is explained by further analyses, discussed below.

The second step in the primary analysis is to examine the variables from the significant multivariate analysis to separate univariate tests. The results of these univariate for the five intrapsychic self variables are given in Table 2. The first two variables were each analyzed with a classical analysis of covariance model using the WAIS and family density scores to control for intelligence, sibling spacing, and family size. 7
TABLE 1. Overall multivariate tests for four groups of dependent variables, adjusted for WAIS vocabulary score and family density.

<table>
<thead>
<tr>
<th>Cluster of dependent variables</th>
<th>d.f.</th>
<th>Hotelling's $T$</th>
<th>$T^2$</th>
<th>F statistic</th>
<th>$p&lt;$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intrapsychic self</td>
<td>5,22</td>
<td>4.64</td>
<td>21.61</td>
<td>3.65</td>
<td>.014</td>
</tr>
<tr>
<td>[Articulation, Humtot, Pruitt/Spilka OR-E, Urist mutuality score, Special scores]</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Needs</td>
<td>2,25</td>
<td>2.66</td>
<td>7.08</td>
<td>2.18</td>
<td>.116</td>
</tr>
<tr>
<td>[Achievement, Affiliation]</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cognitive style</td>
<td>5,22</td>
<td>3.32</td>
<td>11.05</td>
<td>1.87</td>
<td>.140</td>
</tr>
<tr>
<td>[Response rate (R), Space (S), Populars (P), Texture (T)]</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Outlook</td>
<td>4,23</td>
<td>1.12</td>
<td>1.27</td>
<td>.28</td>
<td>.887</td>
</tr>
<tr>
<td>[Pessimism, Optimism, Retro-pection, Prospection]</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
TABLE 2. Results of univariate analyses of covariance for birth order and intrapsychic self variables, adjusted for intelligence, family density, and response rates (**indicates significant main effects for birth order).

<table>
<thead>
<tr>
<th>Source of Variation</th>
<th>d.f.</th>
<th>Mean Square</th>
<th>F</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Human Total</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Covariates</td>
<td>3</td>
<td>16.89</td>
<td>5.41</td>
<td>.005</td>
</tr>
<tr>
<td>R-Humtot</td>
<td>1</td>
<td>47.18</td>
<td>15.12</td>
<td>.001</td>
</tr>
<tr>
<td>WAIS</td>
<td>1</td>
<td>5.30</td>
<td>1.70</td>
<td>.204</td>
</tr>
<tr>
<td>Famdense</td>
<td>1</td>
<td>.98</td>
<td>.31</td>
<td>.580</td>
</tr>
<tr>
<td>Main effect</td>
<td>1</td>
<td>2.02</td>
<td>.64</td>
<td>.428</td>
</tr>
<tr>
<td>Explained</td>
<td>4</td>
<td>13.17</td>
<td>4.22</td>
<td>.010</td>
</tr>
<tr>
<td>Residual</td>
<td>25</td>
<td>3.12</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Pruitt/Spilka OR-E</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Covariates</td>
<td>3</td>
<td>1161.10</td>
<td>4.53</td>
<td>.011</td>
</tr>
<tr>
<td>R-Pruitt/Spilka</td>
<td>1</td>
<td>3188.73</td>
<td>12.44</td>
<td>.002</td>
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<tr>
<td>WAIS</td>
<td>1</td>
<td>38.29</td>
<td>.15</td>
<td>.702</td>
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<td>Famdense</td>
<td>1</td>
<td>2.25</td>
<td>.01</td>
<td>.926</td>
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<tr>
<td>Main effect</td>
<td>1</td>
<td>1647.93</td>
<td>6.43</td>
<td>.018 **</td>
</tr>
<tr>
<td>Explained</td>
<td>4</td>
<td>1282.81</td>
<td>5.00</td>
<td>.004</td>
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<tr>
<td>Residual</td>
<td>25</td>
<td>256.29</td>
<td></td>
<td></td>
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<tr>
<td><strong>Special Scores</strong></td>
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<tr>
<td>Covariates</td>
<td>3</td>
<td>5.72</td>
<td>2.14</td>
<td>.120</td>
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<td>R-specials</td>
<td>1</td>
<td>.01</td>
<td>.01</td>
<td>.955</td>
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<tr>
<td>WAIS</td>
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<td>.121</td>
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<td>Famdense</td>
<td>1</td>
<td>13.41</td>
<td>5.02</td>
<td>.034</td>
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<tr>
<td>Main effect</td>
<td>1</td>
<td>11.32</td>
<td>4.24</td>
<td>.050 **</td>
</tr>
<tr>
<td>Explained</td>
<td>4</td>
<td>7.12</td>
<td>2.67</td>
<td>.056</td>
</tr>
<tr>
<td>Residual</td>
<td>25</td>
<td>2.66</td>
<td></td>
<td></td>
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<tr>
<td><strong>Urist mutuality</strong></td>
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<tr>
<td>Covariates</td>
<td>2</td>
<td>.54</td>
<td>2.12</td>
<td>.140</td>
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<tr>
<td>WAIS</td>
<td>1</td>
<td>.25</td>
<td>.97</td>
<td>.333</td>
</tr>
<tr>
<td>Famdense</td>
<td>1</td>
<td>1.02</td>
<td>3.95</td>
<td>.057</td>
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<tr>
<td>Main effect</td>
<td>1</td>
<td>.84</td>
<td>3.24</td>
<td>.083</td>
</tr>
<tr>
<td>Explained</td>
<td>3</td>
<td>.64</td>
<td>2.59</td>
<td>.082</td>
</tr>
<tr>
<td>Residual</td>
<td>26</td>
<td>.25</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Articulation</strong></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Covariates</td>
<td>2</td>
<td>5338.37</td>
<td>.50</td>
<td>.608</td>
</tr>
<tr>
<td>WAIS</td>
<td>1</td>
<td>6817.03</td>
<td>.64</td>
<td>.428</td>
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<td>Famdense</td>
<td>1</td>
<td>1701.93</td>
<td>.16</td>
<td>.691</td>
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<tr>
<td>Main effect</td>
<td>1</td>
<td>55561.08</td>
<td>5.28</td>
<td>.030 **</td>
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<tr>
<td>Explained</td>
<td>3</td>
<td>22079.27</td>
<td>2.09</td>
<td>.125</td>
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<tr>
<td>Residual</td>
<td>26</td>
<td>11713.37</td>
<td></td>
<td></td>
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</tbody>
</table>
The other three variables present a complication inherent in Rorschach research. Those Rorschach categories which represent the number of times a particular response category appears in a record will receive larger scores in protocols which contain more responses. Thus, group differences in some Rorschach scores may only reflect differences in rates of responding. Several methods have been proposed to cope with this problem, including using the percentage of R (the total number of responses) as the dependent variable, or using R as a covariate. However, Kalter and Marsden (1970) have shown that the most appropriate procedure is to use as a covariate the total number of responses minus the number of responses which include the category being analyzed. For example, in the case of space responses (S), the covariate would be R-S. This procedure is not appropriate when the dependent variable does not covary with R, which includes all variables which are ratios, means, or other arithmetic functions which are independent of the response rate. In the present analysis, the Urist mutuality score and the articulation score adapted from the Blatt group's work are such arithmetic functions and do not require covariate controls for response rates. Thus in Table 2, only the analyses for the human content score, the OR-E scale, and the special scores for pathological thinking employ statistical controls for response rates.

The table shows that there was a significant main effect for the Pruitt/Spilka OR-E score \((F = 6.43, p<.018)\), the articulation score \((F = 5.283, p<.03)\), and the special scores for pathological thinking \((F = 4.24, p<.05)\). In addition, the Urist mutuality score was marginally significant \((F = 3.24, p<.083)\). Examination of cell means
indicated that the lastborn women had better object relations scores than their elder sisters (see below, and Table 7).

Conceivably, the analyses could terminate at this point, with the conclusion that only three of the nineteen variables in the design are significantly related to first versus last sibling position in women. However, there may be more to be learned from this data. In the first step, the overall multivariate test, only one group of variables was statistically significant. What of the other three groups? One, the outlook variables which assessed subjects' optimism, pessimism, retrospection and prospection as reflected in the TAT stories are clearly nonsignificant and of little further interest. There is no evidence in the present study to support Adler's claim that the de-throned firstborn would remain nostalgic for and preoccupied with the past and would be generally more pessimistic than laterborn.

The case for nAch and nAff is less discouraging. Although results of the overall multivariate test do not justify rejection of the null hypothesis, the results are sufficiently significant to merit further exploration ($T^2 = 7.087, p<.116$). The results of separate univariate tests for the three needs variables, with the WAIS vocabulary score (as a control for the potential confounding effect of intelligence) and family density measure (as a control for family size and sibling spacing) used as covariates, are presented in Table 3. Both these variables show differences in the predicted direction. This is not meant to build a case for significant results where none exist. Rather, these analyses are presented to demonstrate important trends in the data and to caution against outright dismissal of the relationship
<table>
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<th>P</th>
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between birth order, and need for achievement and need for affiliation.

The remaining variable group, the cognitive style variables taken from the Rorschach, is in the same general range of significance as the needs variables, but the meaning of these results is less clear. The univariate analyses for each of the variables in this group are presented in Table 4, with WAIS and family density scores used as covariates. From this analysis it would appear that both overall response rate and the number of white space responses differ across birth ranks. However, none of the analyses presented in Table 4 include covariate corrections for rate of response. Given the large difference in response rate, such controls are necessary. The same univariate analyses, this time including the appropriate response rate covariate, are presented in Table 5. The confounding effect of R is well illustrated; with R controlled, none of the cognitive style variables are significantly related to birth order (except of course R itself). Thus, the only non-spurious relationship in the cognitive style variables is that between birth order and response rate with lastborns scoring higher. It was originally suggested that a lowered response rate would reflect the tendency of the firstborn to exhibit a more constrained, restricted cognitive style. However, that was only part of a more complex hypothesis derived from the Adlerian view that firstborns are more constricted, conventional, and conforming as well as being less affectively oriented and less creative than laterborns. Given that none of the other cognitive style indicators were significantly related to birth order, the relationship between R and birth order is difficult to interpret, especially since R is potentially
TABLE 4. Results of the univariate analyses of covariance for birth order and the Rorschach measures of cognitive style, adjusted for intelligence and family density.

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TABLE 5. Results of univariate analyses of covariance for birth order and cognitive style variables, adjusted for intelligence, family density, and rate of response.

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related to a variety of other variables, including age, depression, and anxiety.

Given the foregoing analyses, and bearing in mind Tukey's (1962) suggestion that we be "willing to err moderately often in order that inadequate evidence shall more often suggest the right answer," what can be concluded about birth order and personality? The present study offers no support for the Adlerian notion that firstborns are more constricted, conventional, or conforming than lastborn children. Likewise, the evidence does not confirm Adler's assertion that firstborns are more pessimistic and more nostalgic for the past than are laterborns. While the data do not permit a decisive conclusion, they show some trends supporting the proposition that firstborn women have a higher need for achievement and a higher need for affiliation than lastborn women. Finally, the data reveal a significant relationship between birth order and what has here been called the intrapsychic self. In this category, measures of both pathological thinking and object relations were significantly related to birth order.

This relationship can be more fully grasped by using a discriminant analysis, which enables the comparison of previously defined groups simultaneously across multiple criteria. The criterion variables are weighted and combined to discriminate between the two groups. The purpose of discriminant analysis is to develop rules to allocate cases to groups, maximizing the likelihood of correct assignment. Discriminant functions maximize the ratio of between-group to within-group variance, which separates the groups as much as possible given
the variables available. It is then possible to determine the probability of misclassification of cases (Kendall, 1975).

There is disagreement over whether discriminant analysis can do more than classify cases. Lachenbruch (1975) asserts that this procedure is not to be used to evaluate group differences. On the other hand, Cooley and Lohones (1971) suggest that group differences can be amply illustrated by discriminant analyses (see, for example, Gutman et al., 1979). In the present study, other data is available to suggest that there is a birth order effect for several measures of pregenital personality variables. Thus, we may employ discriminant analysis to illustrate the magnitude of these differences, without claiming to be testing for their statistical significance and without running afoul of the debate over whether this is a misuse of this procedure.

Four variables were used in the discriminant analysis of the intrapsychic self (pregenital personality) variables: the articulation score, the special scores for pathological thinking, the Pruitt/Spilka OR-E score, and the Urist measure of mutuality. Although the latter was only marginally significant, it was included on the grounds that it provided information about a dimension which was not captured by the other variables, yet which should be closely related to them. Although the Finn program provides for discriminant analysis, it is not cost-effective, so the SPSS computer package was used (Nie et al., 1975). This program provides for stepwise selection of variables; the variable contributing the most discriminative power is entered first, then the variable which adds the most to the composite function, and so on.
Since there are only two groups in this design, only one function was derived (see Table 6). Wilks' lambda, which is the inverse of the discriminating power of the variables to be used in the discriminant function, was .583, suggesting that over 40 percent of the variance in the pool of discriminating variables is related to birth order (p<.007). This, and a canonical correlation of .645 for the function produced suggest that the function is quite strong.

The discriminant analysis, in combination with the table of means and standard deviations (Table 7) explicates the relative contribution of each variable in this relationship. The absolute value of the standardized discriminant function coefficients reveals the relative importance of each variable and the group means indicate the direction of each relationship. As Table 6 indicates, there was not a great deal of difference between the coefficients suggesting that each provides an important, significant contribution. Thus, while the Urist mutuality scale was not significant by itself it was the strongest component when all measures were combined, probably because it taps a slightly different dimension than the other three. Recall that this measure rates the manifestation of healthy, autonomous, reciprocal relationships on a scale from one to seven, with seven being the most primitive. The data suggest that the lastborn will be somewhat more capable of mutual and reciprocal object relations than the firstborn.

The next largest coefficient in the function was for the articulation score. This indicates how well elaborated the internal object world is, as reflected in the elaboration of human content responses on the Rorschach. Here lastborns showed a greater elaboration of their
TABLE 6. Results of discriminant analysis for intrapsychic self variables with birth order, including standardized coefficients.

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<td>df = 4</td>
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<td>p = .007</td>
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<td>Canonical correlation</td>
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<th>Standardized discriminant function coefficients</th>
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<td>Pruitt/Spilka OR-E</td>
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<td>Special scores</td>
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TABLE 7. Group means and standard deviations for the intrapsychic self variables, listed by birth order.

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<td>$\bar{x}$</td>
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human responses than did firstborns. This suggests that lastborns have a more robust and complex capacity for object representation. Internalized objects will be more fully developed (but not necessarily more accurately so).

The third variable in the function is the sum of special scores. This reflects the potential for pathological thinking, as reflected in the Rorschach. Firstborns received more special scores than did lastborns, indicating that firstborns have greater tendency to disturbed thinking, especially in ambiguous or threatening situations.

Finally, we have the Pruitt/Spilka object relations/empathy scale. This is similar to the articulation score in that it evaluates gradations in elaboration of a percept. However, it is concerned with the human-ness, the context, the elaboration, and the action of the object, while the articulation score focuses more exclusively on the elaboration of features of the object itself. As with articulation and mutuality, lastborns showed more capacity for robust, well-developed object relations (see Table 7).

Statistically, then, it would appear that lastborns have a more fully developed personality structure, or intrapsychic self. Their internal object world is better articulated, somewhat more engaged and active, and is characterized by a greater degree of reciprocity in object relationships. In addition the lastborn is less likely to rely on pathological thinking to manage information. While these findings might suggest a birth order effect for psychological intactness, to wit firstborns are less well put together than lastborns, such a conclusion is unwarranted for two reasons. First, both first and last children
were well within the well-adjusted range on all scales. More importantly the variables examined here do not exhaust the dimensions of personality structure.

To illustrate, we may examine a Rorschach score for which no predictions were made for the present study, the pair response. A response is considered a pair response whenever use is made of the symmetrical features of the inkblot to perceive two of something. The pair response is generally considered an index of narcissism (Exner, 1969) and a higher number of pair responses is generally taken to reflect a greater reliance on narcissistic defenses. Research indicates that extremely frequent pair responses are given by individuals who exhibit narcissistic character structure, replete with unrealistic idealization/devaluation of self and others, labile affect, and a need to use others to mirror their own self-representations (Exner, 1969; Mayman, 1981; Sugarman, 1981).

No predictions were made concerning the pair response in this study because the theoretical position of narcissism remains very much open to question. Those who believe, with Kohut (1971), that the narcissistic position is a natural and inevitable part of development would interpret the pair response far differently than would those who believe that narcissistic defenses represent a false self-adjustment overlaying a more psychotic core. Thus one might interpret group differences on the pair response either as differences in developmental achievement/regression or as differences in core psychopathology. (While the two are correlated, they are not synonymous.) For this reason, the pair response was not included in this study.
The univariate analysis of pair responses (with the usual three covariates) is presented in Table 8. The pair response is significantly related to birth order (df = 1,25, F = 4.07, p<.050) and the differences are in the opposite direction one would predict given the other object relations scores on the Rorschach. While both firstborns and lastborns are well within the normative range for pair responses (Exner, 1974), lastborns scored higher than firstborns on this measure. This might suggest that lastborns are somewhat more narcissistic than firstborns; despite their superior capacity for object relationships, they may rely on narcissistic defenses to a greater extent than firstborns. Alternatively, these data may suggest that firstborns are deficient in egocentricity, a certain amount of which is necessary for healthy adjustment. Clearly, pronouncements cannot be made on the basis of the pair response. Lacunae in the theory preclude definitive statements about different amounts of narcissism, which are only partially captured by the pair response in any case. The point is that the four intrapsychic self measures being examined here do not represent the entire domain of the intrapsychic self. The fact that lastborns appear to do better on these measures must be considered in the context of other aspects of the personality structure which are not examined in this study.
TABLE 8. Results of univariate analysis of covariance for birth order and pair responses, adjusted for response rate, intelligence, and family density.

<table>
<thead>
<tr>
<th>Source of Variation</th>
<th>d.f.</th>
<th>Mean Square</th>
<th>F</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pairs</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Covariates</td>
<td>3</td>
<td>15.88</td>
<td>4.26</td>
<td>.015</td>
</tr>
<tr>
<td>R-Pairs</td>
<td>1</td>
<td>43.734</td>
<td>11.75</td>
<td>.002</td>
</tr>
<tr>
<td>WAIS</td>
<td>1</td>
<td>1.67</td>
<td>.45</td>
<td>.508</td>
</tr>
<tr>
<td>Famdense</td>
<td>1</td>
<td>7.24</td>
<td>1.94</td>
<td>.175</td>
</tr>
<tr>
<td>Main effect</td>
<td>1</td>
<td>15.16</td>
<td>4.07</td>
<td>.050</td>
</tr>
<tr>
<td>Explained</td>
<td>4</td>
<td>15.70</td>
<td>4.22</td>
<td>.010</td>
</tr>
<tr>
<td>Residual</td>
<td>25</td>
<td>3.72</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Implications

The findings presented here have several implications for both researchers and clinicians, but first a few caveats are in order. These data may or may not generalize to men, and may or may not bear out for first versus second or last versus middle children. In short, the limits of the relationships observed are as yet unknown.

This project demonstrates that using within-family samples in birth order research is both feasible and profitable, albeit demanding. This method produced highly matched samples, avoiding the necessity of controlling for a variety of potential confounds. With a relatively small sample, marginally significant trends emerged which support earlier findings of birth order effects for nAch and nAff, using far fewer subjects. Thus the present project attests to the efficiency and power of this sampling procedure.

This project also illustrates the usefulness of the Rorschach and underscores the advantage of using scoring formats which are derived to answer specific questions, in addition to the standard Rorschach scores. Further development of these techniques should be encouraged.

The present study offers little evidence for the Adlerian notion that sibling rivalry and its sequelae will produce outlook differences in first and last children. The evidence here for birth order differences on pessimism, retrospection, conventional thinking, and creativity add to the list of studies which fail to support the Adlerian formulations about birth order.
The parent-mediated birth order effects seem to be more substantial. The personality structure variables and the needs for achievement and affiliation are all presumed to derive from differences in parent-child interactions, beginning with infancy. Present findings suggest that being the child of first-time parents does impact on personality development and that both the intrapsychic and social selves are affected.

Future research may take several directions. One route is to test the limits of the present findings. Are they applicable to men as well as women? Are there differences for other birth ranks besides first and last born? Alternatively, these findings raise the question of whether the relationship between birth order and pregenital personality structure may be more extensive. One might wish to consider whether birth order effects exist for other dimensions of core personality structure such as primitiveness of defenses or object constancy. This latter approach might best begin with a more comprehensive inventory of the ways in which infants of different birth ranks are treated differently by their parents. A more explicit account of these differences would facilitate the generation of specific hypotheses. Birth order differences in parent-infant interactions could become the arena to test several of the precepts of object relations theory. Such investigations await a more elaborate understanding of the nature of birth order differences in parent-infant interactions.
FOOTNOTES

1 In 1947, 43% of all white children born in the United States were firstborn, while by 1955 only 29% of the births were first children (Vital Statistics, 1967). Thus, if the sample included only seniors, most of the subjects would have been born in 1948, a peak year for firstborns. Alternatively, extrapolating from the census data, a sample of freshmen, born in 1952, would contain only thirty percent firstborns.

2 Thus: "There have been many studies of the relation of mental disorder to birth order. Since the data reported tend to be confusing and generally rather contradictory they will not be introduced here, except for...two studies on schizophrenia" (Altus, 1966, p. 47).

3 The following paragraphs, drawn from different sections of the paper, illustrate the problem.

Onlyborn are...more often among childhood schizophrenics...adult psychiatric patients...and schizophrenics in the Navy, though underrepresented among one adult schizophrenic sample. The frequency of the onlyborn among the greatly disturbed would seem to be, overall, average to somewhat above average with some variability in frequency due to the era and the mean sibship size of the samples (p. 84).

Among 11 investigations of schizophrenia by ordinal position, one showed an overrepresentation, two a slight underrepresentation, and eight an average frequency. Birtchnell reported no ordinal position differences for mental health patients...Eldest have above average occurrence among schizophrenic outpatients, especially those from small sibships, and generally high occurrence among outpatients (pp. 90-91).

Schizophrenics occur relatively more frequently among youngest than among other ordinal positions, especially in large families and among men (p. 95).

Laterborn among American soldiers in Vietnam more frequently develop psychoses than the earlierborn. Middleborn are significantly more frequent among the 442 schizophrenic patients than among the 495 controls (in one study) (pp. 101-102).

From these data, it's unclear whether there really is a birth order effect for schizophrenia, or what position the authors (Wagner et al., 1979) would endorse.
This approach bypasses several issues which are beyond the scope of this paper. They are sufficiently important to merit enumeration here. The reformulation of nAff into a behavioral analysis of reinforcement history has been offered by Mehrabian and Ksionzky (1974). Less drastic revision, attributing birth order differences in Schachter's to variables other than affiliative motivation have been proposed. For a self-esteem explanation, see Zimbardo and Formica (1963). Theoretical derivatives of Schachter's formulation will also be bypassed here—for example, the hypothesis that if firstborns affiliate more to reduce stress, they will also be more susceptible to social influence of their emotional state (see Ring et al., 1965).

I am indebted to Richard Halgin, Ph.D., of the University of Massachusetts, for suggesting this procedure. I had not yet come across Bayer's (1967) suggestion and in any case might have dismissed it without Dr. Halgin's earlier input.

I am indebted to James Murray of Case Western Reserve University for the donation of his time and expertise as the second Rorschach rater for this study.

All the analyses were performed at the computing center at the University of Wisconsin, Milwaukee. The most appropriate method for analysis of variance with matched subjects is a repeated measures formula, which is available on the SPSS NOVA program. Since this program was not available in Milwaukee, the classical analysis of covariance was employed. Using this model gives a slightly more conservative test of the hypotheses than the repeated measures design. The advantage to be gained with repeated measures is counterbalanced by the loss of degrees of freedom in the error term from an already small sample size. Further, to the extent that intelligence and family size are correlated with family membership, covarying on these two variables accomplishes the same thing as the repeated measures design. In sum, reanalysis with the repeated measures design is unlikely to change the results or conclusions of the study.
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### CHARACTERISTICS OF SUBJECT SAMPLE

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Firstborn</th>
<th>Lastborn</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>25.6</td>
<td>20.1</td>
</tr>
<tr>
<td>Marital Status</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Single</td>
<td>5</td>
<td>0</td>
</tr>
<tr>
<td>Married</td>
<td>10</td>
<td>15</td>
</tr>
<tr>
<td>Religion</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Catholic</td>
<td>11</td>
<td>10</td>
</tr>
<tr>
<td>Protestant</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Other</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Educational Attainment (12 = High school graduate)</td>
<td>13.1</td>
<td>14.3</td>
</tr>
<tr>
<td>WAIS vocabulary score Mean (S.D.)</td>
<td>49.0 (10.0)</td>
<td>45.1 (12.19)</td>
</tr>
<tr>
<td>Age spacing to next sibling</td>
<td>3.24 (1.81)</td>
<td>2.75 (1.60)</td>
</tr>
</tbody>
</table>

Additional data were collected (see Appendix B) on the subjects' impressions of their family of origin. There were no significant differences between the two birth order categories, although the lastborns saw their parents as slightly more conservative than did the firstborns. The subjects came from middle- and lower-middle-class families, and perceived their parents as religiously devout and politically conservative, although not extremely so in either case. Subjects' fathers had completed an average of one year of college, while their mothers had an average of one-half semester of college education. All of the subjects' parents and 86% of the non-participating siblings live in the same city. Only four of the subject families included male siblings.