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**EXPRESSED PREFERENCES FOR
INFORMATION SEEKING BEHAVIORS
AND THEIR RELATIONSHIP TO BIRTH ORDER**

DISSERTATION

**Presented in Partial Fulfillment of the Requirements for
the Degree Doctor of Philosophy in the Graduate
School of The Ohio State University**

By

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*** * * * ***

**The Ohio State University
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Chapter I

INTRODUCTION

Statement of the Problem

Since the nineteenth century birth order has been studied systematically as an antecedent to various classes of human behavior. In general, the overall results may be seen to be at best inconclusive, at worst a random sampling of data which sometimes points in one direction and then another, depending upon chance and the bias of the interpreter. One might readily conclude that birth order is not an appropriate independent variable for behavioral research, were it not for two consistent and interrelated findings. First, there is no question but that only and firstborn children are overrepresented in college matriculation, graduation and advance work. Second, there is no question but that firstborn and only children are overrepresented among persons of all occupations judged to be eminent, and they are also overrepresented in the scientific population. These factors are interrelated in that eminent persons and scientists tend to be selected from the population that matriculated into college, graduated and took advanced degrees. Thus the college matriculation phenomenon is the more basic finding and the appropriate area of research is the source of variance in college matriculation that may be correlated with birth order. There are the obvious sources of variance

such as socio-economic group, attitudinal factors, parental expectations, peer pressures, personality characteristics such as need achievement, proximity to a college, interests and aptitudes. It would seem that birth order would probably be correlated with one or more of these in such a way as to become correlated with college matriculation, for there is nothing inherent in a demographic variable like birth order which would result in a correlation with a dependent variable such as college matriculation. It is the position of the writer that the source of variance associated with college matriculation will be found in the organismic variables associated with personality and aptitude development, inasmuch as demographic variables such as the socio-economic ones have not provided an explanation for the observed relationship between birth order and college matriculation.

However, before attempting to specify the developmental antecedents of the birth order/college matriculation phenomenon, it is necessary to determine the correlatives of birth order and college matriculation.

Survey of the Literature

Summary of the Major Reviews of the Literature

There are numerous reviews of the literature on birth order and its correlates. Jones (1931) was unable to find a consistent trend in the research reports. He best summed up his review in a later reference to it (Jones, 1954) as follows:

In an earlier critique (Jones, 1931) of research in

this field evidence has been given that when...methodological difficulties are properly controlled no birth-order difference in intelligence occur in normal samples. So far as this problem is concerned, we must then dismiss the environmental arguments as having little net weight. Atypical results, however, have been encountered in certain highly selected samples. Studies of gifted children...and of eminent men...have shown a distribution of birth orders differing from chance expectation and strongly favoring the firstborn. No satisfactory explanation of this finding has been given.

Murphy, Murphy and Newcomb (1937) gave birth order and intelligence especial attention. They presented three lines of evidence. Firstborn and only children are (1) more intelligent than laterborn children, (2) less intelligent than laterborn children and (3) there is no difference between the various birth order groups. Sears (1950) reviewed birth order as a variable in behavioral research and concluded:

In sum it appears that second born children are somewhat less dependent than first. Dependent behavior is related to a history of frustration in nursing and weaning experiences and the mothers of second and later children tend to be somewhat less frustrating than the mothers of first children.

Although Sampson (1965) pointed out that the research on birth order is extremely inconsistent, he indicated that good research methodology does produce differential birth order effects and Sampson (1965, p. 220) did observe that there were some consistencies. He stated:

As compared with the laterborn individual, it appears that the firstborn or the only child (1) is more likely to attain a position of intellectual eminence, particularly in the more scientific fields, (2) is less likely to express overtly aggressive feelings, (3) is more likely to seek the company of others when he is anxious, and to benefit from such affiliative activity, yet (4) is less likely to be a sociable, outgoing, highly rated individual, one who is empathetic and sympathetic. In addition, it is probable that, as compared with the laterborn child, the firstborn is (1) more likely to experience a sudden shift in the

centrality of his family role, particularly with respect to attention and affection, and (2) more likely to experience a conflict over the issue of dependence versus independence.

Warren (1966, p. 38) concerned himself with birth order and social behavior. He summarized the literature as follows:

The most firmly established and persistent finding relative to birth order shows an overproportion of firstborn children in college. Substantial evidence also exists showing (a) firstborn to be more susceptible than later born to social pressure and (b) firstborn women, when apprehensive, to be more strongly attracted than later born women to the company of others.

Finally Bradley (1968, p. 45) concerned himself with birth order and school related behavior and, with some reservations, stated:

As evidence accrues there appears to be a redoubtable link between birth order and college matriculation. Overwhelming evidence shows that firstborns of both sexes attend college in greater numbers than their later born peers. While explanations of this phenomenon are tenuous, substantial evidence exists indicating that early personality factors favoring firstborns are substantiated and extended while in school. Firstborns seem to more frequently (a) meet teacher expectations and (b) show more susceptibility to social pressure than later borns. Exhibiting (c) greater information-seeking behavior and (d) being more sensitive to tension-producing situations, firstborns may be judged by others as (e) serious and (f) low in aggression. These behaviors may (g) strengthen firstborns' achievement motivation and (h) help to enhance their academic performance.

Birth Order, College Matriculation and Eminence

The overrepresentation of firstborns in college populations has been demonstrated in numerous surveys. This is, perhaps, the most consistent finding in relation to birth order. It occurs with controls for socio-economic conditions and for size of family (Schacter, 1963). The proportion of firstborns in the general population varies from 25 to 43 percent depending upon year of birth, however, Altus (1965a) reported

findings at the University of California at Santa Barbara, and stated that in excess of sixty percent of incoming students are firstborn and only children and if the only child is left out about fifty-five percent are firstborn. Capra and Dittes (1962) reported about sixty-one percent of incoming students are either only children or firstborns. Cattell (1917), Ellis (1904), Clark (1916), and others (Roe, 1953; Apperly, 1939) report a greater percentage of eminent persons and scientists are firstborns and, as Schacter (1963) has pointed out, the eminent and the scientists are chosen from the college populations. Cobb and French (1966) indicated this same pattern holds for medical students. In recent reviews of the literature by Schacter (1963), Warren (1966), Bradley (1968) and Sampson (1965), no verified studies were reported which failed to support the hypothesis that firstborn and only children are overrepresented in the academy nor has the writer been able to find one inconclusive result, much less a result which would controvert the firstborn/college matriculation phenomenon. Schacter (1965) did make mention of two unverified negative reports.

The proportion of entering college students who are firstborn varies depending upon family size and whether or not only children are included, but the proportion is from 50 to 66 percent, while chance representation would be from 25 to 43 percent. Clark (1916) had noted this and attributed it to the expense of securing an education, however, as has been indicated, financial factors have been minimized as a source of variance and the result has not been found to vary. The reasons for this phenomenon of overrepresentation remain unknown.

Birth Order, Intelligence and Verbal Facility

The data available concerning intelligence and birth order are quite inconsistent (Jones, 1931; Murphy, Murphy, and Newcomb, 1937; Bradley, 1968; Warren, 1966). However, there may be a consistent trend in this area which has not been given sufficiently close scrutiny. Galton (1874), Clarke (1916), Cattell (1917), Ellis (1904) and others report a higher incidence of firstborns among the eminent and among successful scientists. Schacter (1963) points out that these are chosen from the college matriculated population and discounts intelligence as a factor, citing the inconclusive results of numerous investigations. Thurstone and Jenkins (1931) demonstrated conclusively that within their atypical sample, IQ scores tended to increase as birth order increased, if the size of family was held constant. DeLint (1967) made this same observation using a Canadian sample of 201 alcoholic men. But Terman (1926) had found an unexpectedly high incidence of firstborns among his large sample of gifted. Recent studies of Merit Scholarship competitors and winners produced further evidence of the superiority of the firstborns although the data were not without the ambiguity which almost always characterizes research in this area (Burton, 1968; Nichols, 1966). Altus (1965) found a strong trend for the Verbal College Entrance Examination Board score of entering firstborn college students to be higher than that of the laterborns, but found no such differentiation with the Mathematics test score.

Results which have controverted the idea of firstborn superiority in the intellectual sphere tended to be based upon global measures of

intelligence. It is also noteworthy that the population from which these samples were drawn were populations from which the eminent, successful scientists, or even college bound are not drawn, i.e. lower socio-economic classes and behaviorally disordered. The results of the two types of studies are not comparable. Thurstone and Jenkins' (1931) sample consisted of 1500 cases from the Chicago Institute for Juvenile Research and tended to be youngsters having difficulty who were from the deprived socio-economic groups. One wonders if superiority of the laterborn was not a function of the younger age at which the laterborn were tested. The evidence is strong that the IQ scores tend to decrease with age among the culturally deprived. In the case of the DeLint (1967) study the sample consisted of 201 alcoholic men. She reported only total Wechsler Adult Intelligence Scale IQ's. The means were below average for the normative group, thus the sample would seem to have limited generalizability. Ordinarily, one would expect a higher performance scale IQ than verbal scale IQ from such a population as DeLint used (Wechsler, 1958). Similar criticisms may be made of most studies which support either the notion that firstborns are brighter or that laterborns are brighter.

There does seem to be a consistent trend developing which would indicate that the firstborn have greater verbal facility, but they are not more able in all areas of intellectual functioning. This being true, results would be strongly affected by sex, age and socio-economic factors as well as birth order. This would explain why the results in this area are so inconsistent.

An explanation of the possible verbal superiority may be found in

the work of Bing, (1963) who compared children high on a verbal measure and low on a non-verbal measure (Primary Mental Abilities: Verbal, Spatial, and Numerical) with children who had the reverse pattern. She found striking differences in the child rearing practices of the groups. The high verbal group received more verbal stimulation and had more responsive mothers, but their mothers also tended to withhold help and gave evidence of disapproval of the child's failures. The mothers of the non-verbal children tended to allow them considerable freedom to experiment on their own and, in general, exhibited a more laissez-faire attitude. Unfortunately, Bing did not address herself to birth order differences nor does she have this information available.¹

Birth Order, Affiliation Responses and Anxiety

Firstborns seek the company of others when under anxiety or tension producing conditions more than laterborns. Schacter (1959) hypothesized that firstborns and laterborns would be differentially represented in certain occupations and other groupings based upon the availability of other persons whose presence would assist in the reduction of anxiety. He found laterborns to be overrepresented among fighter pilots while firstborns and onlies were overrepresented among bomber pilots and patients undergoing psychotherapy. Previous to these demographic studies, Schacter had performed a number of experiments using female subjects, the results of which were supported by the demographic studies. Later experimental work by Sampson (1962)

¹Personal communication from Elizabeth Bing to the author, September 2, 1969.

and Connors (1963) tended to support the generalization of the affiliation tendency of firstborns when under stress to include men. Additional support comes from Dahrenwend and Dahrenwend (1966) who found that firstborn subjects exhibited more symptoms of emotional distress when waiting alone rather than with others, and laterborns showed more symptoms when social interaction was enforced during the waiting period for an unpleasant experience. Wrightsman (1962) had found that the anxiety of firstborns was reduced while waiting with others but this reduction was not observed in laterborns, which would support Dahrenwend and Dahrenwend.

The source of this behavioral variation is not at all clear. Ring, Sipinski and Braginsky (1965) manipulated the opportunity for anxiety reduction and self evaluation for thirty-two firstborn and the same number of laterborn females. They concluded that it was not need for anxiety reduction which prompted the affiliation tendencies of the firstborn; rather it was the need for self evaluation, using others as models for themselves. Consequently the firstborn tend to converge toward the emotional level of others more, react more favorably to those like themselves than those that reduce anxiety and demonstrate more anxiety under ambiguous conditions. These investigators postulated an identity problem among firstborns as an explanation.

There is also evidence that under conditions of high fear all birth order groups prefer the company of others (Gerard and Rabbie, 1961; Sarnoff and Zimbardo, 1961). Sarnoff and Zimbardo differentiated fear and anxiety. Under conditions of anxiety but not fear of

pain, they found a preference for waiting alone rather than with another. This was not true under the fear of pain condition. Unfortunately, they did not differentiate the various birth order groups in their work.

The research relative to male firstborns and affiliation tendencies is not as clear as it is for females. There have been several negative results (Gerard and Rabbie, 1961; Zimbardo and Formica, 1963; Zucker, Manosevitz and Lanyon, 1968). The one negative result Schacter reported in his monograph was the only experiment in which he used male subjects (Schacter, 1959).

There is no consistent evidence that need for affiliation is greater in the firstborn than the laterborn in all situations. Waters and Kirk (1967) used the Edwards Personal Preference Schedule and attempted to differentiate only children, older of two, younger of two, oldest of three or more, intermediate among three or more and youngest of three or more. Sex differences were apparent but there were no indications of birth order/need affiliation relationship. However Dember (1964) used the TAT and did find some need affiliation response/birth order correlation and had concluded that the firstborn had greater need affiliation.

There is evidence that firstborns are less popular and less likely to join a college fraternity. Schacter (1964) found that firstborn fraternity members were less popular than laterborns. Baker and O'Brien (1969) found that firstborns were less likely to affiliate with a fraternity than laterborns.

In summary, there is substantial evidence that firstborn females are more likely to seek affiliation when anxious than laterborn

females. The evidence that firstborn males seek affiliation when anxious more than laterborn males is conflicting but tends to support the report that firstborns are more likely to affiliate with others when under stress. There is little or no evidence that this is a function of a generalized need for affiliation on the part of firstborns, and the evidence is not clear that affiliation when anxious is sufficient by itself to reduce anxiety. Other possible explanations have been offered, including the need for information (Bradley, 1968) and the need for self evaluation based on a model (Ring, Sipinski and Braginsky, 1965).

Birth Order and Influenceability

The opinions and behavior of firstborns are influenced by authoritative statements of individuals or groups more than those of laterborns. The evidence regarding influenceability, as with most research discussed in this paper, is difficult to summarize because of problems of definition. Influenceability refers simply to the probability that a person will make one response rather than another because he is directly encouraged to do so by others or indirectly pressured by weight of opinion.

Schacter (1959) demonstrated that firstborn subjects were more easily influenced than laterborns. He interpreted this as evidence for emotional dependence. Becker, Lerner and Carroll (1964, 1966), using an Asch situation, found that firstborns are more likely to conform to group pressures than laterborns. Eisenman and Platt (1968) found that more firstborn males have higher external scores on the

internal-external control of behavior continuum, which would indicate greater influenceability. Arrowood and Amoroso (1965) found that first-born females who learned that their opinion deviated from the mode of the group opinion changed more readily than did the laterborns who were also deviates.

In summary, in situations where actual variation in behavior may be brought about by the influence of others, firstborns appear more likely to vary their behavior than laterborns.

Birth Order and Dependence

That firstborns are more easily influenced than laterborns has been interpreted as evidence that they are more dependent. This, however, may not be the case since the influenceability of the firstborn could be a reaction to a particular source of information, e.g. a source which has higher credibility. Dependence in the sense of need for emotional support is yet another question. Although firstborns tend to behave in accordance with the standards of their reference groups to a greater extent than laterborns, there is no consistent line of evidence that firstborns are emotionally dependent upon the acceptance of others to the extent that they can be influenced to engage in behaviors that they have previously perceived to be at variance with the standards of their reference group. When the behaviors to be influenced are irrelevant to the standards of the firstborns' reference group, they may be influenced more readily than laterborns, perhaps because they perceive the statements of those who are attempting to influence them as indicative of appropriate norms for the behavior in question.

Sears (1950) found firstborns to be more dependent as measured by their responses to their mothers but he was very cautious in his interpretation due to low substantive significance. Dahrenwend and Dahrenwend (1966) found that symptoms of emotional distress increased for firstborns who had to wait alone for an unpleasant experience and there was a corresponding increase in symptoms of emotional stress for laterborns who had to wait in conditions of enforced social interaction. This was cited before in relation to anxiety, and it also has been interpreted as indicative of the emotional dependence of firstborns. Becker, Lerner and Carroll (1964, 1966) found that firstborns require the support of others to maintain their stated positions more so than laterborns. Their findings are consistent with those of Arrowood and Amoroso (1965) who found that firstborns who had been led to believe they deviated from a group opinion changed their opinions more readily than laterborns. These results are also consistent with those of Schacter (1959) who had stated that firstborns are consistently more dependent than laterborns.

There is however, other evidence that would indicate that firstborns are not more emotionally dependent than laterborns. Vernon, Foley and Schulman (1967) found, in contradistinction to Sears (1958), no differential indications of dependency among firstborn and laterborn preschoolers during admission procedures to a hospital or during anesthesia induction. Dager (1964) had hypothesized that firstborns would acquiesce or yeasay more on tests if they were more influenceable, dependent and conforming, but he found that the firstborns had no greater tendency to yeasay than others. Stotland and Dunn (1962)

varied models so that college students Ss perceived their model (same age and status) as having done well or poorly on the same or an opposite task. The dependent variable was to predict one's own performance on a clerical task, which task would be the same as their model's or opposite to their model's. It was laterborns who identified most with the performance of their models. The firstborns tended to generalize oppositeness, i.e. they predicted they would do the opposite of what their model did on an opposite task, but they did not identify with their model if he had worked on the same set of tasks. Thus, both firstborns and others seemed to be dependent (identify with another in some fashion), but the conditions which elicit the response vary. This is also true of the experiments of Becker et al. (1964, 1966), Arrowood and Amoroso (1965) and Dahrenwend and Dahrenwend (1966). It was not the case that only firstborns exhibited emotional symptoms and/or acquiesced. Laterborns also did these things. The stimuli which elicited the responses varied, not the responses.

In summary, it is not accurate to say that firstborns are more emotionally dependent than laterborns. It is appropriate to state that emotional dependence can be elicited differentially across birth orders. However, the qualities of the stimuli have yet to be sufficiently specified so that predictions can be made except, as will be seen later, firstborns seem to be more dependent upon those who are seen as being in control or in authority. Firstborns are more dependent when responding positively to the perceived norm of their reference group. This latter aspect of dependence (responding to the norm or standard of the reference group) would be better labelled conformity than

dependence.

Birth Order and Conformity

Conformity must be differentiated from conscience. In this discussion, at least, conscience is thought of as an inhibiting or negative factor, while conformity is positive in that it relates to the way an individual behaves, not the way he does not behave.

It has been stated that firstborns are not more emotionally dependent than laterborns. But firstborn have been shown to be more easily influenced under some conditions. These conditions would seem to almost always involve conformity to the perceived norms and standards of the individual. Smith and Goodchilds (1963), using the Minnesota Multiphasic Personality Inventory and questionnaires, found that first-born firemen were more conforming within their group and perceived with greater clarity the social structure of their group. Sampson and Hancock (1967) in a carefully controlled study found that firstborns have higher needs for achievement and autonomy and, if male, they manifest more achievement related conformity. Ring, Sipinsky and Braginsky (1965) used female subjects and found that firstborns responded positively to those like themselves (or those whom the firstborns were like) while laterborns responded to individuals on the basis of whether or not the relationship had some sort of utility such as, in this experiment, the reduction of anxiety. MacDonald (1969a) was concerned about the disparity between Schacter's hypothesis about dependence and the data which in many instances failed to support Schacter's dependency hypothesis when the Ss were male. MacDonald hypothesized that the

observed conflicting responses were due to a tendency of firstborns to conform to the expectations of adult and/or authority figures, and that there are different expectations for males and females. MacDonald used volunteers in a fear of pain situation and found that firstborns were more responsible about keeping an appointment and that firstborns believed the experimenter more, i.e. accepted the situation as it was presented. There were no sex differences in appointment keeping. However, Ss were given a chance to withdraw from the experiment and the firstborn males were least likely to withdraw (brave men) while firstborn females were most likely to withdraw (timid women). Laterborn males and females were intermediate. MacDonald concluded that the firstborns were more socialized and consequently more likely to do what was expected of them. MacDonald (1969b) also found that firstborns express more religious sentiment and, even when they have no religious preference, are more likely to engage in the generally accepted religious practice of going to church on Sunday.

In summary, firstborns tend to conform more to the standards of their reference groups, especially inasmuch as these were learned from contact with authority figures such as parents. When the situation is not classifiable due to lack of previous experience and no previous communication, firstborns tend to use available individuals to establish standards and then respond accordingly.

Birth Order and Belief in Authoritative Statements

There is substantial evidence that firstborns tend to believe authoritative statements more than laterborns. MacDonald (1969a) found

this to be true, as has already been mentioned. Staples and Walters (1961) found that firstborn judgments were more influenced by threat of shock than laterborns. They concluded support for Schacter but failed to control for the variable of belief, i.e. if the firstborns believed they were to be shocked, they would be more influenced than would a group which did not so believe. Suedfeld (1964) and others (Capra and Dittes, 1962) have pointed out that firstborns volunteer for experiments in disproportionate numbers. However, there have been reports that firstborns were at times underrepresented (Dahrenwend, Feldstein, Plosky and Schmeidler, 1967). Suedfeld (1968) attempted to resolve the disparity by varying the advertisement for volunteers, and measuring the variations in anticipated stress between firstborns and laterborns. He found that an advertisement with minimal information resulted in no differences in anticipated stress. A reassuring advertisement resulted in less anticipated stress for firstborns than laterborns and a frightening advertisement resulted in greater anticipated stress for firstborns. Jacoby (1968) investigated the pre-experimental anxiety of firstborns and laterborns and found no differences in the pre-experimental level of anxiety. Unfortunately, Jacoby did not mention the type of solicitation used to secure the subjects' cooperation. Nonetheless, Jacoby concluded that observed response differences between firstborns and laterborns are a function of treatment, not a pre-existing high level of anxiety, which conclusion is consistent with Suedfeld (1968).

In summary, the evidence consistently points to the tendency of firstborns to believe authoritative statements and behave accordingly to a greater extent than laterborns.

Birth Order and Conscience

Conscience, as mentioned earlier, is considered here a negative or inhibiting factor in human behavior. There is no evidence that firstborns have a greater number of inhibitions than laterborns, but there is substantial evidence that the inhibitions that do exist are stronger. It may or may not be that firstborns have more inhibitions.

Sears, Maccoby and Levin (1958) noted that firstborns exhibit behaviors that appear to indicate a stronger conscience than laterborns. They attributed this to the additional contact with the father that the firstborn seems to enjoy. This is consistent with the clinical evidence of Adler (1927) who saw the oldest as "the guardian for law and order." Bossard and Boll (1955) identified eight personality types within large families. The only type with which oldest (of sex) was identified was the responsible type. Wuebber (1967) gave 113 male subjects instructions to avoid talking about their experience as experimental subjects. He found that firstborn and only children talked substantially less than laterborns. This is consistent with the report of MacDonald (1969a) that more firstborns kept their appointments than laterborns.

Lasko (1954) noted that laterborns are treated in a more permissive, relaxed manner which supports Sears et al.'s (1958) observations. Altus (1966) also noted the development of a strong conscience as one of the important differences between firstborns and laterborns.

Birth Order and Teacher-Pupil Relationships

As in the case of conscience, the evidence is such that this

relationship must be inferred, although it would be amenable to direct observation. At the present time, all that can be stated is that many behaviors associated with the firstborn are those valued by teachers. This justifies the working hypothesis that the relationships of firstborns and their teachers are superior to the relationships of laterborns and their teachers.

Hall and Barger (1964) found that the firstborn of two child families demonstrate tendencies toward seriousness, conservatism, and organizing activities as opposed to the gregariousness, confidence and activity orientation of the laterborn of two-child families. This is consistent with Adler's (1927) characterization of firstborn as the guardian of law and order and Bossard and Boll's (1955) report of the firstborn responsible type. It is also consistent with Capra and Dittes' (1962) and Suedfeld's (1964) reports of the overrepresentation of firstborn volunteers for experiments. It is consistent with Wuebben's (1967) report of the honesty of firstborns and MacDonald's (1969a) report of greater responsibility. In short, the thrust of the data is that firstborns are far more likely to exhibit behaviors which please teachers than laterborns. The data of exception are those reports of greater probability of delinquency among firstborns (Sampson, 1965). Where this had been observed, however, it appeared to be the result of the greater socialization of the firstborns in that they had met the perceived standards of behavior of their reference group to a greater extent than did the laterborn.

Although the inference cannot be said to be based on direct

observation, there are sufficient indicators to justify the working hypothesis that firstborns enjoy a better relationship with their teachers than laterborns.

Hypotheses

People tend to do what they want to do, i.e. they choose to engage in classes of behaviors which satisfy their needs or reduce their tensions or meet their expectancies for themselves. If one group of people engages in a class of behaviors to a greater extent than another group, it is appropriate to examine that class of behaviors for factors which differentiate the groups. One such factor which has relevance for the educational class of behaviors is information seeking behavior.

It was hypothesized as follows:

1. Firstborns express greater preference than laterborns for seeking information by consulting with authorities.
2. Firstborns express greater preference than laterborns for reading for information.

These hypotheses were derived from a number of premises. First, firstborns, especially if female, are more likely to seek company of others when under tension. Firstborns tend to be more susceptible to social pressure, have greater need for interpersonal contact and reassurance when under tension and are more conforming.

Firstborns are also more likely to believe an authoritative statement. The latter characteristic is a corollary of the stronger conscience of firstborns. There is evidence that firstborn children have greater verbal facility and there is evidence that they have more

successful relationships with their teachers than do the laterborns although laterborns tend to have more successful peer relationships.

There were two negative assumptions of importance in the development of the hypotheses. First, there are no differences in the general intellectual abilities of the various birth order groups based on global measurements. Secondly, there are no socio-economic factors which can account for the observed overrepresentation of firstborn and only children in the college population.

There were two implicit assumptions which required testing. These were that college matriculation is related to differential preferences for information seeking behavior and that preferences for information seeking behavior are differentially related to academic achievement and aptitude. It was deemed necessary to the argument to test these assumptions as an aspect of the predictive capacity of the instrument which would be used to assess preferences for information seeking behavior. These assumptions were expressed as third and fourth hypotheses which are as follows:

3. Plans to enter college will vary with expressed preferences for information seeking behaviors.
4. Expressed preferences for information seeking behaviors will vary with academic achievement and aptitude.

Chapter 2
VARIABLES, SUBJECTS AND METHOD
Variables

The dependent variables of concern are the expressed preferences for the various types of information seeking behavior. Six types had been identified and will be discussed in more detail in Chapter 3.

They were:

1. Reading for Information
2. Consultation, Personal Contact with Authorities
3. Consultation, Personal Contact with Non-authorities
4. Consultation, Dependence upon Well Defined Statements
5. Thinking for Information
6. Observing for Information

The first two of these, Reading and Personal Contact with Authorities (Consultation with Authorities) were the specific variables which were hypothesized to vary with birth order.

Variables which were considered for control were as follows:

1. Intellectual ability
2. Occupational classification of father
3. Age of parents
4. Education of parents
5. Dispersion of ages of siblings
6. Age of subjects

7. Sex of subjects

Subjects

The total sample consisted of more than 1,000 secondary school students in Clinton County, New York. After incomplete records and a group of junior high school students (N = 92) were eliminated, there were 866 usable records remaining. The birth order characteristics of this sample may be seen in Table 1. Birth order was defined as only child, firstborn of two or more, middle born of three or more and lastborn of two or more. Those subjects whose nearest sibling was more than seven years older were eliminated when the subsamples were drawn and are identified in Table 1.

Note that only 5.1 percent of the master sample were only children. This is at variance with the projected 8.4 percent based upon census reports (U. S. Bureau of the Census, 1968). Furthermore, a disproportionate number of only children surveyed attended a private school for boys. Their number was further reduced by selecting out subjects with one or both parents deceased or where there had been a divorce or permanent separation. The resulting numbers of only children classified by sex and age group were so small that the category of only children was eliminated from the study.

This sample was drawn from five high schools in Clinton County, four of which were in the city of Plattsburgh, New York. They were as follows:

1. Mount Assumption Institute (MAI) is a private school for

males located in Plattsburgh, with both boarding and commuting students. (N Ss = 200)

Table 1

Birth Order Characteristics of the Total Sample

Birth Order	Number	Percent of Total
Only	44	5.1
1st of 2 or more, more than 7 years to next sibling	18	2.1
1st of 2 or more, 7 years or less to next sibling	203	23.4
Middle of 3 or more, more than 7 years to next oldest	22	2.5
Middle of 3 or more, more than 7 years to next youngest	41	4.7
Middle of 3 or more, 7 years or less to next oldest and youngest	326	37.5
Last of 2 or more, more than 7 years to next oldest	57	6.6
Last of 2 or more, 7 years or less to next oldest	133	15.4
Unclassifiable	22	2.7

2. St. John's Academy (SJA) is a parochial school which emphasizes college preparation. It is located in Plattsburgh. (N Ss =276)
3. Our Lady of Victory Academy (OLVA) was a parochial school located in a working class area in Plattsburgh. This secondary school was closed at the end of the 68/69 academic year.

(N Ss = 75)

4. Plattsburgh High School (PHS) is the only public high school located in Plattsburgh. (N Ss = 247)
5. Champlain Central High School (CCHS) is a public high school located in the northern section of the county serving the villages of Champlain and Rouses Point. (N Ss = 68)

There was a disproportionately large number of males in the total sample (56.4 percent). This disproportion was due to the inclusion of the all male private school. About 50 percent of the students from that school came from outside Clinton County. The number of females at SJA (63.4 percent) was greater than males because many Catholic males in the community attended the more prestigious private school. The male/female ratios of the public schools are more difficult to explain as these students were volunteers. At Champlain Central High School, there were more male subjects than female (58 percent vs. 42 percent) because many girls were preparing for a dance on the day data were collected there. The reason for the disproportionate number of females at Plattsburgh High School is not known.

A complete breakdown of birth order, age, sex and post high school plans may be found in Table 19, Appendix II.

Method

The Survey of Information Seeking Behavior (SISB) and the Same-Opposites subtest of the Ohio State Psychological Test, Form 26 were administered to all students who volunteered in the two public high

schools. Two hundred and forty-seven usable records were secured from Plattsburgh High School and sixty-eight usable records were secured from Champlain Central High School. In both public schools, about fifty percent of the potential subjects refused to cooperate. In most cases of refusal the student had planned to use his study hall time for home work and had no other time available to him.

Because of this difficulty the procedure was varied in the Catholic Schools. All the students in these schools took the SISB and filled out the biographical data sheet in their home room periods except at OLVA, where the small student body was surveyed during a special assembly.

Different biographical data sheets were used for the public and Catholic schools (see Appendix I). The original sheet, used with the public school students, was found to be inadequate, as the number of students who stated plans to attend college was quite high and the system of checking categories for grade average failed to produce a discriminating score. Consequently, the data sheet was altered to include seven choices for post high school plans and the student was to write his average grade, which was expressed as a numerical score from 0 to 100. These figures were checked in the case of St. John's Academy students and found to vary little from the average on the permanent record cards. About one-half of the students were more than one point in error and only six were more than five points in error. The St. John's Academy students had also taken several aptitude tests and it was determined the better course would be to use smaller samples with more accurate measurements than a larger sample of rough estimates of

academic aptitude and achievement. The differential outcomes of this change in technique will be discussed in greater detail in Chapter 4.

The Subsamples

Twelve subsamples of twenty subjects each were drawn from the total sample. These subsamples were of the three birth orders of (1) first of two or more with seven years or less to the next youngest, (2) middle of three or more with seven years or less to the next oldest and the next youngest and (3) last of two or more with seven years or less to the next oldest. Each of these groups was then divided by sex and age (15 years and 17 years). In the literature on birth order there are numerous indications of sex by birth order interactions (Sampson, 1968), and it was for that reason that the sex differentiation was made here. Although birth order/age interactions had not been predicted, the nature of the primary instrument used was such that there could have been maturation effects, especially as the interests and attitudes of older high school students tend to be more stable than those of younger students. It was decided that a maturation effect could confound the results, so the age variable was included. Since both age and sex would ordinarily be expected to influence personality-type survey results, they also served as reference variables against which the magnitude of possible birth order effects could be judged.

It appeared that the distribution of Ss across schools was not even. It was especially noteworthy that St. John's Academy was over-represented in four groups. These groups were all female, and three of the four were in the fifteen year age group. The reason for the

disproportionate number of females at St. John's Academy is known, but the reason for the disproportionate number of fifteen year olds is not known. For some reason, twenty-nine percent of the St. John's Academy was fifteen years old, but only twenty percent of the total sample was fifteen years old. It has already been mentioned that St. John's Academy had a higher proportion of females than other schools due to the presence of an all male school in the same city.

It was noted that most of the seventeen year old Ss were in grades 11 and 12 and the fifteen year old Ss tended to be in grades 9 and 10. There were some exceptions to this (15 of 240), however, since, as will be seen later, aptitude, age and grade level have little or no relationship with Survey of Information Seeking Behavior scores, there was no justification for eliminating a subject because he was ahead or behind one or two grades.

It was noted that middleborns had more siblings than the firstborns and laterborns. This is due to the definition of the various birth order groups used in this study. It is possible for firstborns and laterborns to come from families with as few as two children, while the middleborns must come from larger families. Care was taken in the assessment of socio-economic factors because of the bias that could have been introduced by this factor.

It was found that there were no significant differences between the groups for occupation of father (Revised Scale for Rating Occupations, Warner, 1960, p. 141), the working mother/housewife ratio or the education of either parent.

There was little variation in the age dispersion of the siblings of the three birth order groups except that the lastborns were more distant from their nearest sibling than the firstborns and middleborns.

The ages of the parents of the various groups differed significantly. The parents of the firstborns were the youngest and the parents of the lastborns were the oldest. It was initially thought best to control for this, however, it would have reduced the generalizability of the sample, for it is reasonable to expect that the average age of parents of lastborns would be greater than the average age of parents of firstborns and middleborns.

There was no significant variation noted in the stated plans to attend college across the birth orders. About seventy-five percent of each group indicated such plans, as was the case for the total sample. The attempt to reduce the number of persons stating such plans by increasing the options on the biographical data sheet was not particularly successful.

In summary, the total sample was examined and Ss with unusual family circumstances, those who were twins, those aged other than fifteen years and seventeen years and those whose nearest sibling was more than seven years distant were eliminated. Twelve subsamples defined by birth order, age and sex were drawn from the remainder. There were few unanticipated differences between the resulting groups, and those that were found could be explained in terms of the normal contingencies related to birth order, with the one exception of the overrepresentation of students from St. John's Academy in four of the groups.

A more complete statement of the characteristics of the twelve groups may be found in Table 21, Appendix II.

Chapter 3

THE SURVEY OF INFORMATION SEEKING BEHAVIOR

It was necessary to develop a method of measuring preferences for the various types of information seeking behaviors. It was determined that a questionnaire or rating scale approach was more feasible for the generation of initial hypotheses than direct observation of techniques employed by Ss in a problem situation requiring new information for solution. In this latter experimental type situation, it was quite possible that techniques would be employed by Ss that were not actually preferred. In the former, the social desirability of the items could be controlled, in part, by the use of norms.

The first step in the development of the scale was to approach college students and ask how they would prefer to secure information in a problem situation. On the basis of this informal inquiry, four basic classes of behavior were found to account for all responses. They were as follows:

1. Reading
2. Conversation
3. Thinking
4. Observation

Berlyne (1960) referred to information seeking behavior as epistemic behavior, or that behavior which would reduce the epistemic drive. He used three basic classes of epistemic behavior which conform to

traditional Western epistemology as follows (Berlyne, 1960, p. 295):

consultation - ... behavior that exposes an individual to verbal stimuli issuing from other individuals. It will include asking questions, writing letters and reading.

epistemic observation - ... responses which place the subject in contact with external situations that will nourish the pertinent learning process. They include everything from the scandal seeking of the gossip when it is rewarded not so much by the pleasure of witnessing scandalous goings on as by that of being able to recall or recount them afterwards, to the systematic observations and experiments of science.

epistemic thinking - ... 'productive' or 'creative' thinking. It differs from other thinking, which calls up remembered material to guide the handling of current problems, since its function is to put the individual in permanent possession of new knowledge.

Further consideration of these categories led to seven basic categories by the inclusion of a tough minded - tender minded dichotomy as follows:

1. Consultation, Reading
2. Consultation, Personal contact with authority
3. Consultation, Personal contact with non-authority
4. Thinking, Rigorous
5. Thinking, Intuitive
6. Observation, Systematic
7. Observation, Casual

Note that the writer differed with Berlyne by including reading as a separate category. Although reading is a form of consultation, it is impersonal in nature, as opposed to the personal contact of 2 and 3.

The next step in the construction of the research instrument was to ask several hundred students to list the ways they went about securing information. These responses were then divided into the seven categories listed above and ten were selected for each category. Items

were selected on the basis of:

1. general applicability of the technique
2. common usage of terms

Two independent judges were used. There had to be agreement on an item before it was included in a scale. There was no difficulty in placing items into the four main categories of reading, personal consultation, thinking and observation; however, the tough minded - tender minded dichotomy of the categories was quite difficult and there was concern about the reliability of the judgments.

Following this process, items were arranged in random order and mimeographed. An IBM 1230 Document No. 505 answer sheet was used and each of the seventy ways of securing information was to be rated from one (the lowest possible desirability) to five (the highest possible desirability). The scale was administered to several hundred college students. One hundred and eighty completed scales by males and 179 scales by females were combined and factor analyzed. Male/female was included as an item. The seventy-one item matrix was submitted to principal components analysis with unities in the diagonals. Sixteen components had eigenvalues above 1.00 and were rotated to the varimax criterion. Inspection revealed that the scale was over-factored. Theoretically, there should have been eight components, one each for each of the subtests and one for sex. The eigenvalues for the twenty original components may be seen in Table 2. The eigenvalues continue to drop conspicuously through the seventh factor. The ratio of eigenvalue six/eigenvalue seven was in excess of 1.20. Rotations were ordered for eight, seven, six, and five components. Inspection of

the results revealed that the six component rotation provided the best condensation of the observed variance. The six component rotation may be seen in Appendix II, Table 24. The first seven original components may be seen in Appendix II, Table 23. On the seven component rotation, the seventh component contained no loadings as high as .30.

Table 2

**Eigenvalue and Percentage of Trace
of First Twenty Original Components
of the Survey of Information Seeking Behavior**

Component	Eigenvalue	Percentage of Trace	Component	Eigenvalue	Percentage of Trace
1.	14.36	20.2	11.	1.21	1.7
2.	6.55	9.2	12.	1.18	1.7
3.	4.31	6.1	13.	1.09	1.5
4.	2.97	4.2	14.	1.07	1.5
5.	2.51	3.5	15.	1.06	1.5
6.	2.17	3.1	16.	1.01	1.4
7.	1.54	2.2	17.	.97	1.4
8.	1.51	2.1	18.	.96	1.3
9.	1.42	2.0	19.	.91	1.3
10.	1.32	1.9	20.	.88	1.2

The principal components analysis resulted in the following decisions:

1. Surveys could be scored without regard to the sex of the subject, as this variable did not load appreciably on any component.
2. Six subtests were defined as follows:
 1. Consultation, Reading
 2. Consultation, Personal contact with authority
 3. Consultation, Personal contact with non-authority
 4. Consultation, Dependence upon well defined statements
 5. Thinking
 6. Observation

Criteria for the inclusion of an item in the final scales were as follows:

1. Highest loading of variable on component (subtest) to which assigned
2. Loading .4 or higher on the scale
3. Loading less than .4 on any other scale
4. Face validity

Items that loaded on two or more scales were not scored. This was done to reduce the correlation between scales as much as possible and to increase the discriminability of the SISB. Fifty-five of the original seventy items were used for scoring purposes.

The results reported above provided adequate construct validity for the SISB. Of the seven original subtests, three were retained and the last four were reduced to two, however this was in keeping with the basic constructs discussed by Berlyne (1960) and the observations of

the writer. It is noteworthy that the Thinking and Observation subscales provided the greatest difficulty while being dichotomized into tough minded/tender minded. The Dependence upon Well Defined Statements subscale had not been predicted; however, it did seem to be a valid construct and was retained as a subtest for heuristic purposes.

The scale was designed in such a way that it could be read by an optical scanner for key punching and then scored by computer. The sample of 359 was used as a norm group. The scales were scored by summing the ratings of each of the items included in the scale for each individual. The raw means and standard deviations of each of the scales for the norm group were then used for establishing standard scores with a mean of 50 and a standard deviation of 10. This was done to permit the comparison of scores within Ss as well as between Ss.

The scoring program that was written included coefficient alpha. For each group of Surveys that was scored a coefficient alpha was automatically computed. The coefficient alpha for the normative group and other groups may be seen in Table 3.

Test-retest coefficients for the revised scale are at least satisfactory. A group of fifty college students took the Survey three weeks apart. The results by subtest may be seen in Table 4.

In summary, the face, content and construct validities of the Survey of Information Seeking Behavior are satisfactory. The internal consistency and stability of the scale are also satisfactory. As a research instrument, the SISB is adequate.

Table 3

Alpha Coefficients, Survey of Information Seeking Behavior

	N	Read	Autho- rity	Non- autho- rity	Depen- dence	Think	Observe
Norm group (college)	359	.872	.879	.853	.681	.875	.815
Champlain Junior High	92	.821	.854	.860	.735	.851	.793
St. John's Grades 11 & 12	125	.791	.779	.794	.602	.881	.778
St. John's Grades 9 & 10	128	.800	.810	.818	.600	.869	.816
Plattsburgh H.S.	276	.825	.844	.822	.624	.838	.764
Our Lady of Victory	75	.777	.769	.855	.525	.835	.734

Table 4

Stability Coefficients (Test / 3 weeks / Retest)

N	Reading	Authority	Non-authority	Dependence	Think	Observe
50	.786	.627	.694	.681	.663	.815

Chapter 4

RESULTS

The first procedure in the analysis of the results was to compute the mean scores for each of the ordinal position/age/sex groups for each item of the SISB. An inverse principal components analysis was accomplished with mean item scores as subjects and groups as variables. The groups used were divisions of the master sample rather than the twelve subsamples defined in Chapter 2, although the same selection procedures were used, except that three groups of only children were available and were included for heuristic purposes. The characteristics of the groups may be seen in Table 5. It should be noted that groups of only children were selected on the basis of availability only, rather than meeting any other criterion except sex.

The purpose of the inverse principal components analysis was to carefully explore the data before submitting them to analysis of variance. Furthermore, using inverse factor analysis techniques, an overall measure of the substantive significance of the results can be made that is superior to the use of eta in several different analyses of variance.

The results of the inverse principal components analysis may be seen in Table 6. Note that no clear patterns emerge. Component I appeared to be a sex effect and there was a possible birth order effect which may be seen in Component II. It would appear that some

interactions were present. These could be more clearly demonstrated using an analysis of variance design.

Table 5
Characteristics of the Groups Used as Variables
in the Inverse Principal Components Analysis

Group No.	Birth Order	Sex	Age	N Ss
1	First	Female	15	22
2	First	Male	15	21
3	First	Female	17	25
4	First	Male	17	33
5	Mid	Female	15	30
6	Mid	Male	15	34
7	Mid	Female	17	45
8	Mid	Male	17	45
9	Last	Female	15	20
10	Last	Male	15	23
11	Last	Female	17	27
12	Last	Male	17	30
13	Only	Male	16	12
14	Only	Male	17	12
15	Only	Female	15 & 17	12

Table 6

Varimax Rotation of Three Components of Birth Order/Age/Sex Groups

Group	I	Factor II	III
1. 1st 15 F	23	44	70
2. 1st 15 M	32	81	11
3. 1st 17 F	19	77	24
4. 1st 17 M	68	06	49
5. Mid 15 F	20	62	55
6. Mid 15 M	70	31	41
7. Mid 17 F	37	37	75
8. Mid 17 M	51	30	67
9. Last 15 F	44	39	67
10. Last 15 M	55	46	33
11. Last 17 F	31	42	72
12. Last 17 M	73	21	48
13. Only 16 M	71	22	18
14. Only 17 M	22	00	75
15. Only all F	75	19	15

Table 7

Standard Score Means (Standard Deviations) of the Twelve Subsamples

Group (N=20)	Subscales					
	1. Read	2. Authority	3. Non-Auth.	4. Depend.	5. Think	6. Observe
1. 1st 17 M	49.37 (9.76)	46.69(11.93)	45.36(13.11)	48.29 (9.54)	50.06(11.46)	52.35 (9.53)
2. 1st 15 M	55.05 (7.67)	51.87(10.04)	46.84(10.40)	51.36 (6.90)	46.50 (9.33)	51.22 (8.08)
3. 1st 17 F	53.55 (9.196)	46.01 (9.66)	43.41(16.18)	51.09(10.37)	43.68(14.64)	47.04(11.35)
4. 1st 15 F	55.89 (8.24)	52.62(11.33)	51.28(12.03)	50.82 (8.54)	50.84(10.74)	49.32(11.92)
5. Mid 17 M	46.36(10.32)	43.92(11.45)	44.46 (9.77)	43.69 (8.41)	41.63 (1.16)	45.72(10.91)
6. Mid 15 M	48.40 (8.91)	46.27(10.31)	41.02(10.31)	47.75 (9.71)	45.75(11.34)	50.38(10.06)
7. Mid 17 F	47.87(10.41)	48.80(11.88)	51.07(13.16)	50.29(11.37)	49.73(13.07)	47.64(10.26)
8. Mid 15 F	50.07(10.15)	52.94(11.43)	46.78(15.69)	48.69(12.32)	43.97(10.13)	48.63(10.07)
9. Last 17 M	50.88 (9.58)	48.71 (9.31)	44.67 (8.83)	52.56 (9.89)	51.55 (9.76)	53.13 (9.51)
10. Last 15 M	49.70 (8.15)	49.69 (9.177)	45.56(10.29)	49.76 (9.91)	46.45 (9.89)	48.94 (9.24)
11. Last 17 F	50.56 (9.194)	48.96 (9.60)	53.75 (9.14)	50.15(11.32)	48.85 (9.38)	48.78(10.34)
12. Last 15 F	49.04(11.14)	46.45(11.81)	46.82(12.64)	44.42(10.42)	48.37(11.49)	50.52 (9.93)

The results of the twelve subsamples are summarized in Table 7. The groups are labelled by birth order (1st, Mid., Last), age (17, 15) and sex (M, F). The analysis of variance design clearly called for by these results is a between/within design of the three birth orders by two ages by two sexes across six subscales. However, examination of the variances seemed to indicate that there was some systematic variation. The F Max ratio was 5.51, which was satisfactory for the degrees of freedom available though it appeared to be large. To test for systematic variation, the observed variances were cast into a rank order table and submitted to Friedman Two Way Analysis of Variance (Siegel, 1956). The results may be seen in Table 8 and clearly support the observation of systematic variation. Although the F Test is rather insensitive to random variation of the size of the variances, such variation does reduce the power of the test (Winer, 1962). Ordinarily, the variation can be reduced by utilizing a scale transformation. That procedure is not justified, however, when the variation of the size of the variances is systematic. For this reason it was decided to deal with each subscale individually, especially since the main hypotheses dealt with only two of the subscales, Reading and Consultation with Authorities. The summaries of the analyses of variance which constitute the major results of the study may be seen in Tables 9 and 10. The overall analysis of variance was done and may be seen in Appendix II, Table 27.

The results seen in tables 9 and 10 are of greatest interest in this study. In both cases it had been hypothesized that there would be a birth order effect. The effect was present in the case of preference

for reading to get information. Firstborns clearly preferred reading in comparison with the middle and last born. The comparison of the birth order group means may be seen in Table 11. This effect did not occur in the case of preference for consultation with authorities. The younger group (15 year olds) expressed a greater preference for consultation with authorities than the older group. There was a slight trend for firstborn females to exhibit a preference for consultation with authorities.

The results for the remaining subscales were submitted to the same type of analysis and may be seen in Apendix II, Tables 28, 29, 30 and 31. Females were notably higher than males on the consultation with Non-authorities subscale. No other significant effects were noted except for a birth order/age/sex interaction on the Observation subscale.

The predictive capacity of the SISB was tested. The hypotheses were (a) plans to enter college will vary with information seeking preferences and (b) expressed preferences will vary with academic achievement and aptitude.

The Ss from Plattsburgh High School were used for the initial test of these hypotheses. The SISB subscales, age, grade, sex, average grade, aptitude score (Same-Opposites Test) and plans to enter college were intercorrelated. Sex was coded: Male = 1; female = 0. Plans to enter college were coded: Yes = 1; no = 0. Average grade and aptitude scores were coded on a five interval scale. The intercorrelations may be seen in Table 12.

Table 8

Friedman Two Way ANOVA by Ranks of the Variances of the
Twelve Subsamples across Six Subscales*

Group	Ranks of Subscale Variances					
	Read	Authority	Non-authority	Dependence	Think	Observe
1	4	2	1	5	3	6
2	5	2	1	6	3	4
3	5	6	1	4	2	3
4	6	3	1	5	4	2
5	3	1	4	6	5	2
6	6	3	2	5	1	4
7	5	3	1	4	2	6
8	4	3	1	2	5	6
9	3	5	6	1	2	4
10	6	4	1	2	3	5
11	3	4	6	1	5	2
12	4	2	1	5	3	6

* chi square = 12.19, 5 df, p. 05.

Table 9

Analysis of Variance SISB Subscale Reading

Source	Sum of Squares	df	Mean Square	F ratio	p
Birth order (A)	1150.61	2	575.30	6.20	.005
Age (B)	254.49	1	151.77	1.66	ns
Sex (C)	87.30	1	87.30	—	ns
A X B	202.93	2	101.87	1.11	ns
A X C	94.62	2	47.31	—	ns
B X C	20.66	1	20.66	—	ns
A X B X C	25.74	2	12.87	—	ns
Within (error)	20890.70	228	91.62		

Table 10

Analysis of Variance SISB Subscale Consultation with Authorities

Source	Sum of Squares	df	Mean Square	F ratio	p
Birth order (A)	71.15	2	35.58	—	ns
Age (B)	466.75	1	466.75	4.03	.05
Sex (C)	123.82	1	123.82	1.07	ns
A X B	449.57	2	228.79	1.98	ns
A X C	586.88	2	293.44	2.54	.10
B X C	0.16	1	0.16	—	ns
A X B X C	87.03	2	43.51	—	ns
Within (error)	26371.00	228	115.66		

Table 11

Duncan Multiple Range Test for Means SISB Subscale Reading by Birth Order

		Last	Middle	Shortest Significant* Range
	Means	50.05	48.18	
First	53.47	3.42*	5.29*	3.01
Last	50.05		1.87	3.17

*p = .05

Table 12

**Intercorrelations* of Plattsburgh High School SISB Scores
and Other Characteristics (N = 247)**

	B	C	D	E	F	1	2	3	4	5	6
A. Age	-123	757	060	079	113	029	-012	044	203	117	080
B. Sex	--	061	021	-056	024	126	027	-128	068	093	043
C. Grade		--	049	-036	251	-019	-058	-019	096	027	051
D. Plans			--	134	216	-023	-015	-049	-103	046	-038
E. Grade Point Average				--	447	061	091	092	-090	085	043
F. Aptitude					--	019	039	-029	-116	149	127
1. Read						--	209	163	511	139	373
2. Authority							--	324	223	209	366
3. Non-authority								--	183	500	235
4. Dependence									--	179	349
5. Think										--	487
6. Observe											--

* Decimal points omitted.

These results were such that further analysis was not warranted.

This decision was based upon the following findings:

1. Most PHS Ss indicated plans to attend college. This particular item did not seem to discriminate. It correlated with the aptitude score .216 which was the only significant correlation for that score.

2. The correlation of the average grade (gpa) and aptitude score was .447 which seemed spuriously low. It was decided that the five interval scales used for coding gpa and aptitude scores resulted in considerable loss of discriminative power.

Data collection procedures were changed after these results had been obtained, as was discussed in Chapter 2, i.e. the Same-Opposites Test was eliminated and a more discriminating biographical data sheet was introduced.

St. John's Academy grades 9 and 10 had available a composite score from the Science Research Associates Achievement Test and a total IQ score from the California Test of Mental Maturity. The reported grade averages (gpa) were checked for accuracy and these three measures of academic performance were each coded on a 10 interval scale. In addition, age and sex were included and coded as was done with the Plattsburgh High School sample. The resulting 11 variable correlation matrix may be seen in Table 13. This matrix was submitted to factor analysis using the centroid method and three factors were rotated to the varimax criterion. The centroid method was used because using the principal components technique with unities in the diagonal tends to increase the probability of securing large loadings from small correlation coefficients. The centroid program employed called for the largest correlation in each row to be placed in the diagonal. The original factors and rotation may be seen in Tables 14 and 15.

It appeared that the Reading subscale headed a factor and that the grade point average correlated significantly with it in partial support of the hypothesis that preference for reading and consultation

with authority would correlate with academic achievement.

Table 13

Intercorrelations* of St. John's Academy Grades 9 and 10
SISB Scores and Other Characteristics (N=132)

	B	C	D	E	1	2	3	4	5	6
A. Age	068	092	-131	-077	-063	019	-052	-065	-112	-022
B. Sex	--	-137	-119	-060	-217	-069	-178	-019	026	006
C. Achievement Test		684	708	-064	-036	133	-053	249	034	
D. Grade Point Average--			566	057	074	019	-040	069	075	
E. IQ Score			--	-108	-139	-087	-236	110	-064	
1. Read				--	275	001	431	026	463	
2. Authority					--	367	332	175	318	
3. Non-Authority						--	298	487	172	
4. Dependence							--	320	363	
5. Think								--	513	
6. Observe									--	

* Decimal points omitted.

A replication was done with the St. John's Juniors and Seniors. The only change in the variables was the substitution of the Preliminary Scholastic Aptitude Test (Verbal and Quantitative scores combined) for the total IQ of the California Test of Mental Maturity. The correlation matrix, original centroid loadings and rotated loadings may be seen in

Tables 16, 17, and 18.

Table 14

Centroid Factor Matrix of St. John's Academy Grades 9 and 10

Variable	Factors*			
	I	II	III	h_2
A. Age	-230	082	084	066
B. Sex	-174	082	-045	039
C. Achievement Tests	552	-653	106	742
D. Grade Point Average	533	-571	-391	763
E. IQ	349	-687	-121	608
1. Read	398	265	-592	579
2. Authority	390	379	069	301
3. Non-Authority	461	256	489	517
4. Dependence	422	516	061	448
5. Think	557	248	395	528
6. Observe	511	464	118	490

* Decimal points omitted.

Table 15

Varimax Rotation of Centroid Factors
of St. John's Academy Grades 9 and 10

Variable	Factors*			
	I	II	III	h_2
A. Age	-068	219	119	066
B. Sex	-092	175	-012	039
C. Achievement Test	050	-848	143	742
D. Grade Point Average	-151	-800	-317	763
E. IQ	-213	-750	021	608
1. Read	139	-098	-742	580
2. Authority	511	027	-197	301
3. Non-Authority	687	-091	193	517
4. Dependence	607	107	-262	448
5. Think	703	-166	082	528
6. Observe	664	012	-223	490

* Decimal points omitted.

Table 16

Intercorrelations* of St. John's Academy Grades 11 and 12

SISB Scores and Other Characteristics (N=102)

	B	C	D	E	1	2	3	4	5	6
A. Age	005	-291	-260	-314	102	030	-044	022	-203	-103
B. Sex	--	-023	-108	-025	024	035	-257	065	-097	050
C. Achievement Test			796	898	-103	-005	151	-138	231	-013
D. Grade Point Average			--	768	-141	-029	102	-112	136	-038
E. PSAT				--	-154	022	059	-163	217	-005
1. Read					--	270	120	353	014	326
2. Authority						--	424	417	184	333
3. Non-Authority							--	344	381	235
4. Dependence								--	137	363
5. Think									--	557
6. Observe										--

* Decimal points omitted.

Table 17

Centroid Factor Matrix of St. John's Academy Grades 11 and 12

Variable	Factors*			
	I	II	III	h_2
A. Age	-364	041	183	168
B. Sex	-120	-154	-179	070
C. Achievement Test	637	-657	-042	839
D. Grade Point Average	557	-642	112	735
E. PSAT	606	-677	-106	837
1. Read	192	409	130	222
2. Authority	416	443	181	402
3. Non-Authority	535	278	299	452
4. Dependence	322	540	194	433
5. Think	571	176	-389	508
6. Observe	499	489	-371	625

* Decimal points omitted.

Table 18
 Varimax Rotation of Centroid Factors
 of St. John's Academy Grades 11 and 12

Variable	Factors*			
	I	II	III	h_2
A. Age	-364	041	183	168
B. Sex	-120	-154	-179	070
C. Achievement Test	911	-028	-016	839
D. Grade Point Average	846	001	141	735
E. PSAT	909	-091	-056	837
1. Read	-154	437	-084	221
2. Authority	-020	622	-121	402
3. Non-Authority	180	648	002	452
4. Dependence	-154	630	-112	433
5. Think	288	290	-584	508
6. Observe	016	447	-652	625

* Decimal points omitted.

It is clear that the replication with the Junior and Senior Ss failed to support the results obtained with the Freshmen and Sophomores. Especially in view of the observed correlations, these results offer no support of the hypothesis that expressed preferences for information seeking behaviors can be related to academic achievement or aptitude measures.

To test the hypothesis that preferences vary with post high school plans, the subjects from the Catholic schools, all of whom had used the revised biographical data sheet, were separated by sex and by expressed post high school plans. As was indicated in Chapter 2, the majority of students stated plans to enter college. Thus the numbers planning to enter other types of school or pursue other immediate goals were limited. Where 20 or more students (with one exception) marked a category, the mean scores of the groups were calculated. These scores may be seen in Tables 19 and 20. These means were cast into Friedman Two Way Analysis of Variance Tables. In the case of both males and females, the SISB discriminated between the groups. Those planning to enter college received the higher SISB scores. The responses to the subscales also varied reliably. Reading and Dependence upon Well Defined Statements received the strongest response. Females responded positively to Consultation with Non-authorities. The subscales of greatest interest, Reading and Consultation with Authorities, were examined individually. The means of those planning to enter college were compared with those expressing other plans using the Kruskal-Wallis one way analysis of variance. The results were $H = .164$, degrees of freedom = 1, $p = .70$ for the Reading subscale and $H = 2.08$, degrees of freedom = 1, $p = .20$ for the Consultation with Authorities subscale. There is no apparent interaction of the subscales by expressed plans. Consequently, these data offer little support for the hypothesis that the SISB subscales will discriminate between those planning to attend college and those not planning to do so. However, these data do indicate a promising line of future research.

Table 19

SISB Mean Scores by Expressed Post High School Plans of Males

Post High School Plans	N	Read	Auth.	Non- Auth.	Depend.	Think	Observe
1. 4 year College	213	51.79	48.87	46.19	51.00	49.87	51.03
2. 2 year College	47	50.14	47.69	50.36	52.42	48.78	51.98
3. Enter Armed Forces	21	49.89	43.84	42.91	51.92	45.96	49.95
4. I don't know	36	51.20	46.15	43.97	50.64	47.08	48.77

Friedman Two Way ANOVA across subscales, chi square = 14.71, 5df, $p < .02$

Friedman Two Way ANOVA across groups, chi square = 10.2, 3df, $p < .02$

Table 20

SISB Mean Scores by Expressed Post High School Plans of Females

Post High School Plans	N	Read	Auth.	Non- Auth.	Depend.	Think	Observe
1. 4 year College	111	53.44	51.72	52.71	50.91	50.17	50.11
2. 2 year College	27	50.70	49.31	51.77	50.45	50.31	49.41
3. Business or Trade School	30	54.87	46.82	48.36	50.73	45.17	49.87
4. Other type school	15	51.74	51.97	47.08	53.31	44.46	45.29
5. I don't know	20	49.86	44.32	42.82	47.49	44.79	46.11

Friedman Two Way ANOVA across subscales, chi square = 11.51, 5df, $p < .05$

Friedman Two Way ANOVA across groups, chi square = 11.33, 4df, $p < .05$

Chapter 5

SUMMARY AND CONCLUSIONS

The research literature on birth order is long and, for the most part, contradictory. There are, however, two consistent and inter-related findings:

1. Firstborns are overrepresented among those entering college and those pursuing advanced work.
2. Firstborns are overrepresented among the eminent and among successful scientists.

These findings are interrelated in that the second group would tend to be selected from the first group. Thus, it was decided that initial research efforts should be directed toward the birth order/college matriculation phenomenon.

No satisfactory explanation for the overrepresentation of firstborns in the college population has yet been offered. It is apparent that it is a developmental phenomenon but it is necessary to determine the correlatives of birth order in relation to college matriculation before attempting to define the developmental antecedents.

It was hypothesized that firstborns (1) express greater preference for reading for information and (2) have greater preference for consultation with authorities when in need of information than laterborns. It was also thought that (3) the plans of students to enter college would be related to preferences for information seeking

behaviors and (4) that preferences for information seeking behaviors would be differentially related to academic achievement and aptitude.

The hypotheses were derived from the general premise that people tend to do those things they want to do and that firstborns would want to do those things which were required in college. The literature concerning birth order does not relate directly to this point, however, there is a number of corrolaries as follows:

1. Firstborns are more likely to seek the company of others when under tension.
2. Firstborns are more susceptible to social pressure when the behavior to be performed is not contrary to their self concept.
3. Firstborns are more dependent and conforming under some conditions than laterborns.
4. Firstborns are more likely to believe an authoritative statement.
5. Firstborns have stronger consciences than laterborns.
6. Firstborns have greater verbal facility but not greater intelligence than laterborns.
7. Firstborns tend to engage in behaviors which would be pleasing to teachers to a greater extent than laterborns.

The hypotheses were tested by administering the Survey of Information Seeking Behavior (SISB) to a large number of high school students. The SISB was constructed especially for this purpose. It was designed to measure preferences for information seeking behaviors in the following categories:

1. Reading

2. Consultation with Authorities
3. Consultation with Non-authorities
4. Dependence upon Well Defined Statements
5. Thinking
6. Observation

The SISB subscales were then correlated with the birth order groups of (a) firstborn, (b) middleborn and (c) last born. The subscales were also correlated with the expressed post high school plans, grade point averages and academic aptitude scores of the subjects.

Summary of the Findings

1. Firstborns achieved higher scores than both groups of laterborns on the Reading subscale.
2. No differences were found between the birth order groups on the Consultation with Authorities subscale.
3. No reliable relationship was demonstrated between scores on the Reading and Consultation with Authorities subscales and measures of academic aptitude and achievement.
4. Students planning to attend college exhibited stronger preferences for information seeking behaviors in all categories than those who did not plan to attend.
5. No relationship was found between subtest differential and post high school plans.
6. Fifteen year old high school students had higher scores on the Consultation with Authorities subscale than 17 year old students.
7. Females had higher scores on the Consultation with Non-authorities

subscale than males.

8. There was a trend for younger firstborns to prefer consultation with Non-authorities.

9. A birth order/age interaction was noted on the Consultation with Non-authorities subscale. There was a trend for firstborn fifteen year olds to have high scores on this subscale.

Conclusions

Firstborns prefer to read for information more than other birth order groups. This was the only hypothesis which was clearly supported. As it has not been conclusively demonstrated that the Reading subscale score is related to plans to attend college, academic aptitude or academic achievement, there is no justification for a conclusion that preference for reading to secure information is a source of variance in the birth order/college matriculation phenomenon. On the other hand, there would be far less justification for assuming it is not. Certainly the finding reported is consistent with the notion that the more intense early relationship with the mother is conducive to the development of verbal skills and if one accepts the premise that people like best those things they do best, the greater preference for reading could be explained easily.

The maturation effect on the Consultation with Authorities subscale is interesting. It would appear that older high school students are less concerned with the use of the authority figure as a source of information. It may be that the instrument used would be more discriminating with a younger population which was more interested in the use

of authorities as sources of information. It could well be that the Consultation with Authorities subscale discriminates rather poorly in the population sampled.

The conclusion that females prefer Consultation with Non-authorities more than males should come as a surprise to no one since this scale has a number of items relating to peer contact. Perhaps all that can be said is that this is an indication that the SISB is sensitive to some behavioral variance.

The finding that those planning to enter college have higher SISB scores across all categories is interesting and would indicate that students do attend college to learn something, or at least they plan while in high school to attend college because they want information. Considering the large percentage of students who indicated college matriculation plans and the high probability that many were making socially acceptable responses rather than reflecting their true interests, this result gives additional support to the notion that the SISB is sensitive to some behavioral variance. It also supports Bradley's (1968) suggestion regarding an appropriate area of research, i.e. that firstborns may be more prone to engage in information seeking behavior in general.

That there are individual differences for type of information seeking behavior is perhaps the most important point. Inasmuch as people usually do what they want to do anyway, an educational system which does not provide for these individual differences must necessarily fail to educate all of its clients equally. Perhaps it would be more appropriate in some cases to think in terms of information seeking behaviors as a

source of differential in classroom performance rather than just motivation in general terms.

Implications for Future Research

It was suggested in the first chapter that what was needed before research was undertaken into the developmental antecedents of college matriculation was some direction. These results suggest that research concerning preferences for reading would be quite appropriate. However, it is suggested that the Bing (1963) model would be worthwhile using as independent variables reading preference and reading skill. Data collected on birth order should reveal a larger number of firstborns in a group with normal reading skills and high preference for reading for information as compared with an equally intelligent group with normal reading skills and low preference for reading for information. The work of Bing is suggested as a model due to the interesting results she obtained using differential scores within subjects after having equated groups for total ability.

The SISB is in need of considerable refinement. Although it is only seventy items in length, subjects complain that it is boring. As the basic constructs have been established, the development of a more discriminating scale should not be especially difficult. Perhaps the interest level could be increased by using a situation type item, i.e. a description of a situation requiring information for which the subject would have to choose an information gathering procedure from several alternatives.

The present SISB should be used with a large number of junior high

school students and tested for reliability and validity. It is suspected that the scale might prove to be quite discriminating with that group with only a few item modifications. The scale would have to be refactored and, as a matter of good procedure, it should be factor analyzed again before it is re-used with high school students.

Another interesting use for this scale is as an indirect measure of adolescent rejection of adult leadership. If the test were to be further developed and refined, the Consultation with Authorities subscale might prove to be quite valuable.

APPENDIX I

Figure 1

Original Biographical Data Sheet

NOTE: Your cooperation is needed, but if you do not feel comfortable answering these questions, you need not do so.

DO NOT WRITE YOUR NAME

Age _____ Birth _____ Sex _____
Mo. Day Year

School _____ **Grade** _____

Ages of Your Brothers _____
(Include deceased and half brothers--start with oldest)

Ages of Your Sisters _____
(Include deceased and half sisters--start with oldest)

Father's Occupation _____ **Age** _____
(Be specific as to type of work, not place of work; e.g.,
carpenter, H.S. teacher)

Mother's Occupation _____ Age _____
(Be specific as to type of work, not place of work; e.g.,
housewife, secretary)

Do you plan to attend college? _____ If you attend college, what will your major be? _____

What are your occupational goals? _____

What do you think your job may be when you are 40 years old? _____

Check the category closest to your average high school grade:

65 to 71 _____ 72 to 78 _____ 79 to 85 _____ 86 to 92 _____

93 to 100 _____

Did your father attend college? _____ Graduate? _____

Did your mother attend college? _____ Graduate? _____

Figure 2

Revised Biographical Data Sheet

Name _____
last first middle

Age _____ Birthdate _____ Sex _____
month/day/year

School _____ Grade _____

Ages of your brothers _____
(Include deceased and half brothers--start with oldest)

Ages of your sisters _____
(Include deceased and half sisters--start with oldest)

Father's
Occupation _____ Age _____
(Be specific as to type of occupation, not place of work;
e.g., carpenter, teacher)

Mother's
Occupation _____ Age _____
(Be specific as to type of occupation, not place of work;
e.g., secretary, housewife)

After high school, what do you plan to do? (Check one of the choices below)

1. Attend a four year college _____
2. Attend a two year college _____
3. Attend a business or trades school _____
4. Attend some other type of school _____
5. Join the Armed Forces _____ (name of school)
6. Go to work without any further training except on the job _____
7. I have no idea _____

If you attend college, what will your major be? _____

What job do you want to have? (Assuming you could have any job you want) _____

What do you think your job may be when you are forty years old? _____

What is your average grade in high school to date? _____

Did your father attend college? _____ Did he graduate from college? _____
Did your mother attend college? _____ Did she graduate from college? _____
Did your father graduate from high school? _____
Did your mother graduate from high school? _____

Figure 3

SURVEY OF INFORMATION SEEKING BEHAVIOR

This survey consists of seventy (70) behaviors or ways people get information or find out about things. All of these ways of getting information are good, but every person does not like to do each of them the same. You are to rate how much you like to behave in each of these ways when you want to get information. Try not to be influenced by how much you think that other people want you to behave in certain ways. Your own preferences for information seeking behavior are what are important.

Mark your answers on the separate answer sheet. Each of the behaviors is to be rated individually. The rating scale is from 1 (the lowest possible desirability to you) to 5 (the highest possible desirability to you). The mid-point is 3 (neutral desirability).

Read each behavior and rate it before reading the next behavior. Be sure that the number of the behavior agrees with the number on the answer sheet.

Work as fast as you can with comfort. Remember, 1 is the lowest possible rating you can give one of these ways to get information and 5 is the highest possible rating you can give one of them. Some of the behaviors will be very desirable to you; some of them will not be at all desirable to you and others will be in between.

If you have a question about how to use the answer sheet, ask your teacher or proctor to help you with it.

MAKE NO MARKS ON THE SURVEY BOOKLET.

- To get information I like to (1) be deductive in my approach.
- To get information I like to (2) be observant.
- To get information I like to (3) seek expert advice.
- To get information I like to (4) take measurements.
- To get information I like to (5) ask for information.
- To get information I like to (6) have discussions.
- To get information I like to (7) listen to directions.
- To get information I like to (8) think about things.
- To get information I like to (9) communicate with scholars.
- To get information I like to (10) attend to the business at hand.
- To get information I like to (11) get ideas from experience.
- To get information I like to (12) find differences between things.
- To get information I like to (13) check the journals.
- To get information I like to (14) appeal to experts.
- To get information I like to (15) review a chapter.
- To get information I like to (16) become personally involved.
- To get information I like to (17) correspond with friends.
- To get information I like to (18) depend upon inspiration.
- To get information I like to (19) consult texts.
- To get information I like to (20) scrutinize evidence.
- To get information I like to (21) engage in research.
- To get information I like to (22) confer with others.
- To get information I like to (23) use logic.
- To get information I like to (24) interview those who know.
- To get information I like to (25) travel the globe.
- To get information I like to (26) make judgments based on known

principles.

- To get information I like to (27) talk about things.
- To get information I like to (28) infer answers from my experience.
- To get information I like to (29) play with ideas.
- To get information I like to (30) learn from associates.
- To get information I like to (31) use reference books.
- To get information I like to (32) contemplate possible solutions.
- To get information I like to (33) get instructions.
- To get information I like to (34) make tests of ideas.
- To get information I like to (35) determine by reflection.
- To get information I like to (36) be creative.
- To get information I like to (37) discover by trial and error.
- To get information I like to (38) give it some thought.
- To get information I like to (39) search the literature.
- To get information I like to (40) take note of things.
- To get information I like to (41) perform experiments.
- To get information I like to (42) test for accuracy.
- To get information I like to (43) go to libraries.
- To get information I like to (44) chat with acquaintances.
- To get information I like to (45) dope things out.
- To get information I like to (46) theorize answers.
- To get information I like to (47) examine in person.
- To get information I like to (48) read books.
- To get information I like to (49) refer to encyclopedias.
- To get information I like to (50) record data.
- To get information I like to (51) put questions to skilled people.

- To get information I like to (52) use inductive reasoning.
- To get information I like to (53) listen to conversations.
- To get information I like to (54) think of what could happen.
- To get information I like to (55) devise answers.
- To get information I like to (56) inquire of authority.
- To get information I like to (57) look in magazines.
- To get information I like to (58) learn from the experience of others.
- To get information I like to (59) consider the alternatives.
- To get information I like to (60) discuss ideas with specialists.
- To get information I like to (61) talk to people.
- To get information I like to (62) be free with imagination.
- To get information I like to (63) make investigations.
- To get information I like to (64) determine results.
- To get information I like to (65) use programmed instruction.
- To get information I like to (66) weigh all possibilities.
- To get information I like to (67) try things.
- To get information I like to (68) be intuitive.
- To get information I like to (69) look around.
- To get information I like to (70) exchange ideas.

APPENDIX II

Table 21

Birth Order, Age, Sex and Post High School Plans of the Master Sample by School

A. Birth Order	Mount Assumption (N=200)	St. John's (N=276)	O.L.V.A. (N=75)	P.H.S. (N=247)	C.C.H.S. (N=68)	Total (N=866)
	% (n)	% (n)	% (n)	% (n)	% (n)	% (n)
0. Only	7.5 (15)	3.6 (10)	0.0 (0)	5.7 (14)	7.4 (5)	5.1 (44)
1. First of two or more, >7 yrs. to next sibling	1.0 (2)	2.5 (7)	1.3 (1)	2.8 (7)	1.5 (1)	2.1 (18)
2. First of two or more, ≤7 yrs. to next sibling	22.0 (44)	26.1 (72)	24.0 (18)	21.1 (52)	25.0 (17)	23.4(203)
3. Middle of three or more, >7 yrs. to next oldest	2.5 (5)	2.5 (7)	2.7 (2)	2.4 (6)	2.9 (2)	2.5 (22)
4. Middle of three or more, >7 yrs. to next youngest	5.0 (10)	4.3 (12)	4.0 (3)	6.1 (15)	1.5 (1)	4.7 (41)
5. Middle of three or more, ≤7 yrs. to next oldest and youngest	33.5 (67)	39.5(109)	49.3 (37)	34.4 (85)	41.2 (28)	37.5(326)
6. Last of two or more, >7 yrs. to next oldest	8.0 (16)	5.8 (16)	4.0 (3)	7.7 (19)	4.4 (3)	6.6 (57)
7. Last of two or more, ≤7 yrs. to next oldest	18.0 (36)	12.7 (35)	13.3 (10)	16.6 (41)	16.2 (11)	15.4(133)
Unclassifiable	2.5 (5)	2.9 (8)	1.3 (1)	3.2 (8)	0.0 (0)	2.7 (22)

Table 21 (continued)

	Mount Assumption (N=200)	St. John's (N=276)	O.L.V.A. (N=75)	P.H.S. (N=247)	C.C.H.S. (N=68)	Total (N=866)
	% (n)	% (n)	% (n)	% (n)	% (n)	% (n)
B. Age						
13	0.0 (0)	0.4 (1)	0.0 (0)	0.0 (0)	0.0 (0)	0.1 (1)
14	13.0 (26)	12.0 (33)	12.0 (9)	0.0 (0)	0.0 (0)	7.9 (68)
15	19.5 (39)	29.0 (80)	17.3 (13)	13.0 (32)	17.6 (12)	20.3 (176)
16	32.5 (65)	22.5 (62)	26.7 (20)	32.0 (79)	29.4 (20)	28.4 (246)
17	22.5 (45)	25.0 (69)	21.3 (16)	36.8 (91)	38.2 (26)	28.5 (247)
18	9.0 (18)	9.8 (27)	18.7 (14)	15.4 (38)	11.8 (8)	12.1 (105)
19	3.5 (7)	1.4 (4)	4.0 (3)	2.0 (5)	3.0 (2)	2.4 (21)
20	0.0 (0)	0.0 (0)	0.0 (0)	1.2 (3)	0.0 (0)	0.3 (3)
C. Sex						
Male	100.0 (200)	36.6 (101)	48.0 (36)	44.5 (110)	58.8 (40)	56.4 (487)
Female	0.0 (0)	63.4 (175)	52.0 (39)	55.5 (137)	41.2 (28)	43.6 (379)

Table 21 (continued)

	Mount Assumption (N=200)	St. John's (N=276)	O.L.V.A. (N=75)	P.H.S. (N=247)	C.C.H.S. (N=68)	Total (N=866)
	% (n)	% (n)	% (n)	% (n)	% (n)	% (n)
D. Post High School Plans						
Four year College	70.0(140)	59.1(163)	25.3 (19)	-----	-----	58.6(322)
Two year College	13.0 (26)	12.7 (35)	18.7 (14)	-----	-----	13.4 (75)
Business or Trade School	1.0 (2)	10.5 (29)	9.3 (7)	-----	-----	6.9 (38)
Other School	3.0 (6)	3.3 (9)	9.3 (7)	-----	-----	4.0 (22)
Armed Forces	4.4 (9)	1.8 (5)	12.0 (9)	-----	-----	4.2 (23)
Take a Job without Further Training	0.0 (0)	2.2 (6)	5.3 (4)	-----	-----	1.8 (10)
No Idea	8.5 (17)	10.5 (29)	20.0 (15)	-----	-----	11.1 (61)
Attend College (Public School only)	-----	-----	-----	85.0(210)	61.8 (42)	79.0(249)
Not Attend College (Public School only)	-----	-----	-----	15.0 (37)	26.5 (18)	17.5 (55)
No response	-----	-----	-----	0.0 (0)	11.7 (8)	3.5 (8)

Table 22

Characteristics of the Twelve Subsamples (N of each = 20)

	Group Number											
	1	2	3	4	5	6	7	8	9	10	11	12
Ordinal Position	1st	1st	1st	1st	Mid	Mid	Mid	Mid	Last	Last	Last	Last
Age	17	15	17	15	17	15	17	15	17	15	17	15
Sex	M	M	F	F	M	M	F	F	M	M	F	F

A. School

(number of subjects per cell)

Mount Assumption	7	6	--	--	7	9	--	--	4	10	--	--
St. John's Academy	6	7	5	15	5	6	9	14	1	7	12	12
Our Lady of Victory Academy	2	1	2	1	0	2	3	0	3	1	3	1
Plattsburgh High School	3	3	10	4	4	2	8	5	9	2	2	5
Champlain Central High School	2	3	3	0	4	1	0	1	3	0	3	2

B. Grade

(number of subjects per cell)

9	0	7	0	5	0	9	0	9	1	10	0	4
10	1	12	0	15	2	11	0	11	2	9	1	12
11	7	1	10	0	8	0	12	0	6	1	9	4
12	10	1	10	0	10	0	8	0	11	0	10	0

Table 22 (continued)

	Group Number											
	1	2	3	4	5	6	7	8	9	10	11	12
C. Number of Siblings (Quartile)	(number of siblings at each quartile)											
Q 1	2	2	2	2.5	3	3	3	5	1	1.5	1	1.5
Q 2	3	3	3	3	4	5	4	5	2	2	2	2
Q 3	4	4	4	4	6.5	6.5	6	6.5	3.5	4	3	3
D. Age of Closest Sibling												
Average N years older	NA	NA	NA	NA	2.7	2.5	2.2	2.4	3.3	3.9	3.7	4.0
	(number of siglings at each quartile)											
Q 1	NA	NA	NA	NA	2	2	1	1	2	2.5	2	2.5
Q 2	NA	NA	NA	NA	2	2	2	2	3	4	3.5	4
Q 3	NA	NA	NA	NA	4	4	3	3.5	4	5.5	6	6
Average N years younger	2.2	2.1	2.4	1.9	2.8	3.0	2.4	2.6	NA	NA	NA	NA
	(number of siblings at each quartile)											
Q 1	1	1	1	1	2	2	2	1.5	NA	NA	NA	NA
Q 2	2	2	2	2	3	3	3	2.5	NA	NA	NA	NA
Q 3	3	3	3.5	2	4.5	4	3	3.5	NA	NA	NA	NA

Table 22 (continued)

	Group Number											
	1	2	3	4	5	6	7	8	9	10	11	12
E. Occupation of Father (Quartile)												
Warner scale, 1 = highest, 7 = lowest	(Warner scale rating at each quartile)											
Q 3	1	3	1.5	2	2.5	2	1.5	2.5	3	1.5	3	1
Q 2	3	3.5	3	3.5	4	3	3.5	3.5	3	3	4	3
Q 1	4	5	4	5	5	5	5	4.5	4	4	4.5	4
F. Education of Father	(number of fathers per cell)											
College Graduate	7	3	3	3	2	9	3	6	5	7	2	9
Attended College	2	2	5	2	3	1	4	0	2	2	2	1
High School Graduate or less	11	15	12	15	15	10	13	14	13	11	16	10
G. Occupation of Mother	(number of mothers per cell)											
Working	5	14	10	6	11	5	7	8	8	9	10	10
Housewife	15	6	10	14	9	15	13	12	12	11	10	10

Table 22 (continued)

	Group Number											
	1	2	3	4	5	6	7	8	9	10	11	12
H. Education of Mother	(number of mothers per cell)											
College Graduate	5	4	3	2	6	5	5	7	5	8	5	8
Attended College	1	2	6	3	1	2	3	2	0	2	0	1
High School Graduate or less	14	14	11	15	13	13	12	11	15	10	15	11
I. Age of Mother (average)	40.1	36.8	39.3	38.3	44.1	43.3	44.7	42.3	49.5	48.0	48.6	47.2
J. Age of Father (average)	43.3	39.1	42.5	40.8	47.5	46.9	46.0	44.0	50.6	52.0	52.7	51.5
K. Plans to Attend College	(number of subjects per cell)											
Yes	17	17	15	14	18	15	15	13	15	15	12	18
No	3	3	5	6	2	5	5	7	5	5	8	2
L. Planned College Major, if any	(number of subjects per cell)											
Math and Science	6	3	2	5	6	8	0	4	1	5	0	5
Social Science	1	3	4	3	3	2	2	1	5	0	3	0
Humanities and Fine Arts	1	2	0	4	2	0	1	1	0	1	1	5

Table 22 (continued)

	Group Number											
	1	2	3	4	5	6	7	8	9	10	11	12
Medical Professions	1	0	1	1	0	1	4	2	0	1	0	0
Business Administration	4	1	1	1	4	0	3	1	6	2	3	1
Engineering	1	0	0	0	0	0	1	0	1	0	0	0
Education	0	1	3	0	0	0	2	0	0	0	3	6
Other	1	0	2	0	1	0	2	1	1	3	0	0

Table 23
First Seven Original Principal Components
of the Survey of Information Seeking Behavior

Item No.	Component						
	I	II	III	IV	V	VI	VII
Sex	046	030	348	-242	158	045	-073
1	406	050	153	055	135	-007	128
2	492	097	-035	110	-098	-228	014
3	379	-350	-167	-416	050	049	-192
4	287	-211	296	-070	109	-240	-174
5	314	-253	-352	-095	-064	-041	-109
6	417	157	-130	-220	-337	-142	001
7	242	-411	-111	241	390	048	-137
8	470	244	-051	192	-049	085	-340
9	469	-273	035	-441	-225	123	-043
10	375	-226	015	056	028	-160	-335
11	542	117	-141	095	-003	-312	-325
12	559	153	126	116	009	-194	-091
13	297	-442	154	163	-354	140	025
14	327	-441	-164	-452	060	247	-154
15	254	-501	-057	343	-001	060	-206
16	526	219	-198	-103	-233	-136	-133
17	400	092	-440	208	144	-137	-185
18	219	262	-001	267	078	423	-118
19	260	-633	120	320	-047	122	-124

Table 23 (continued)

Item No.	Component						
	I	II	III	IV	V	VI	VII
20	507	083	205	-032	018	-014	-225
21	390	-283	428	-064	-206	-243	-028
22	571	058	-409	-065	026	-107	-028
23	494	120	211	001	187	013	-096
24	492	-142	-226	-400	-002	205	-050
25	307	160	-253	063	-230	-006	-240
26	370	-145	-030	027	423	142	-183
27	557	218	-392	042	-169	-085	110
28	516	239	-148	036	131	-069	-243
29	547	329	204	038	-192	318	-148
30	419	-203	-307	-060	183	-101	010
31	310	-718	066	268	-113	010	024
32	635	214	264	071	077	293	014
33	238	-497	-119	197	488	043	007
34	505	075	390	-133	-018	057	093
35	469	258	079	020	-009	404	102
36	515	347	077	030	-323	185	-029
37	300	164	269	140	-015	023	-126
38	558	187	105	210	036	078	-052
39	332	-528	135	218	-403	143	138
40	527	-113	092	262	029	-087	175
41	435	-081	445	-112	-057	-345	083
42	398	-221	497	-141	134	-317	162

Table 23 (continued)

Item No.	Component						
	I	II	III	IV	V	VI	VII
43	268	-663	124	222	-332	080	096
44	448	131	-559	-014	119	-068	121
45	354	165	027	085	090	262	-079
46	477	253	378	-095	068	187	038
47	645	075	048	-165	024	-197	-015
48	369	-380	-099	199	-418	095	062
49	179	-686	-050	306	-045	066	077
50	245	-461	338	072	073	-185	044
51	504	-340	-089	-541	039	192	041
52	472	-011	366	023	148	177	-035
53	486	078	-508	159	060	-033	306
54	530	258	-087	178	214	123	142
55	419	341	193	090	232	290	200
56	481	-474	-216	-404	078	195	097
57	310	-300	-223	308	-153	091	150
58	310	-185	-224	059	307	-040	314
59	559	142	046	025	283	006	351
60	512	-311	-085	-559	-046	141	067
61	572	126	-485	-026	-114	-142	159
62	523	508	079	105	-153	197	012
63	621	074	302	-116	-105	-213	060
64	589	039	363	-033	186	-206	058
65	147	-437	-126	105	384	-059	-141

Table 23 (continued)

Item No.	Component						
	I	II	III	IV	V	VI	VII
66	578	023	230	-023	144	-149	158
67	620	280	056	072	-092	-294	008
68	517	293	-024	078	-009	103	019
69	583	311	-161	152	-063	-090	004
70	584	084	-346	017	-118	-135	157
Eigen- values	14.3580	6.5528	4.3095	2.9659	2.5054	2.1680	1.5417

Table 24

Subscales of the Survey of Information Seeking Behavior

Component Loadings of Items*

Subscale 1. Reading								
Item	Item No.	I.	II	III	IV	V	VI	h^2
To get information I like to:								
check the journals	13	09	-65	01	-15	-08	-14	40
review a chapter	15	01	-57	-08	-02	32	-04	60
consult texts	19	04	-70	09	-07	29	-13	37
use reference books	31	-08	-75	00	-14	28	-20	36
search the literature	39	08	-77	-01	-15	-07	-13	41
go to libraries	43	-05	-80	04	-16	04	-15	59
read books	48	06	-65	-24	-16	-09	-02	49
refer to encyclopedias	49	-12	-69	02	-09	34	-03	51
look in magazines	57	07	-50	-28	-04	15	09	71
Subscale 2. Consultation with Authorities								
Item	Item No.	I	II	III	IV	V	VI	h^2
seek expert advice	3	-04	-11	-15	-63	16	-14	33
communicate with scholars	9	11	-22	-11	-64	-14	-24	33
appeal to experts	14	01	-17	-02	73	18	-01	48
interview those who know	24	18	-05	-26	-64	07	-03	34
put questions to skilled people	57	11	-11	-11	-79	11	-18	43
inquire of authority	56	04	-23	-15	-75	26	-08	48

Table 24 (continued)

Item	Item No.	I	II	III	IV	V	VI	h^2
discuss ideas with specialists	60	09	-11	-15	-78	03	-21	42

Subscale 3. Consultation with Non-Authorities

Item	Item No.	I	II	III	IV	V	VI	h^2
To get information I like to:								
have discussions	6	08	-01	-45	-21	-32	-18	40
become personally involved	16	19	00	-56	-18	-20	-17	45
correspond with friends	17	10	-01	-59	03	29	05	45
confer with others	22	14	-01	-63	-26	15	-07	51
talk about things	27	21	-04	-70	-12	-06	-01	55
chat with acquaintances	44	10	09	-66	-19	23	11	55
listen to conversations	53	16	-07	-65	-09	24	11	53
talk to people	61	11	-04	-74	-21	03	-02	61
exchange ideas	70	16	-10	-65	-17	02	-10	50

Subscale 4. Dependence upon Well Defined Statements

Item	Item No.	I	II	III	IV	V	VI	h^2
To get information I like to:								
listen to directions	7	04	-27	-05	-06	61	-05	45
make judgments based on known principals	26	27	-02	-07	-19	48	-11	36
get instructions	33	00	-26	-01	-13	71	-07	60

Table 24 (continued)

Item	Item No.	I	II	III	IV	V	VI	h^2
learn from the experience of others	58	04	-06	-24	-14	44	-06	28
use programmed instruction	65	-12	-18	-02	-12	57	-08	39

Subscale 5. Thinking

Item	Item No.	I	II	III	IV	V	VI	h^2
To get information I like to:								
think about things	8	43	-07	-37	05	01	07	33
depend upon inspiration	18	56	-03	-06	10	07	21	37
use logic	23	41	04	-14	-08	14	-35	34
play with ideas	29	68	-08	-18	-10	-25	-13	59
contemplate possible solutions	32	72	-07	-13	-12	04	-25	62
determine by reflection	35	64	-02	-14	-16	-05	01	46
be creative	36	53	-09	-32	-07	-35	-11	53
give it some thought	38	51	-11	-30	05	07	-22	41
dope things out	45	46	-02	-12	-07	08	00	24
theorize answers	46	58	08	01	-13	-08	-34	48
use inductive reasoning	52	49	-12	06	-13	13	-35	41
think of what could happen	54	51	05	-36	01	22	-08	45
devise answers	55	65	14	-06	00	11	-11	48
consider the alternatives	59	42	08	-27	-10	26	-28	42

Table 24 (continued)

Item	Item No.	I	II	III	IV	V	VI	h^2
be free with imagination	62	65	06	-34	04	-24	-09	61
be intuitive	68	48	02	-36	-04	-02	-12	37

Subscale 6. Observation

Item	Item No.	I	II	III	IV	V	VI	h^2
To get information I like to:								
take measurements	4	00	-11	03	-09	13	-50	29
find differences between things	12	31	-05	-36	05	03	-42	40
engage in research	21	03	-34	01	-13	-12	-61	52
perform experiments	41	09	-10	-06	-07	-08	-70	53
test for accuracy	42	06	-09	08	-13	11	-74	59
record data	50	-06	-36	14	-07	22	-48	43
make investigations	63	29	-08	-26	-15	-13	-60	55
determine results	64	33	00	-15	-07	14	-64	56
weigh all possibilities	66	31	-03	-21	-11	14	-51	43

Items that were not used

Item	Item No.	I	II	III	IV	V	VI	h^2
To get information I like to:								
be deductive in my approach	1	31	-03	-13	-04	14	-28	21
be observant	2	17	-11	-44	02	02	-30	33
ask for information	5	-10	-20	-36	-32	13	02	30

Table 24 (continued)

Item	Item No.	I	II	III	IV	V	VI	h^2
attend to the business at hand	10	03	-23	-21	-11	17	-29	22
get ideas from experience	11	13	-03	-56	01	08	-31	43
scrutinize evidence	20	36	-05	-17	-12	00	-37	31
travel the globe	25	14	-08	-43	-04	-15	06	24
infer answers from my experience	28	32	11	-46	-06	13	-13	37
learn from associates	30	-01	-09	-38	-28	34	-10	36
make tests of ideas	34	43	-05	-01	-19	-08	-45	43
discover by trial and error	37	35	-05	-05	11	05	-25	21
take note of things	40	27	-30	-27	04	19	-32	38
examine in person	47	24	02	-40	-26	03	-46	49
try things	67	29	01	-52	05	-09	-44	57
look around	69	37	-00	-58	04	-02	-16	50

* Decimal points are omitted.

Table 25

Intercorrelations* for Inverse Principal Components Analysis
of Birth Order/Age/Sex Groups

	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1. 1st 15 F	51	54	53	60	59	76	69	71	52	75	60	40	50	42
2. 1st 15 M	--	58	37	63	53	43	40	51	55	50	49	41	31	37
3. 1st 17 F		--	36	52	41	60	53	55	42	47	46	31	22	37
4. 1st 17 M			--	43	62	63	66	68	56	50	76	49	49	51
5. Mid 15 F				--	63	62	62	67	62	69	52	42	51	29
6. Mid 15 M					--	61	72	65	68	62	74	64	54	56
7. Mid 17 F						--	83	80	62	83	69	50	53	48
8. Mid 17 M							--	74	65	83	80	54	48	51
9. Last 15 F								--	64	78	66	51	57	56
10. Last 15 M									--	58	57	49	36	48
11. Last 17 F										--	64	46	47	48
12. Last 17 M											--	58	50	63
13. Only 16 M												--	32	41
14. Only 17 M													--	27
15. Only all F														--

* Decimal points are omitted.

Table 26
Original Inverse Principal Components Analysis
of Birth Order/Age/Sex Groups

Group	Component				
	I	II	III	IV	V
1. 1st 15 F	80	18	-26	-16	03
2. 1st 15 M	65	47	36	24	23
3. 1st 17 F	63	50	17	-31	16
4. 1st 17 M	75	-38	03	-04	19
5. Mid 15 F	77	36	-10	32	-07
6. Mid 15 M	83	-18	18	25	-04
7. Mid 17 F	88	04	-24	-22	-13
8. Mid 17 M	88	-10	-13	-16	-22
9. Last 15 F	88	01	-14	-07	04
10. Last 15 M	76	04	21	16	-17
11. Last 17 F	85	12	-24	-13	-23
12. Last 17 M	84	-29	17	-08	11
13. Only 16 M	65	-24	33	24	-36
14. Only 17 M	61	-18	-45	40	38
15. Only all F	63	-29	37	-33	25
Eigenvalues	8.84	1.09	.94	.80	.61

Table 27

Analysis of Variance Summary

Birth Order X Age X Sex across SISB SubscalesBetween Subjects

Source	Sum of Squares	df	Mean Square	F ratio	p
Birth order (A)	1321.32	2	660.66	2.14	ns
Age (B)	57.41	1	57.41	—	ns
Sex (C)	279.93	1	279.93	—	ns
A X B	1628.76	2	814.38	2.64	<.10
A X C	825.11	2	412.56	1.34	ns
B X C	.92	1	.92	—	ns
A X B X C	349.24	2	174.62	—	ns
Subjects within groups (error)	70,259.58	228	308.16		
Subtotals	74,776.27	239			

Within Subjects

Source	Sum of Squares	df	Mean Square	F ratio	p
Subtests (D)	2526.45	5	505.29	6.87	<.001
A X D	906.78	10	90.68	1.23	ns
B X D	752.47	5	150.49	2.05	<.10
C X D	1180.18	5	236.04	3.21	<.01
A X B X D	651.79	10	65.18	—	ns
A X C X D	811.37	10	81.37	1.11	ns
B X C X D	219.61	5	43.92	—	ns
A X B X C X D	1659.29	10	165.93	2.26	<.025

Table 27 (continued)

Source	Sum of Squares	df	Mean Square	F ratio	p
Subtests X subjects within groups (error)	83,792.72	1140	73.50		

F max = 5.51

Table 28
Analysis of Variance

SISB Subscale Consultation with Non-authorities					
Source	Sum of Squares	df	Mean Square	F ratio	p
Birth order (A)	146.2	2	73.1	—	ns
Age (B)	36.4	1	36.4	—	ns
Sex (C)	1049.1	1	1049.1	7.25	<.01
A X B	877.2	2	438.6	3.03	<.06
A X C	274.2	2	137.1	—	ns
B X C	3.5	1	3.5	—	ns
A X B X C	506.9	2	253.4	1.75	ns
Within (error)	32,958.0	228	144.6		

Table 29
Analysis of Variance

SISB Subscale Dependence upon Well Defined Statements					
Source	Sum of Squares	df	Mean Square	F ratio	p
Birth order (A)	102.72	2	51.36	—	ns
Age (B)	114.08	1	114.08	1.14	ns
Sex (C)	13.80	1	13.80	—	ns
A X B	321.87	2	160.94	1.61	ns
A X C	343.35	2	171.68	1.72	ns
B X C	83.39	1	83.39	—	ns
A X B X C	17.83	2	8.92	—	ns
Within (error)	22,728.49	228	99.69		

Table 30
Analysis of Variance
SISB Subscale Thinking

Source	Sum of Squares	df	Mean Square	F ratio	p
Birth order (A)	203.50	2	101.75	—	ns
Age (B)	5.71	1	5.71	—	ns
Sex (C)	252.80	1	252.80	2.03	ns
A X B	193.51	2	96.76	—	ns
A X C	257.27	2	128.64	—	ns
B X C	16.76	1	16.76	—	ns
A X B X C	230.47	2	115.24	—	ns
Within (error)	28,409.78	228	124.60		

Table 31
Analysis of Variance
SISB Subscale Observation

Source	Sum of Squares	df	Mean Square	F ratio	p
Birth order (A)	528.57	2	264.29	2.19	ns
Age (B)	21.93	1	21.93	—	ns
Sex (C)	20.33	1	20.33	—	ns
A X B	212.65	2	106.33	—	ns
A X C	203.79	2	101.89	—	ns
B X C	49.73	1	49.73	—	ns
A X B X C	1150.22	2	575.11	4.77	<.01
Within (error)	27,469.83	228	120.48		

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