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COGNITIVE EFFECTS OF
BIRTH ORDER AND
PARENTAL ABSENCE

by

Joy A. Moss O'Shields

A Dissertation Submitted to the Faculty of the School of Education
of Loyola University of Chicago in Partial Fulfillment
of the Requirements for the Degree of
Doctor of Education

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1980

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VITA

The author, Joy A. O'Shields, obtained her elementary and secondary education in Gary, Indiana. She received a degree in elementary education from the University of Michigan.

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CHAPTER I

INTRODUCTION

The present research is intended to investigate the significance of family structure, specifically birth order and parental absence, in relationship to the achievement of a selected population.

Early research on birth order relied primarily on achievement data. Gini (1915) conducted research on the superiority of the oldest. His conclusions verified earlier speculations by (Ellis, 1904; Galton, 1874). In Gini's study of Italian professors, first-borns were clearly over-represented in the study.

Among 341 pairs of siblings tested with the Kuhlmann-Binet, Arthur (1926) found no effect of birth order in the case of children of native American background. However, in the immigrant groups, the oldest averaged reliably poorer performances than their younger siblings.

Thurstone and Jenkins (1929) examined a large number of children and published birth order results which were contradictory to those of Ellis (1904) and Galton (1874). The findings of Thurstone and Jenkins (1929) indicated that on the whole the later-born siblings tend to be on the average more intelligent than the first-born.

Other studies of birth order followed. Some reported increments with birth order, some decrements, and several failed to find any relationship whatever.

Belmont and Marolla (1973) examined the relationship of birth

order and family size to intellectual performance as measured by the Raven Progressive Matrices with nearly all of the 400,000 19-year old males born in the Netherlands in 1944 through 1947. It was found that birth order and family size had independent effects on intellectual development.

Zajonc and Markus (1975) developed a Confluence Model to explain the effects of birth order and family size on intelligence. The premise of the Confluence Model is that within the family the intellectual growth of every member is dependent on that of all the other members, and that the rate of this growth depends on the family configuration. Different family configurations constitute different intellectual environments. Each member contributes to the total intellectual atmosphere which changes continually as children grow. With each additional child, the family's intellectual environment depreciates, because a child's intellectual growth is partly controlled by the overall intellectual climate of the household.

Zajonc (1975) assumes that birth order differences can be mediated by birth intervals. The longer the intervals between births the more beneficial this is for first-borns and later-borns.

Breland (1974) found that National Merit Scholarship Qualification Test scores generally declined with increasing sizes, within each family size they decline with birth order; the rate of decline decreases with successive birth orders. From the data of the Breland (1974) study, Zajonc and Markus (1975) found a discontinuity for the only child who scores below a level that would be expected had intelligence declined monotonically with increasing family size.

Zajonc (1976) argued that variations in aggregate intelligence scores are closely associated with variations in patterns of family configuration, and that these aggregate family factors are deeply implicated in the declining Scholastic Aptitude Test scores. Tavris (1976) stated that Zajonc's Confluence Model emphasizes the phenomenon of dramatic changes in the intellectual environment occurs when someone joins the family or leaves it.

The Confluence Model implies that a one-parent home constitutes an inferior intellectual environment and should result in intellectual deficits, and the early loss of a parent should produce greater deficits than a loss occurring at a later age. Research by Broman (1975), Biller (1974), and Lynn (1974) support the implications derived from the Confluence Model.

In a review by Shinn (1978), research has shown that child rearing in father absent families or in families where fathers have little supportive interaction with their children is often associated with poor performance on tests of cognitive abilities. The findings are generally consistent with the hypothesis that children's interaction with their parents foster cognitive development and that a reduction in interaction hinders it.

Deutsch (1960) found that two-parent children had higher Scholastic Aptitude Test reading, mathematical, and total scores.

Maccoby and Rau (1966) hypothesized that "anxiety interference" is the cause of Quantitative-Verbal differences found in middle class students from fatherless families. They suggested that father absent children are under a great amount of stress, and that stress and

tension interferes more with mathematical than verbal activities.

Landy, Rosenberg, and Sutton-Smith (1969) found that quantitative scores were lower the longer and the earlier the onset of father absence.

Although being deprived of a parent is generally accompanied by stress in the home from other sources, such as marital conflict or bereavement, intellectual deficits occur even when the father's absence is temporary and free from these stressful conditions. Carlsmith (1964) found that children of men in the service, and children whose fathers are frequently absent or not readily available because of their occupation, show substantial intellectual and academic lags.

The concern of the study is whether the Confluence Model is generalizable to different family configurations; what effect parental absence has on children of different birth orders and family sizes. According to Zajonc (1975), the Confluence Model is based entirely on the mutual influences among children as they develop in the family context. The major emphasis therefore is on the intellectual environment during the course of their development. Adult entry and exit from the family constellation is crucial to the Confluence Model's interpretation of different intellectual patterns.

The Statement of the Problem

This research proposes to identify and evaluate the effects of birth order and parental absence on the achievement of a selected population of college students.

1. The first subproblem. The first subproblem is to determine whether there are significant birth order effects on the composite score of the SAT for the selected population and, if so, if they differ from prior studies on other populations.

2. The second subproblem. The second subproblem is to determine whether there are significant birth order and family size effects on achievement for the selected population and, if so, in what ways they compare to those predicted by the Confluence Model.

3. The third subproblem. The third subproblem is to determine whether there are significant effects of birth order, family size, and parental absence on achievement ability for the selected population and, if so, in what ways they compare to those predicted by the Confluence Model.

The Hypotheses

General Hypothesis

There will be significant birth order and parental absence effects on the composite score of the Scholastic Aptitude Test.

Specific Hypotheses

1. First-borns will score significantly higher than later-borns on the composite of the Scholastic Aptitude Test.

2. Subjects from father absent homes will score lower on the composite of the Scholastic Aptitude Test than subjects from father present families.

3. There will be significant birth order, parental absence, and sex effects on the composite of the Scholastic Aptitude Test.

- (a) Female subjects of all birth orders from a father absent home will score lower on the SAT than female subjects of all birth orders from father present homes.
- (b) Male subjects of all birth orders from a father absent home will score lower on the SAT than male subjects of all birth orders from father present homes.

4. There will be significant birth order, early parental absence (before age five), and sex effects on achievement for the selected population.

CHAPTER II

REVIEW OF THE RESEARCH

There has been a resurgence of interest in research on birth order as a result of studies indicating that first-borns are more likely to be high achievers than are those of later ordinal positions. The mediating variable in this relationship is often assumed to be intelligence. However, existing birth order-intelligence studies have yielded conflicting findings. Some studies have indicated a superiority in intelligence of later-born over first-born, while other studies have suggested that first-borns are superior in the intelligence to those of later ordinal positions.

At the turn of the century, geneticists, pathologists, and psychologists directed their attention to birth order and the superiority of the eldest (Ellis, 1904; Galton, 1874). Early research relied primarily on achievement data. Gini's (1915) study substantiated earlier speculations of the superiority of the eldest. Gini collected data on the birth order ranks of professors in Italian universities. In this study, first-borns were over-represented among Italian professors.

The findings of an early classic on birth order and intelligence by Thurstone and Jenkins (1929) supports the view of the intellectual superiority of the later-born. These investigators studied actual siblings in 382 families from records at the Institute for Juvenile Research in Chicago. The children studied were primarily "problem"

children with case histories of asocial and antisocial behavior. While it was held by the investigators that the interrelationships of characteristics of this sample would present no unique difference from similar relationships in the general population, the children were well below average intelligence, with a mean I.Q. of 80. Thurstone and Jenkins concluded that the increase in intelligence with birth order was progressive at least as far as the eighth born child.

A parallel study by Steckel (1930) supported the findings of Thurstone and Jenkins (1929). Steckel found that on the average later born children have a higher intelligence quotient than earlier born children; that in general, intelligence as measured by intelligence tests, increases uniformly with ordinal position up to and including the eighth born child.

Among 341 pairs of siblings tested with the Kuhlmann-Binet, Arthur (1926) found no effect of birth order in the case of children of native American stock, but in immigrant groups, the older children averaged lower scores than their younger siblings.

Arthur (1926) did not account for the difference in achievement by the immigrant group. However, it can be speculated that there was a language barrier for the older children and as the families became more "Americanized" the younger children benefited more from attending school.

Terman's (1925) study found a bias favoring the first-born in their study of the gifted, particularly among those coming from families of two, three, and four children. There is a distinct

similarity of the ratios Terman found to those of Cattell (1947) in his survey of eminent American scientists. Terman reported that 56.11% of representatives of the two-child family in his study of the gifted were first-borns. In fact, this data closely paralleled those reported by Cattell. There was a 57.4% representation of first-borns in Cattell's study of eminent American scientists.

The early birth order-intelligence dilemma was confounded by the inconsistencies in research results. Some reported increments with birth order, some decrements, and several failed to find any relationship at all. Among studies that found decreasing intelligence or scholastic scores with birth order are those of Altus (1965), Bayley (1965), Breland (1974), Belmont and Marolla (1973), Lunneborg (1968, 1971), and Schachter (1963). Increases in intelligence scores with birth order were reported by Commins (1927), Hill (1936), Koch (1954), and Willis (1924). In a study by Hsiao (1931), some samples show a positive relationship with birth order and intelligence and others a negative relationship. Bayer (1966) and McCall and Johnson (1927) failed to find any relationship between birth order and intelligence.

There has been much theorizing about birth order effects in the past. Speculations about birth order effects range from ideas about uterine fatigue to economic factors. Psychological explanations of birth order effects (Schachter, 1959; Sears, 1950) invariably invoke the relationship of the child to the mother. Studies can be found that relate birth order to artistic creativity (Eisenman, 1964), schizophrenia (Farina, Barry, and Garmezy, 1963; Schooler, 1964),

pain tolerance (Gelfand, 1963), conformity (Sampson, 1962), socio-metric choice (Schachter, 1964), and alcoholism (Smart, 1963).

Intellectual Aptitude

Altus (1965) found birth order effects in verbal but not in the quantitative scores of the Scholastic Aptitude Test given to University of California students. The first-born college student was somewhat superior to the later-born in verbal aptitude. In mathematical aptitude, birth order did not appear to be of great significance.

Nichols (1964) found in an 84% sample of 1,618 finalists in the National Merit Scholarship Qualifying Test that the first-born is markedly over-represented: 66% of the two-child family representatives were first-born; 52% for the three-child family; 59% for the four-child family; and 52% for the five-child family. In all, he found slightly over 59% of the representatives of two-, three-, four-, and five-child families were first-borns.

Terman's (1925) earlier study and the recent studies of Altus (1965) and Nichols (1964) infer that birth order may well be associated with aptitude if the population is unusually intelligent. Research conducted by Bradley (1969) on 1503 high school students who had been identified as being intellectually superior found a significant over-representation of first-borns for every family size.

The verbal superiority of the first-born was explicitly illustrated in the studies by Nichols (1964) and Altus (1965). However, these studies failed to find a significant relationship between

mathematical ability and ordinal position. In retrospect, it may be said that Terman's (1925) study of the superiority of the first-born among his gifted may have been a function of the highly verbal measuring instrument, the 1916 Stanford-Binet Intelligence Scale.

Breland (1974) conducted a study of 800,000 candidates on the National Merit Scholarship Qualification Test (NMSQT) to determine whether or not the relationship between academic achievement and birth order was due to a verbal factor. Five features from the Breland study are of particular significance: (1) NMSQT scores generally decline with increasing family size; (2) with each family size the scores decline with birth order; (3) the rate of decline decreases with successive birth orders. The primary source of score differences on the NMSQT was verbal aptitude. Breland performed a stepdown analysis on the individual tests. After all other sources of variation were removed, the birth order differences for the verbal sections of the NMSQT tests (Word Usage) remained significant.

Belmont and Marolla (1973) discovered a strong relationship between birth order and intellectual performance. Data were collected on 386,114 nineteen year old men in the Netherlands born between 1944 and 1947. To classify the men, the Dutch military used the Raven Progressive Matrices, a nonverbal intelligence test which is relatively free of cultural bias. To establish an interaction for birth order and family size, Belmont and Marolla computed the average Raven scores for the first-born in a family of two, the second-born in a family of three, and so forth. They found a clear effect of family size on I.Q. and a birth order effect within different family

configurations.

Further examination of the data collected by Belmont and Marolla (1973) were conducted by Belmont, Stein, and Wittes (1976). The rates of school failure (those who attended schools for the mentally retarded and who failed lower school) were studied in a population of approximately 200,000 young adult Dutch males born between 1944 and 1946 and whose families had from 1 to 6 children. The data used was the records of the Dutch military preinduction examination. Rates of school failure rose both with increased birth order and with increased family size. This trend held only for families with 2 to 6 children. In general, school failure rates were significantly related to birth order position. For each family size, the last-borns were at greater risk of school failure than were the first-borns.

Oberlander, Jenkins, Houlihan, and Jackson (1970) tested the hypothesis that there exists a meaningful relationship between birth order, family size, scholastic aptitude and achievement in 318 eighth graders. It was found that first-borns were characterized by higher I.Q. scores than later-borns. In contrast to the Belmont, Stein, and Wittes (1976) study, family size was not significantly related to any of the measures in the study.

Chittenden, Foan, Zweil, and Smith (1968) analyzed school achievement records of 120 pairs of first and second born siblings from two school systems. The subjects were compared on teacher grades and Iowa Basic Skill scores obtained during upper elementary and junior high school. Differences between siblings on grades and test scores significantly favored the first-borns. The data also indicated

that first-born superiority may be more pronounced for siblings close in age and first-born girls.

Burton (1968) collected data from a large national sample of high school seniors indicating a tendency of first-borns to have superior intelligence over later-borns. However, the reported difference in intelligence did not appear large enough to explain the repeated findings of an over-representation of first-borns among high achievement groups. Burton suggested that further research on social-psychological correlates to ordinal position is needed to determine why first-borns are more likely to be high achievers than are later-borns.

In a study of a group of Southern first graders, Skovholt, Moore, and Wellman (1973) found a relationship between birth order and intelligence. Teacher ratings of the academic performance of 686 male and 580 female suburban, southern students were used in the study. Data were analyzed in a 2x4 factorial analysis of variance with two levels of sex and four levels of birth order (only children, first-borns, middle children, and last-borns). Results from this study found that only males and first-born females were rated higher than middle males; only males, only females, first-born females, and last-born females were rated higher than last-born males.

It appears that the results of the Skovholt, Moore, and Wellman (1973) study support the traditional theory of the intellectual superiority of the female regardless of birth order.

Among a sample of 2,878 male and 2,523 female high school seniors, Lunneborg (1968) found evidence to attest to the viability

of the birth order hypothesis which stresses greater achievement and aptitude among first-borns. First-borns were not merely superior verbally; they excelled over a range of specialized abilities, many of which were quantitative. However, it was clear that such birth order effects may differ in form depending on the sample. For example, some effects were found for males alone and the same applied for females. In both sexes, while first-borns were superior to only children, there was no tendency for only children to be superior to later-borns.

Further research by Lunneborg (1971) examined birth order and sex of sibling effects on intellectual abilities. Sex of sibling for both sexes failed as a main effect. Achievement was higher among first-borns with brothers, and among second-borns with sisters. Among female first-borns, having a younger sister sometimes enhanced performance, sometimes not, but the presence of a younger brother always enhanced the performance relative to the entire female sample.

In a paper by Anastasi (1956), the relationship of intelligence and family size was examined. Several research studies were cited and in each a negative correlation or inverse relationship was found for family size and intelligence. Anastasi suggested that these results may not be associated with the size of sibship per se, but other factors associated with family size within a given culture which produce the obtained differentials in intellectual level.

Nisbet (1953) hypothesized that family size had a direct effect on the environmental aspect of mental development. It appears that part of the negative correlation of family size and intelligence

test scores may be attributed to an environmental influence of the size of the family on verbal development and through it on general cognitive development. The Nisbet research infers that there will be less verbal interaction between child and parents as the family size increases. Later research by Nisbet and Entwistle (1967) corroborated the earlier results of Nisbet (1953). A group of Aberdeen school children were tested at ages 7, 9, 11, and 12 on verbal reasoning, non-verbal reasoning, and attainment tests. The relations between family size and test scores were expressed as regression coefficients. An inverse relationship between family size and test scores was observed. Regression coefficients from the verbal tests were larger than the non-verbal tests. Consistently larger regression coefficients were obtained for girls than for boys.

Solomon, Hirsch, Schienfeld, and Jackson (1972) investigated the relationship of sex, father absence, family size, and birth order to factor scores representing general academic achievement in a sample of 149 urban black ghetto fifth graders. Significant main effects were found for sex, with girls showing higher achievement in small families. A significant birth order times family size interaction was found. First-born subjects did best in small families, last-born subjects did best in intermediate (four to five children) families. There was no birth differentiation in large families.

The majority of the studies cited in this review suggest that there are decrements in intelligence as the family size increases; the first-borns displayed higher achievement levels than later-borns.

However, the earlier findings of Thurstone and Jenkins (1929), Jones and Hsiao (1931), Arthur (1926), and Steckel (1930) suggested the second-born scores were higher than first-borns.

The findings of Koch (1954) are congruent with the results of her predecessors. The SRA Primary Mental Abilities Test, Primary Form, was administered in the Koch (1954) research. The mean age of the subjects was 71 months. The results indicated a relationship between a sibling's sex and ordinal position. In the Koch study, controls over family size, social class, and extraneous variables were utilized in the research. The subjects were 384 five and six year old children from intact two-child families. There were 48 children from each of the following subgroups: first-born boys with younger brothers, first-born boys with younger sisters, first-born girls with younger sisters, second-born boys with older sisters, second-born girls with older sisters. Each of these subgroups was further subdivided into three levels of sibling spacing: 0-2; 2-4; and 4-6 years. Each of these 24 groups was matched on age, area of residence within the city of Chicago, and socioeconomic status level. The Primary Mental Abilities Test, Primary Form was used as the measure of intellectual ability. Results of the analysis of variance of total performance scores indicated that second-born children scored higher than first-born children. Children with brothers scored higher than children with sisters on the verbal and quantitative subtests when the children were separated by a two-to-four year age spacing.

Schoonover (1959), in a partial replication of the Koch study

in the Ann Arbor, Michigan, schools, also found that children with brothers scored higher on tests of intelligence and school achievement than did children with sisters.

Bayer (1966) and McCall and Johnson (1927) failed to find any relationship between birth order and intelligence in any respect. The latter authors suspected that the correlation of I.Q. with birth order approaches zero "in those studies where more careful attention is given to sample design and to subsequent controls." (p. 208)

McCall (1973) lends further support to the conclusions of Bayer, McCall, and Johnson (1927). A 1% subsample of Project Talent Data Bank's national high school sample provided test scores and demographic data for 3,308 subjects. Partial correlation and multiple regression methods were used to test hypotheses concerning birth order differences in special ability, over and above expected differences due to sex or to socio-economic status. After controlling for socio-economic status and family size, birth order accounted for only 2% of the variance in Vocabulary and English test scores; and birth order accounted for less than 1% of the variance in the Mechanical Reasoning, Visualization, Arithmetic Computation, Clerical Checking, and Object Inspection scores. Sex differences in ability were independent of birth order and socio-economic status.

Motor Skills

Studies on ordinal position, cognitive, and motor development have primarily focused on the first six years of development.

In a study by Bayley (1965), revised forms of Bayley's Scales of

Mental and Motor Development were administered in 12 metropolitan areas to 1,409 infants, ages 1-15 months. The babies tested were drawn primarily from hospital well-baby clinics. When the parents' education was compared with that of parents of young children in the 1960 census as a criterion of socio-economic status, the population was found to be representative of the United States. Comparisons of means of standard deviations of total scores for each of the 15 months were made for a series of subsamples of the population. No differences in scores were found for either scale between boys and girls, first-born and later-born, education of either father or mother, or geographic residence. No differences were found between blacks and whites on the Mental Scale, but, the black babies tended consistently to score above the whites on the Motor Scale.

It would appear that the advantage the black babies had is a pervasive one, which may lie in a generally heightened muscle tonus. Similar findings of more advanced motor status in black over white babies have been reported by a number of investigators, for example Knoblock and Pasamanik (1946), and Williams and Scott (1953).

One explanation that has been suggested for the motor precocity of black babies has been that, being predominantly in the lower socio-economic class, they are left to move about more freely with fewer restrictions of such things as clothes and playpens.

Section Three

Section three includes the most extensively researched areas involving birth order and psychological-personality characteristics.

As an organizer for this section, Edwards Personal Preference Schedule will be used to categorize personality variables and birth order.

Parent-Child Interaction

Some agreement has emerged that the importance of ordinal position lies in its creation of a particular kind of sociological environment and a set of psychological experiences that are assumed to lead to the development of patterns of personality and behavior. Most opinions support the explanation of the success of the first-born children in terms of acquired rather than innate personality characteristics. The differences in educational performance between first-born and later-born children seems to derive mainly from the variations in parent-child interaction during the processes of maturation and socialization. Rosen (1961) suggests that the first-born child "typically receives more achievement training than later-borns." The amount and degree of interaction between parent and first-born is likely to be large and intense. Also, as the only child, he or she is the sole object of parental expectations. These expectations tend to be high and may lead to accelerated training by the parents. First-born children are likely to talk earlier and to be more competitive than later-borns. Rosen (1961) points out that first-borns tend to be adult-oriented, serious, conscientious, and very sensitive to the expectations and sanctions of their parents.

By contrast, the socialization of later-born children is more causal, less anxious, and less achievement oriented. Parents of second and subsequent children usually have less time to devote to

their needs and they have to learn from the onset that they must share parental attention with their siblings. For youngest children, this relative lack of parental emphasis on achievement may be reinforced by various kinds of over-indulgence which is antithetical to the development of achievement motivation.

Ring, Lipinski, and Braginsky (1965) theorized that parents' high expectations for the first-born child often have profound effects on his later behavior and often push the child on to greater accomplishments.

Altus (1965) suggests that, by virtue of the achievement training a first-born receives at home, he might approach school situations more readily, work more diligently, and pursue academic goals longer. The general picture presented by Altus and others is that first-borns are more likely to be genotypically superior to later-borns. The difference seems to be due to hard work and a high level of motivation on the part of first-borns.

Sampson (1962) indicated that first-borns are given more independence training as youngsters. In a study by Dean (1947), it was suggested that first-borns were judged by their mothers to be more dependent, to spend more time "just thinking", to worry more.

In a study of child rearing practices, Sears (1950) examined the nursing behavior of mothers of first-borns and second borns. The second children appear to be less dependent than first-borns. Sears theorized that dependent behavior is related to a history of frustration in nursing and weaning experience. The mothers of second and later-born children tend to be somewhat less frustrating than mothers

of first-borns.

Kammeyer (1967) described parent-child interaction patterns as follows:

First-Born Child and Parent Interaction

1. Parents consider the birth and existence of the first-born to be a profoundly significant event.
2. Parents possess greater affection for the first-born child than later-born children.
3. Parents have more time and energy to devote to the process of socializing with the first-born child.
4. Parents are less knowledgeable about the process of rearing the first-born child because they lack experience.
5. The first-born child is unbuffered from the adult world; he is more openly exposed to adult expectations and pressures.

The later-born child and parent interaction patterns were the opposite of those for the first-born. However, for the later-born, there is a tendency of the parents to accelerate independent mastery to gain freedom from child rearing.

Parent-child interaction patterns affect the child's socialization. In a study by Clausen and Williams (1963), the effects of ordinal position as regards socialization was examined. From the Clausen and Williams study it was concluded that parents tend to be more insecure and over-concerned with first-borns; parents are more available to first-born children because of fewer competing demands for time and attention; and boys with older brothers have models for appropriate behavior.

Sutton-Smith, Roberts, and Rosenberg (1964) proposed that the close parent-child interaction with the first-born promotes a propensity

for them to pick parent surrogate occupational roles. Social learning among first-borns includes high surrogate training and strong identification with the parents (conscience, conformity, affiliation, dependency, volunteering) and leads to a readiness to take parent-surrogate roles as exemplified by a preference for teaching. Gini's (1915) study strongly supports this proposal.

Need for Achievement

Sampson (1962) investigated birth order, social influence, and the need for achievement. Need for achievement was measured by the projective French Test of Insight. Test anxiety was measured by the Mandler-Sarason Test for anxiety. The inclusion of the anxiety measure was used to obtain a clearer distinction between need for achievement and fear of failure. The results indicated a slight, but non-significant, indication that first-born females and that this relationship between birth order and need for achievement is stronger for females than for the males.

Several assumptions relate early training in independence to the development of the need for achievement. Winterbottom (1958) reported a relationship between early training in independence and the development of need for achievement. Also, McClelland (1953) suggested a relationship between high n Ach and independence from influence. Winterbottom (1958) reported that subjects high in need for achievement asked for help less frequently in puzzling situations than those who had low n Ach. Krebs (1958) found that subjects with the most intense orientation towards achievement are the most resistant

to opinion change.

It seems fair to conclude that in general there is a positive relationship between early training in independence and the strength of need for achievement. The results of the Sampson (1962) study indicated a higher need for achievement in females. Koch (1955) suggested that the first-born female is involved in rearing later-born siblings, and that this involvement gives the first-born female more training in independence than the first-born male. This independence training for the first-born female could lead to a higher need for achievement.

The Rosenfeld (1966) study offered little support to Sampson's (1962) findings. Tests of the hypothesis that first-borns are higher in need for achievement than later-borns were generally negative. However, first-borns did tend to be lower in test anxiety, which has been conceived as the opposite of need achievement. Further analysis by Rosenfeld revealed a significant finding that only children surpassed both first-borns with siblings and later-borns in need for achievement.

Autonomy

Sampson and Hancock's (1967) study involving 251 high school students tested autonomy. These students were tested experimentally for conformity to group norms and given the Mandler-Sarason Test of Anxiety Scale and the Edwards Personal Preference Schedule, which was scored for Need Achievement, Need Affiliation, and Need Autonomy. Sampson and Hancock found that first-borns had more need for autonomy

than later-borns which was contradictory to Warren's (1966) conclusion that first-borns are generally more dependent.

McKeithen (1965) gave the Edwards Personal Preference Schedule to 495 undergraduate females, looking for birth order differences in Need Achievement, Need Autonomy, and Need Affiliation, found very few significant and reliable statistical results. Farley (1967), Wolkon and Levinger (1965), and Masling (1965) used the Edwards Personal Preference Schedule variables to test birth order and found results which were similar to McKeithen.

The above mentioned studies are contradictory to the findings of Koch (1955). She hypothesized that the early training in independence for the first-born especially for girls produced a sense of autonomy in their later stages of development. This assumption is supported by Koch's (1955) data in which she reports that generally girls are seen as more responsible than boys, and first-born girls were rated higher in leadership than first-born boys.

The significance of the independence training and timing of such training has been emphasized by Sampson (1962). In his study, Sampson (1962) stated that training in independence is more significant for the female and occurs at an earlier age than for the male. Sampson suggested that the first-born female is more independent and has a higher need for achievement than the first-born male. Generally, parents expect greater responsibility at an earlier age from the female. Also, parents express greater approval when the female exhibits independent behavior. However, the first ordinal position for the male produces greater dependency and leads to more conformity

in an influencing situation.

Sears (1950) hypothesized that the child rearing methods differed for each ordinal position; subsequently producing different degrees of independence. Sears stated that the degree of frustration in connection with nursing and weaning was positively related to dependent behavior in pre-school children. Using correlations of the frustration scale from the Gewirtz (1949) study, Sears concluded that dependent behavior is related to a history of frustration in nursing and weaning experience, and the mothers of second and later children tend to be somewhat less frustrating than the mothers of first children.

Schachter (1964) suggested that when exposed to a standard fear-inducing situation, first-borns responded more timidly and leaned on other people considerably more than later-borns.

The research on child rearing methods and subsequent dependency has to be interpreted in terms of viewing the family as a learning situation for the children in it. The differences must be viewed as to whether there are some basic differences in the family structure and the roles which compose it, or to the greater experience of the mother and her decreased anxiety about later children.

Affiliation

Schachter (1959) found that people who were first-born or only children wanted to be with others more than later-borns. Schachter suggested that this relation held true only under conditions or situations of excessive fear. According to Schachter, first-borns

tend to relieve fear by means of affiliation more than later-borns. However, Warren (1966) concluded that under conditions of fear, first-born females, not first-born males, seek the company of others more than later-borns.

Murdock and Smith (1969) reported that women are expected to be more concerned with joining groups, forming friendships, and dating than men. Five studies were reported on the generality and consistency of the relation of birth order to affiliation. Questionnaires asking for information about affiliation were submitted to each of the five samples of males and females. From the first study it was concluded, that compared with later-borns, first-born females belong to more organizations, obtain dates more easily, and make friends more easily. Birth order trends indicated that more first-borns are more likely to join fraternities and are more likely to prefer the company of others when shopping than later-borns. From the remaining studies, it was concluded that first-born males marry earlier than later-borns. Also, first-born females did not marry significantly earlier than later-borns, but unmarried females preferred to marry earlier than later-borns.

The need for affiliation by first-borns can further be explained by the Adlerian view of dethronement of the first-born. The affiliative need of which Schachter speaks may be related to the adult stimulation which the oldest child received when he was still alone with his parents. The Rosenfeld (1966) study lends support to the Adlerian view of dethronement. First-borns with siblings were higher in need affiliation than only children. The Dember (1964) findings

were similar to those of Rosenfeld.

Further research by Schachter (1964) studied birth order and sociometric choice in fifteen fraternities and sororities. Within these groups, first-borns chose more popular people and exhibited greater similarity of sociometric choice than later-borns. Furthermore, the data indicated that first-borns were considerably less popular than later-borns. These results are consistent with the hypothesis that first-borns are more dependent and influencible and tend to evaluate their friends in terms of what other people think of them more than later-borns.

In a partial cross-cultural study, Becker and Carroll (1962) used 48 subjects to test need affiliation. Twenty-four (24) of the subjects were first-born children in their families and 24 were later borns. The first-borns were considered the high need affiliation group. Eighteen (18) of the 48 subjects were native born Puerto Rican and spoke fluent English. The hypothesis that need affiliation and aspiration to group membership would be associated with greater conformity was supported by the data.

Cornoldi and Fattori (1976) argued that conflicting results concerning the affiliative personality of first-borns and later-borns can be explained by considering the importance of birth of a sibling and the age spacing between siblings. It is particularly important to determine whether the sibling was born before or after the first-born was 3 years old, since this age represents the period during which the individual-separation process is completed. The birth of a sibling before this age would give rise to affiliation and succorance

needs. Comparisons between the responses to the Edwards Personal Preference Schedule given by 32 pairs of first-borns, 17-19 years old, revealed that first-borns having siblings less than 3 years younger showed greater affiliation and succorance needs than first-borns not having close siblings.

Section Four

Section four focuses on birth order effects and extraneous behavior unrelated specifically to cognitive development. The subjects treated in this section are: college attendance, alcoholism, mental disorders, volunteering for experimental studies, and artistic creativity.

College Attendance

Numerous studies have indicated that eminent scientists and scholars tend to be first-born or only children. Cattell and Brimhall (1921) investigated birth order among eminent scientists. Their results indicated an over abundance of first-borns in this group of scientists. At every family size there was a marked over-representation of first-borns.

Schachter's (1963) study of birth order and higher education indicated a trend towards the first-born being more likely to attend college and graduate school.

"In 1958, the National Opinion Research Center surveyed a national sample of 2,842 graduate students in all fields in 25 universities. Of this group, 52.9 per cent were first-born." (Schachter, 1963) Another study of advanced students and birth order was

conducted by Coker, Bock, et al. (1959). During the 1957-58 academic year, data were gathered on 2,669 medical students who comprised 91 per cent of the student body of eight randomly selected medical schools in the United States. Some 49.6 per cent of this group were first-borns. The evidence is extremely good that as education increases, there is a systematic selection of first-borns and only children. Of course, these data do not indicate whether increased educational attainment of first-borns and only children might be due to intellectual, personality, economic, or other factors.

Schachter's (1963) data indicate that in a random sample of the general population the birth order distributions are within choice limits. In high school, which is compulsory, a birth order effect seems to be absent; but in college there is a significant over-representation of first-borns which is further marked among graduate students. College students are drawn largely from the middle and higher socio-economic strata, which have traditionally had fewer children. This phenomenon will produce a heavy concentration of first-born and only children.

Altus (1966) presented data to suggest that not only are the first-borns more likely to enter college, but that each individual in successive birth orders is less likely to attend college than is any earlier born sibling. Within a given family size, the last-born is the least likely of any of the children to attend college.

Bayer (1966) presented contradictory findings to those of Schachter (1963) and Altus (1966). In his study of high school and college students, there was support for the likelihood of more only

children attending college in comparison to other ordinal positions. Bayer's data indicated that first-borns are no more likely to attend college than last-borns from the same family size. Those of an intermediate ordinal position emerged as being the most disadvantaged with respect to college attendance.

Several tentative suggestions have been offered to explain the birth order trend in college attendance ranging from biological differences to psychological hypotheses. "Uterine fatigue" has been offered as an explanation to explain this phenomenon. It has been suggested that with each succeeding birth there is less nutriment left for the fetus; thus causing "uterine fatigue."

Clark (1916) suggested that the first-born is likely to have more financial resources available to them. Furthermore, he noted that the first-born uses a disproportionate amount of the family's available financial resources for education, thereby causing a curtailment in educational opportunities for subsequent siblings.

The third frame of reference that has been employed to explain the over-representation of the first-born is social-psychological. Researchers have reported a large number of personality traits which are associated with birth order and which are likely the result of: (a) differential parental treatment given to different birth orders and (b) the role expectations accorded to each birth position. A number of the personality traits which are believed to be necessary for high academic achievement, e.g., high need achievement, curiousness, aggressiveness are also found to be the traits most often observed in those of first-borns.

Wark, Swanson, and Mack (1974) used the Minnesota Scholastic Aptitude Test to study 22,538 female and 22,770 male high school students representing almost all high school juniors in Minnesota. The results indicated a relationship between birth order and verbal intelligence. The proportion of planned college attendance decreased, and the proportion of students interested in technical training outside of college increased as the birth order progressed from first- to last-born.

Bradley (1968) presented evidence linking birth order and college attendance. In this study, first-borns of both sexes attended college in greater numbers than later-borns. Substantial evidence indicated that early personality factors favoring the first-born are substantiated and extended while in school. First-borns more frequently: (1) meet teacher's expectations; (2) show more susceptibility to social pressure; and (3) exhibit greater information-seeking behavior and seem more sensitive to tension-producing situations.

Alcoholism

In many studies of alcoholism and birth order, it has been hypothesized that a tendency to non-affiliation during anxiety, meaningfully intervenes between birth order and alcoholism.

It appears that there is some discrepancy among researchers on alcoholism and birth order. As early as 1959, Schachter reanalyzed data on alcoholism by Bakan (1949) and concluded that alcoholics were over-represented among later-born persons. However, Gregory (1965) argued that if there were any birth order differences among alcoholics

they were due to an over-representation of last-borns from large families. Chen and Cobb (1960) summarized data from seven studies examining the relationship between birth order and alcoholism: the ratio of first-born to last-born in these studies ranged from 1.7 to 0.6.

DeLint (1964) hypothesized that there is a probability that last-born children will have been raised by only one parent or by some other person or persons. DeLint contended that an over-representation of last-born alcoholics might be due to an over-representation of persons raised by only one parent or by some other person.

A study by DeLint (1964) of 276 female alcoholics admitted to an alcoholism clinic during the period 1951-62 showed that being last-born rather than first or other born significantly relates to the absence of one or both natural parents during the first 5 years of childhood.

Mental Disorders

Cushna, Greene, and Snider (1964) reported that when a sample of 327 first and 325 last-born children brought to a child development clinic were examined, it was found that among functional behavior disorders there were twice as many first-borns as last-borns--64 versus 32.

Wolf and Wolf (1965) advanced the following interpretations of the Cushna, et al. findings: (a) Given a first and a later-born child with behavior disorders of equal magnitude, it is more likely that the

parents of the first-born child will overestimate the severity of the disorder and tend to seek outside help; and (b) When a later-born child's behavior is somewhat more than normally deviant, the parents may have learned to cope with it. Either situation would lead to more first-born children being seen at a clinic.

Fischer (1966) questioned the Wolf and Wolf (1965) interpretations of Cushna. Fischer felt that the new parents would be more reluctant to seek help and they would be more willing to seek help for later-born siblings.

Schizophrenia

Most of the early data on the effects of birth order among pathological populations indicate that birth order tends to have stronger effects among women than among men, and that later-born women tend to be sicker than earlier-born women. Schooler (1964), in a study based on records of patients hospitalized between 1942-1949 found that "Compared to first-born patients, last-born hospitalized female schizophrenics apparently have a significantly lower degree of social competence;" (p. 577) and more likely to have hallucinations, feelings of depersonalization, and suicidal tendencies. No significant differences were found among men.

In a study which involved structured observations of patient behavior in a ward setting, Schooler and Parkel (1966) concluded that female schizophrenics born in the last half of their sibling group were significantly more likely to be found against the wall. These patients engaged less in verbal social or nonverbal social behavior.

than those born in the first half of their sibling group.

Farina et al., (1963) presented data on the likelihood of recovery of schizophrenics admitted to North Carolina state hospitals between 1949 and 1954. The data revealed that patients with several older siblings were less likely to recover than those with few older siblings. Furthermore, in this sample, the female patients had more older siblings than the male patients.

Schooler's (1964) study revealed that among hospitalized male schizophrenics, social class determined not only the degree but the direction of the difference between birth orders. There were more last-born individuals among middle-class patients and more first-born individuals among lower-class ones. However, for females, social class did not act as a determinant.

Suicide

The person attempting suicide has been viewed as trying to communicate with significant others in their lives and change their behavior toward himself. If such behavior is derived from need for affiliation, there should be more first-born and only children in samples of suicidal attempts. According to Schachter, first-borns exhibit greater affiliative needs than last-born children.

Lawler et al., (1963) reported on 22 children and adolescents admitted for suicidal attempts to the Winnipeg Children's Hospital in Canada during 1960-62. The subjects included 15 girls and 7 boys; six were under 12 and sixteen were 12-15 years old. There were only children; seven first-borns; seven had middle positions; and four

were youngest children. In retrospect, the sample in this study was too small to draw any significant conclusions.

Toolan (1962) reported on 102 adolescents admitted for attempted suicide to Bellevue Hospital, New York City, in 1960. There were 49 first-borns in this sample. A chi-square test showed that the distribution of sibling positions in the study differed significantly from the expected distribution.

Kallman et al., (1949) studied adult suicides and birth order relationships. The results did not reveal any birth order relationships. It appears this finding may indicate the decline in significance of birth order in later years as compared to early childhood and adolescence.

Adler (1956) considered one of the characteristics of the suicidal person to be a pampered life style. Suicidal tendencies, like melancholia, develop "in individuals whose methods of living, from early childhood on, has been dependent upon the achievement and support of others." (Ansbacher and Ansbacher, p. 319) According to Adler, such a life style is found predominantly in first-borns and last-borns, and thus these birth orders are more open to the development of suicidal tendencies than other birth positions.

The Toolan (1962) results appear to be more applicable to an Adlerian interpretation of suicide among adolescents. The Schachter (1963) viewpoint of need affiliation appears to be more appropriate for adult attempts at suicide or actual suicides among adults. Schachter (1959) view the first-born as possessing greater dependency, which might necessitate the suppression of outward-directed aggression

against those on whom the person depends.

Volunteering for Experimental Studies

The greater affiliative behavior of first-borns suggests the possibility that first-born persons will be over-represented among subjects who volunteer for small group experiments. Evidence supporting this possibility was presented by Capra and Dittes (1962).

In the Capra and Dittes (1962) study, 100 Yale freshmen were solicited in their dormitory rooms by a senior student for a small group experiment to be conducted at a later time. The recruiting speech emphasized that the experiment would involve a group performing a common task together. Twenty-two first-borns volunteered as compared to seven later-borns.

The guarantee of small group interaction may have acted as catalyst to attract first-borns. Also, the status of the recruiter may have been an influencing factor.

A total of 520 students were asked by Ward (1964) to volunteer for a psychology experiment and were given individual sign-up sheets which varied in the description of the experiment. The first sheet described the experiment as a small-group experiment; the second sheet contained no description, while the third sheet described the experiment as involving a task done while alone. One-half of the students received the sheets before being informed a minimum course requirement for participation in experiments, and half received them after being informed of the requirement. Birth order was not found to have a significant effect on volunteering. The methodology utilized

in this study possibly eliminated the sampling bias.

Varela (1964) tested the hypothesis that first-borns would tend to volunteer for group psychological experiments with fourth-year Uruguayan high school students. The results favored first-borns and indicated that there are no cultural differences in the relation of affiliative tendency to birth order. The Varela results contradicted the results of the Becker and Carroll (1962) study in which there were no birth order effects on volunteering for Puerto Rican subjects.

Creativity

Adler (1956) held that the first-born is typically more conservative than his later-born siblings, due to the first-born's being dethroned by the second child. Schachter (1959) and Ehrlich (1958) hypothesized that the first-born received more inconsistent nurturance and therefore exhibits more dependency on others.

Eisenman (1964) designed a study to test the hypothesis that the first-born, being more conservative and conforming than the later-born, will also be less original and less artistically creative than the later-born. Twenty art students of whom 8 were first-born constructed designs on the Creative Design Test, and were rated for artistic creativity by an art professor. Scores on both measures were lower among the first-born than the later-born subjects. These results support the hypotheses that the first-born being more conservative and conforming than the later-born will also be less original and artistically creative than the later-born.

Section Five

Section five examines a theoretical model designed to explain the intelligence data published in 1973 by Belmont and Marolla. Zajonc and Markus (1975) attempted to capture the effects of the immediate intellectual environment on intellectual growth, and to specify how individual differences emerge in the social context of the family.

Confluence Model

Zajonc and Markus (1975), in analyzing data from a study by Belmont and Marolla (1973), have developed a Confluence Model which attempts to explain observed effects of birth order and family size on the intelligence test performance of a group of nineteen-year-old Dutch male subjects.

The results of the Belmont and Marolla (1973) study indicated a strong relationship between birth order and intellectual performance. The Raven Progressive Matrices was used to evaluate the subjects. Birth order effects were consistent across social groups as divided into manual, non-manual, and farm workers. When family size effects were examined within the three social groups, the findings were not as consistent.

The Belmont and Marolla (1973) results indicated that, in general, birth order and family size had separate effects on intellectual performance. For most family sizes, independent effects of family size were examined within the three social groups. The effects were strongest in the manual group and less marked in the non-manual

group.

The results of the Belmont and Marolla (1973) study undermined previous contentions that birth order effects were found primarily on verbal proficiency tests. The Raven Progressive Matrices Test measured non-verbal aspects of intellectual competency.

The effect of family size on intelligence has not been fully explained. The hypothesis advanced relates to the tendency for less adequate parents to have larger families. Some researchers have said that this tendency is genetic, others feel that the size of a family leads to fewer material goods or less maternal interaction with each child.

Early research reported inconsistencies, Terhune (1976), however, conducted studies on family size and intellectual level and found consistencies. The results of six surveys of the intellectual levels of four large populations indicated a decline in scores with family size. Although there were differences in age, sex, nationality, and the type of test given, a striking decline in scores with family size was apparent.

Claudy (1976) examined family size effects in the extensive population tested by Project TALENT. His study involved 81,175 twelfth graders who were given the test battery of Project TALENT. Across all the tests, General Information, Comprehension, Mathematics, Abstract Reasoning, English, and the General Ability Composite, the declining pattern was apparent as the family size increased. Claudy's data on family size and intellectual development did not show any sex differences.

Zajonc and Markus (1975) constructed a mathematical model, more appropriately referred to as a Confluence Model, to reflect the following features of the Belmont and Marolla (1973) study: (a) intelligence scores declined with family size; (b) within each family size they declined with birth order; (c) if the last child was ignored, the decline with birth order seemed to be decelerated; (d) the decelerating birth order trend was not followed by the last-born; and (e) the only child showed a discontinuity in that if the family factor were systematically negative in influencing I.Q., the only child should have had the highest average of all, which was not the case.

The basic idea of the Confluence Model is that within the family the intellectual growth of every member is dependent on that of all the other members, and that the rate of this growth depends on the family configuration. Zajonc and Markus (1975) define "intellectual environment" as being some function of the absolute intellectual levels of its members. When the intellectual environment is considered as an average of all the members' absolute contributions, then it changes continually as the children develop and as members enter and leave the family.

According to Zajonc and Markus (1975), with the arrival of each additional child, the family's intellectual environment depreciates because a child's intellectual growth is partly controlled by the overall intellectual climate of his household. It appears that children who grow up surrounded by people with higher intellectual levels have a better chance to achieve their maximum intellectual

powers than children who develop in an intellectually diluted environment.

The Confluence Model predicts that its effects are mediated entirely by the age spacing between siblings. In theory, the negative effects of family size can be overcome by age spacing between children. Zajonc hypothesizes that because the oldest sibling acts as a teacher to their younger siblings this gives the oldest child an advantage. According to Zajonc, being an assistant parent gives older children much experience in solving intellectual problems that younger siblings want solved.

Spacing

Research has assessed the relationship between age spacing and intellectual development. Koch (1954) administered the Primary Mental Abilities Test in various public schools. In the case of the Verbal subtest, there were some interesting significant relations with sex, sibling's sex and ordinal position. The child-sex differences, while consistently favorable to the male, are significant only in the subgroups among the first-borns when the age difference between the sibling is two to four years. While those children with a male sibling score higher than those with a female at all spacings, the subgroups differences are significant only among first-borns at the two-to-four year spacing and at both ordinal positions when the siblings differ in age by four to six years. The most conspicuous difference occurred when the siblings differ in age by two-to-four years.

Cicirelli (1967) interpreted age dependence on birth order effects as "some sort of trend where at an early age the later-born child benefits from the stimulation of an older sibling, and at a later age the first-born child profits from his closer exposure to adults." (pp. 482-483)

Schoonover (1959) used the Stanford-Binet test and Stanford Achievement Test to test the hypothesis of the relationship between age interval and degree of resemblance in mental achievement of siblings. The results obtained by the method correlation coefficients for chronological age interval and average score difference for sibling pairs were nonsignificant.

The results of the Tabah and Sutter (1954) research indicated higher I.Q.'s for pairs of widely spaced children than for closely spaced pairs.

Broman (1975) conducted an extensive study of perinatal effects. In this study it was found that children born after long intervals score four points higher on the Stanford-Binet scale than children born after shorter intervals. This difference was independent of the socio-economic status of the parents.

Zajonc (1976) hypothesized that, in a family of two children, the larger the age separation the longer the older child can remain in an environment undiluted by the presence of an intellectually immature sibling. Long birth intervals give older children the benefits of being in a small family for a longer period of time and during an early phase of growth which is sensitive to environmental effects.

Davis (1977) examined the Confluence Model with a cross-cultural sample of Israeli eighth grade students of Asian-African origin. For this sample, achievement scores decreased as a function of birth order in large families. Although the Davis research supports Zajonc's theory concerning declining scores with an increase in family size, the birth interval theory was not substantiated. In fact, change in birth rate, the indirect measure of birth interval used by Zajonc was negative in both Israeli samples.

Laniel (1975) addressed himself to the insufficient control of variables associated with birth order and intelligence. Eighty-four pairs of brothers and sisters from two-child families were compared on the basis of their intellectual superiority. Three statistical analyses, each at three age difference levels, showed that the only instance where the older child would be more intelligence was when the age difference is no more than twenty-four months.

Laniel's findings differ with that of Zajonc and others who stated that the longer the birth interval the more advantageous it is for the oldest child. Chittenden (1968) analyzed school achievement records of 120 pairs of first and second-born siblings from two school systems. The subjects were compared on teacher grades and Iowa Basic Skill scores obtained during upper elementary and junior high school. The data indicated that first-born superiority may be more pronounced for siblings close in age and for first-born girls.

Rosenberg and Sutton-Smith (1969) studied the effects of age spacing and sibling characteristics. American College Entrance Examination (ACE) scores were obtained for 355 male and 658 female

college students in eight sibling categories of the two-child family with age spacing between siblings from one to six years. Results indicated that for males, ordinal position significantly influenced cognitive ability with higher scores for first-borns and larger age spacings, while sex was not influential. For females, ordinal position was not a significant influence on cognitive ability, but higher scores were achieved with the possession of like-sexed siblings and closer age spacings. Closer age spacing appeared to be detrimental to all subtest scores, regardless of birth order and sex of sibling, though the effect was most pronounced at the 3-year age gap.

Further evidence supporting longer birth intervals with increased intellectual performance can be gathered from the study of twins and their cognitive development. Twins score consistently and substantially lower on intelligence tests and other tests of intellectual performance than do non-twins.

Tabah and Sutter (1954) reported an average I.Q. of 89.2 for twins and 101.2 for singly born children among French 6 to 12 year-olds. Koch (1966) and McCall, Appelbaum, Hogarty (1973) agree with this finding. Record, McKeown, and Edwards (1970) found an average verbal reasoning score of 95.7 for twins and 91.6 for triplets.

Record et al., (1970) reported that twins whose co-twins were still-born or died within four weeks achieve nearly the same average intelligence as non-twins. This finding lends credence to the Confluence Model's emphasis on birth intervals and environmental effects. In the Record et al., (1970) research, twins raised singly

had verbal reasoning scores which were higher than those for twins raised together and almost equal to those of single births. This finding provides evidence that the handicapping incurred by twins in respect to measured intelligence is determined after birth.

Tutoring

Zajonc (1975) has suggested that the opportunity to teach is an important factor in intellectual development. This assumption is based upon data which show the only and last child scoring lower on achievement tests. Last-born and only children share a common disadvantage; they have no younger siblings whom they can instruct. The "teacher" role which the oldest sibling possesses allows him to receive feedback from his teaching. Zajonc asserts that being able to teach is intellectually more beneficial than being taught. Hence, the oldest or first-born should derive more mental stimulation from his teacher role. Only and last children are not "teachers" and it is assumed that the relatively low performance scores often reported for them are associated with the lack of opportunity to teach.

Research on the role of tutoring and its' benefits to both the tutor and tutee lend support to Zajonc's speculations.

Morgan and Toy (1970) assessed gains for student tutors and their pupils in a rural school system over a four month period. There was a nine month gain on the Wide Range Achievement Test for tutors and only a three to five month gain for the tutee. In this study it seemed identification with the problems and process of teaching someone else helped the tutors motivationally and behaviorally

back in their classrooms. The tutor had the opportunity to review content material he had not seen recently in order to teach it. Tutoring provided an opportunity for mastery for the tutors.

Feldman and Allen (1973) studied the effects of using low-achievers as tutors. Low-achieving fifth grade children either taught a third grader or studied alone for a series of daily sessions. At the end of the two week period, the low-achievers performed significantly better in the tutoring situation than in the studying alone situation which was a reversal in the direction of the initial difference between situations. There was no differential effect on tutees of being taught versus studying alone. These results suggest that serving as a tutor may be a particularly useful method for enhancing the academic performance of low-achieving children.

Devin-Sheehan, Feldman, and Allen (1976) reviewed research on children tutoring children and concluded that the benefits accruing to the tutor far exceed those accruing to the tutee. In one relevant tutoring program lasting for a four month period, 96 sixth grade low achievers tutored second and third graders in reading or mathematics (Klentschy, 1971). Klentschy examined improvement in the tutors' reading scores and found that only the tutors teaching reading skills improved significantly in reading.

The research on children tutoring children stresses the gains accrued from being a tutor. In the majority of the studies, the role of tutor facilitated learning through teaching. Many of the researchers assert that children need the opportunity to teach in order to learn more effectively.

Zajonc's Current Reinterpretation of Birth Order and I.Q.

In Zajonc's most recent paper (unpublished), it was demonstrated that birth order effects are not only dependent on spacing among siblings, but are also age dependent. For very young children the first-born surpasses the second-born. This advantage is then reversed and a positive birth order effect develops from age three or four until the teens. During the middle teens there is a return to an effect which favors the first-born and which persists until maturity.

The age dependence of birth order effects has been noted previously by Cicirelli (1967) who interpreted it as "some sort of trend where at an early age the later-born child benefits from the stimulation of an older sibling, and at a later age (where the abstract verbal abilities come into play in the school situation) the first-born child profits from his closer exposure to adults." (pp. 482-483)

Research on the Confluence Model

Zajonc's Confluence Model has been tested on diverse populations. In this section, results of this research will be examined and compared with the original findings of Zajonc.

Schaefer (1977) investigated the significance of family related variables, specifically family size and birth order, relation to verbal and performance abilities of 100 black, male, juvenile delinquents between the ages of 11 and 15 years old. Results indicated that family size is significantly related to performance on the Vocabulary subtest but not the Block Design subtest of the WISC-R. No

independent effects were shown for birth order relative to verbal or performance abilities. When ex post facto analysis of family related variables, including spacing, number of siblings, age of siblings, siblings' sex, was conducted all results were nonsignificant related to Vocabulary or Block Design performance when family size was considered.

Page, Grandon, and Velandia (1978) tested the Confluence Model on a population from a developing country. Test scores, family information, and socio-economic data were analyzed for a sample of over 36,000 college applicants in Columbia, South America. The results of this research indicated that the intellectual effects of all family sizes smaller than six surpassed a single child family. It was argued that the difference was populational rather than intra-familial. Further analysis showed that there was almost no family-size effect for the lower socio-economic group among the college applicants. Birth order effects were not consistent across family sizes. Page, Grandon, and Velandia argued that their results disputed the contentions of the Confluence Model because all the birth positions from the brighter families surpassed the single child. However, although Zajonc has stressed the importance of the "opportunity to teach the younger siblings," he did treat the only child as the last-born child. The phenomenon of the "only child/last-child" should produce lower scores in comparison to other birth order ranks.

Page, Grandon, and Velandia (1978) contended that the Confluence Model is inoperable with subjects in South America. Also, their results indicated that socio-economic influences were operating

outside of the intrafamilial pattern as predicted by the Confluence Model.

While the research by Page, Grandon, and Velandia (1978) disputed the findings of Zajonc (1975), the research by Davis, Cahan, and Bashi (1977) on Israeli students of Asian-African origin substantiates the findings of Zajonc. Davis' results showed a decline in achievement with increasing family size. However, the decline is hypothesized to be accounted for by external influences, such as schooling and intellectual development.

Davis, Cahan, and Bashi (1977) regard the unique environment of the Asian-African family as responsible for birth order trends. The Oriental parents tended to be poorly educated, and functioned at a lower intellectual level than the European-American parents. This was particularly true for large families. Thus, as family size increased, these parents were less able to help their children. However, older children in the family who had attended the Israeli schools were likely to have surpassed the parents in the ability to help their younger siblings. The authors proposed that intellectual development should be regarded as a function of both external and home environment, with family size and birth order relevant variables in each.

Grotevant, Scarr, and Weinberg (1977) obtained intelligence test scores for entire families of children and their parents, and then used the Confluence Model to predict children's intelligence from parent scores and from data on family size and sibling spacing. The model was able to account for only 2% of the variance in the

children's intelligence test scores, indicating that the Confluence Model does not apply well to individual families.

Fowler and Richards (1978) investigated academic deficits due to early and continuing parental absence as derived from the Confluence Model. Equal numbers of father-present and father-absent lower-class black kindergarteners (60 of each sex) were assessed on 12 educational preparedness measures. First, the Early Detection Inventory was administered individually by resource teachers. Second, classroom teachers made behavioral ratings for each child on the Social Psychological Adjustment Inventory. Finally, the Metropolitan Readiness Tests were administered. Two years later, they were tested for reading, mathematics, and language arts achievement. A father absence x sex analysis of covariance of preparedness factor scores revealed no significant effects. Similar multivariate analysis of achievement criteria revealed main and interaction effects on the mathematics test. The latter results favored the father-present subjects. Pairwise comparisons suggested that father absence facilitated the mathematics performance of girls more than boys.

Section Six

Section six focuses on father absence and its effects on academic achievement. Assumptions will be made as to how this phenomenon and ordinal position influence cognitive development.

The basic tenet of the Confluence Model is that the course of a child's intellectual development is profoundly influenced by family configuration. It follows directly from this assumption that a one-

parent home constitutes an inferior intellectual environment and should result in intellectual deficits, and that early loss of a parent should produce greater deficits than a loss occurring at a later age. Studies by Broman (1975), Biller (1974), and Lynn (1974) on the effect of the absent father concur with this inference.

Carlsmith (1964) concluded from a sample of Harvard students that there are lasting measurable effects due to the absence of the father at an early age. The age of the child during the father's absence is an important variable.

Early and long separations from the father result in relatively greater ability in verbal areas than in mathematical areas. Whereas, intact families produce relatively greater ability in mathematics.

Sex-Role Identification

Carlsmith (1964) and others have argued that the effects of father absence on cognitive development are mediated by the child's sex-role identification. According to this theory, the "feminine cognitive style" of high verbal and low quantitative performance shown by male college students from fatherless homes is due to their childhood difficulty in forming a masculine identity without a male role model. However, a study by Herzog (1974) of 119 boys in a small fishing and agricultural village in Barbados concluded that differences in masculinity between father present and father absent boys are small and not always uniform. Results of this study indicated that boys with early or complete father absence did better on I.Q., but worse on arithmetic. The I.Q. superiority of father absent boys vanishes if

birth order is controlled.

Research by Blanchard and Biller (1971) concurred with other studies that father absent boys tended to have relatively higher verbal functioning than mathematical ability--suggesting that verbal proficiency is a "feminine cognitive style."

The Quantitative-Verbal difference score phenomenon is not limited to males or to children from fatherless homes. Several studies have found this phenomenon in father absent female subjects (Carlsmith, 1964; Gregory, 1965; Lessing et al., 1970).

Nelson and Maccoby (1966) analyzed a sample of 1,537 male and 419 female college students. The family configuration in this sample consisted of 94 with deceased fathers; 38 with deceased mothers, and 1,824 with both parents living. The Scholastic Aptitude Test was used to measure achievement. Verbal scores were relatively higher than quantitative scores for males but not for females whose fathers died or were away from home for at least a year. For males, mother absence was associated with a larger effect in the same direction.

Gregory (1965) studied 254 female and male college students. 127 subjects lost a parent prior to college and 127 had both parents present. Verbal scores were relatively higher than quantitative for single-parent males.

Although most of the research cited emphasized the intellectual deprivation experienced in fatherless homes, research has shown that other factors can contribute to this deficit. McCord, McCord, and Emily Thurber (1962) found that the child's age when his father left was of great importance among boys whose mothers were warm and

"normal." Boys reared by normal mothers showed feminine-aggressive behavior only if their fathers left when the boys were between the ages of six and twelve.

Studies of children's sex differentiated behavior give reason to believe that the years of middle childhood may be critical ones in the development of sex identification. A study by Sears et al., (1946) found that early differences in sex role behavior between father-absent and father-present boys had begun to disappear by age five. Bach (1946), however, reported evidence of feminization among 6 to 10 year olds whose fathers had been absent one to three years. By the age of 12, the process of sex role identification is probably complete, thus, possibly explaining the absence of feminine-aggressive behavior among older boys raised by "normal" mothers.

Maxwell (1961) studied a sample of 292 male and female children aged 8-13 attending a psychiatric clinic. The family configuration studied consisted of a father absent before or after age five. The WISC was used to give a measure of intellectual functioning. Father absence after age five was negatively related to Comprehension, Picture Completion, Coding, Vocabulary, and Picture Arrangement. There were no effects for absence before age five.

Bloom (1964) has stated that the first five years of a child's life are critical to his intellectual development. But, according to Maxwell, the absence of a parent before the age of five has no significant effect on intellectual development. The Sutton-Smith et al., (1960) research indicated that absence during the first five years are detrimental to the child's cognitive development.

The onset of father absence was studied by Santrock and Wohlford (1970). The Scholastic Aptitude Test and GPA were used to measure achievement. Fifteen (15) father-present, 15 father-absent (due to divorce, desertion, and separation), and 15 father absent (due to death) subjects were used. The onset of absence was equally divided among ages 0-2, 3-5, and 6-9. The results indicated that differences between father-absent and present groups were non-significant. However, the onset of father absence was related to verbal and overall grades with the 3-5 group outperforming the 0-2 and 6-9 groups.

Anxiety

Maccoby and Rau (1966) hypothesized that "anxiety interference" is the cause of quantitative-verbal difference patterns found in middle class students from fatherless families. They suggested that father-absent children are under a great amount of stress, and that stress and tension interfere more with mathematical than verbal performances. They reasoned that mathematical competence required a high level of ego integration and functioning. Nelson and Maccoby (1966) were unable to differentiate between a sex-typing and an anxiety interference interaction in their study of Stanford students' quantitative and verbal performance.

Lessing, Zagorin, and Nelson (1970) studied 311 boys and 122 girls and their WISC subtest and I.Q. scores. A history of prolonged father absence was associated with a lower Performance I.Q. and lower scores on Arithmetic existed for boys only. Working class, father-absent subjects had lower mean verbal and full scale I.Q. scores.

However, among middle class subjects, the father absent children had significantly higher mean Verbal I.Q. than the lower class subjects.

Santrock's (1972) finding of negative cognitive effects immediately following father absence due to divorce, desertion, and separation supports the emotional stress hypothesis. Weininger (1972), in a review of the emotional and behavioral consequence of parent-child separation, found that both brief and long-term separations (over six months) had adverse effects on behavior. Lessing et al., (1970) also found a high incidence of father absence among children in their guidance clinic.

It appears that father absence has an adverse effect on cognitive development. However, in a study by Solomon, Hirsch, Scheinfeld, and Jackson (1972) which investigated the relationship of sex, father absence, family size, and birth order to general academic achievement in a sample of 149 urban, black, ghetto fifth-graders, no significant effect on achievement was found for father absence. In a comparative study of school performance among boys from broken and intact black families, Wasserman (1972) found no statistical significance.

Restoration of adult presence has beneficial effects for the child. Remarriage of the remaining parent, especially if it occurs early in a child's life, results in improved intellectual performance. In a study by Lessing et al., (1960) father-absent children with a step-father in the home did not differ significantly from their father-present peers.

Income

In Shinn's (1978) review of father absence, she argues that the straitened financial circumstances of mother-headed homes is the major cause of observed effects of father absence on children's cognitive development. For example, Carlsmith (1964) investigated all Harvard undergraduates whose fathers had been in military service. Income was not a determining factor in the decrease in performance.

Parental Interest

The association between partial absence or low father availability and poor cognitive performance in children suggest another explanation for father absence effects: children from fatherless homes receive less parental attention than children from intact homes, and the reduced interaction is an important determinant of their cognitive development. Shinn (1978) states "permanent father absence is simply the lower endpoint of a continuum of father-child interaction."

(p. 300)

According to Shinn (1978), in America, employed men with children spend an average of 20 hours per week engaged primarily in activities with children. Father absence clearly affects the amount of time that fathers spend with their children, even if the absence is not due to death or military service.

Disorganization in divorced families also affect the amount of time mothers devote to their children. In a study by Hetherington et al. (Note 1), divorced mothers were less likely than mothers in intact homes to eat dinner with their children or to read to them at

bedtime. The quality as well as the quantity of interaction suffered. Divorced parents made fewer maturity demands on their children and were less likely to ask their opinions or use reasoning and explanation than were parents in intact familial situations.

Eysenck (1970) investigated family size, birth order, parental occupation, and parental interest in relation to personality, intelligence, and school achievement of 4,000 eleven year olds. The results indicated that smaller families were associated with brighter, more extroverted and less neurotic children. Parental occupation was associated with extroversion and stability in children, and with intelligence and achievement. Parental interest was strongly associated with intelligence and achievement.

Parental attention is affected by both the number of parents and the number of children in the family. Earlier discussion of the Confluence Model cited the function of a child's intellectual environment in his cognitive growth. The child's intellectual environment is represented as a function of the absolute intellectual level of all individuals in the family. The birth of new children dilutes the intellectual environment and slows cognitive development. Similarly, the absence of a parent has a negative impact on the intellectual environment. Children from large families may well attain lower scores on I.Q. tests than children from small families because parental attention must be spread more thinly.

Solomon et al.'s (1972) study of family configuration effects on academic achievement found that children raised by grandparents, foster parents, and other relatives outscored children from intact

and father-absent families. These children were often raised in very small households in which they are likely to receive a great deal of attention from adults.

Extended families, which are more prevalent among blacks than whites, may mitigate the adverse effect of absence, thus accounting for the slightly lower percentage of studies which found such effects for black rather than for white samples. The Solomon et al. (1972) study and Wasserman (1972) results of non-significance for father absence and achievement might be attributed to the extended families in their black samples.

It is the quality and quantity of attention, not the presence of a father, which is important. Biller (1974) reviewed studies showing that "inadequate fathering is frequently in the backgrounds of academic underachievers." (p. 152) A sample of third grade boys revealed that highly available fathers seem to afford their sons models of perserverance and achievement motivation. In the Biller study, low-father presence did not appear to have as disruptive an effect on academic performance as did early father absence.

Landy, Rosenberg, and Sutton-Smith (1969) studied the effects of fathers working night shift work on the quantitative performance of 100 females. The results showed that children under the age of 19 were adversely affected. It was hypothesized that when a man works on the night shift for long periods of time, his children will display behavioral patterns similar to those discovered in families where the father has been totally absent. Absence effects in the Landy study were due to the decreased amount of interaction between father and

child.

Lambert and Hart (1976) reported that parents' interest in their childrens' school achievement is important to school progress. Children whose fathers joined their mothers in discussing the child's school progress with the teacher scored at least seven months higher in reading and math than children whose fathers were not involved. When neither parent talked with the teacher, the child's achievement was more regressed. A low level of involvement among fathers was related to financial difficulties and large family sizes.

The findings of Lambert and Hart (1976) should hold true more so for lower income families because of the fathers' inability to schedule his work around school hours. However, in most middle class families, white-collar workers can arrange time off to attend conferences along with the mother.

Radin (1972, 1973) observed fathers interacting with their four-year old sons and examined the correlations between paternal nurturance and restrictiveness and boys' I.Q. scores measured at the same time one year later. 42 father-son pairs were interviewed in the home. Nurturance was positively correlated with the son's I.Q. Direct teaching activities reported by the father at the pre-test were positively correlated with the son's I.Q. one year later for the middle and lower social classes. This study strongly supports an earlier contention that the quality of interaction was more important than its quantity.

Lessing et al. (1970; Santrock, 1972; Solomon, 1972) reported that father surrogates and step-fathers had remedial effects on father

absent children's performance on cognitive tests.

Sutton-Smith et al. (1968) reported an increase in the magnitude of father absence effects as the number of children in the family increased. The suggestion is that the mother can more adequately compensate for father absence in a small family, but cannot carry out the role of mother and father in large families.

The results of research on father absence do not indicate any clear pattern for mothers. In the Hetherington et al. (1975) study of middle class mothers, less time was spent with the children by their mothers. Longabough (1973), in a study of 51 black mother-child pairs, found that mothers in father absence families in some cases offer "interpersonal resources" such as autonomy more than mothers in father present families.

Ferdinand (1975) compared the school grades for good behavior, diligence, attention, speaking, essay writing, spelling, and arithmetic of three groups of second graders: 353 with nonworking mothers, 122 with mothers working half-time, and 53 with mothers working full time. All grades decreased as the mother's working time increased. When grades were grouped according to the number of siblings, a decrease in achievement was observed for families with three or more siblings.

Placement

Pringle (1974) compared a national group of illegitimate children born in 1958 with adopted and legitimate children born in the same week. By the age of seven most of the illegitimately born

were living in some kind of two-parent situation but only 1 in 4 lived with both of their natural parents. Three times as many illegitimate as legitimate children were placed in day care centers and five times as many experienced separation from home. The illegitimate children had slower intellectual development. Nearly twice as many illegitimate children had behavior and adjustment problems in school.

Jenkins (1958) found that among blacks receiving Aid to Dependent Children in grades 4-12, illegitimate children scored lower than legitimate children in teacher-rated academic performance. In both groups, a high level of father absence existed in the sample.

In the next chapter, the author will present the methodology used to study the Confluence Model and parental absence.

CHAPTER III

METHOD

Subjects

The subjects consisted of 308 students enrolled in the School of General Studies at Purdue University-Calumet Campus during the Spring semester of 1978. The students in the School of General Studies are generally classified into the following categories: undecided, deficient, and academically unprepared. The undecided students have not declared a major field of study. The deficient students have Scholastic Aptitude Test (SAT) scores lower than a composite of 750 or have class rankings in the lower half of their graduating classes and are not permitted to enroll in the regular degreed programs. The academically unprepared student enters the School of General Studies without a high school diploma and is permitted to take 16 hours of course work usually with the intention of taking the G.E.D. test.

One thousand, three hundred and forty-one students were enrolled in the School of General Studies and 763 students qualified for the study. Of these, 308 returned questionnaires suitable for analysis. The following racial distribution was obtained: 227 Caucasian, 50 Black, 28 Hispanic, 2 Asian, and 1 Indian/Alaskan. Sexwise, the sample consisted of 124 males and 184 females. Also, 84 first-borns were included among the subjects.

The white students in the School of General Studies have been described as students who pursued a college preparatory program in high school but failed to score 750 or above on the SAT. The black students have been characterized as having an average level of achievement but did not pursue a college preparatory program in high school. However, many of the black students who did not take college preparatory courses took the SAT and entered Purdue in the School of General Studies where they can fulfill the requirements for admission to a regular degreed program.

Students enrolled in the School of General Studies are characterized as atypical when compared to the regular student enrolled at Purdue because, in comparison, regularly admitted freshmen have SAT scores above 750 and class ranks above the 50th percentile. Only 4 percent of the students in the School of General Studies were in the top 10 percent of their high school classes. During the 1978 Spring semester, the median class rank for these students was in the 49th percentile.

During the 1977-78 academic year, the mean scores on the Scholastic Aptitude Test for the sample were 354 for the verbal section and 372 for the mathematical section. The mean for the composite score was 726. Whereas, the regularly admitted freshmen had a verbal mean score of 410 and a mathematical mean score of 450. The mean of the composite score for the regularly admitted freshmen was 860. The reported national means were 426 for the verbal section, 428 for the mathematical section, and 854 for the composite score. The SAT scores of the students in the School of General Studies are

substantially lower than the national mean and regularly admitted freshmen at Purdue.

Subjects were selected on the basis of available SAT scores. The subjects ranged in age from 17 to 52 years old with a median age of 20.

Measurement of Achievement

The Scholastic Aptitude Test (SAT) is a two and one-half hour multiple-choice test that measures developed verbal and mathematical reasoning abilities. It is intended to supplement the secondary school record and other information in assessing competence for college work. The SAT provides separate verbal and mathematical scores as well as verbal subscores in reading comprehension and vocabulary. The verbal sections of the SAT contain four types of questions: sentence completion, reading passages, antonyms, and analogies. The mathematical questions were classified in three major categories: arithmetic, algebra, and geometry. The mathematical questions emphasize problem-solving skills at a variety of levels from the routine to creative.

The SAT scores used in the study were a composite of all the student's SAT-verbal and mathematical scores.

Procedure

Information about the age of each of the subject's siblings and the adults present in the home before graduation from high school was obtained from a questionnaire. The subjects responded to a one page questionnaire. Seven hundred and sixty-three questionnaires were

mailed with stamped self-addressed envelopes. The first half of the questionnaire asked for biographical information including name, birth date, age of brothers and sisters, and whether all siblings were presently alive. The other half of the questionnaire dealt with social factors such as parental occupation, employment status, birth order, family structure, presence of parent(s), cause of parental absence, and time parental absence occurred. (See Appendix A)

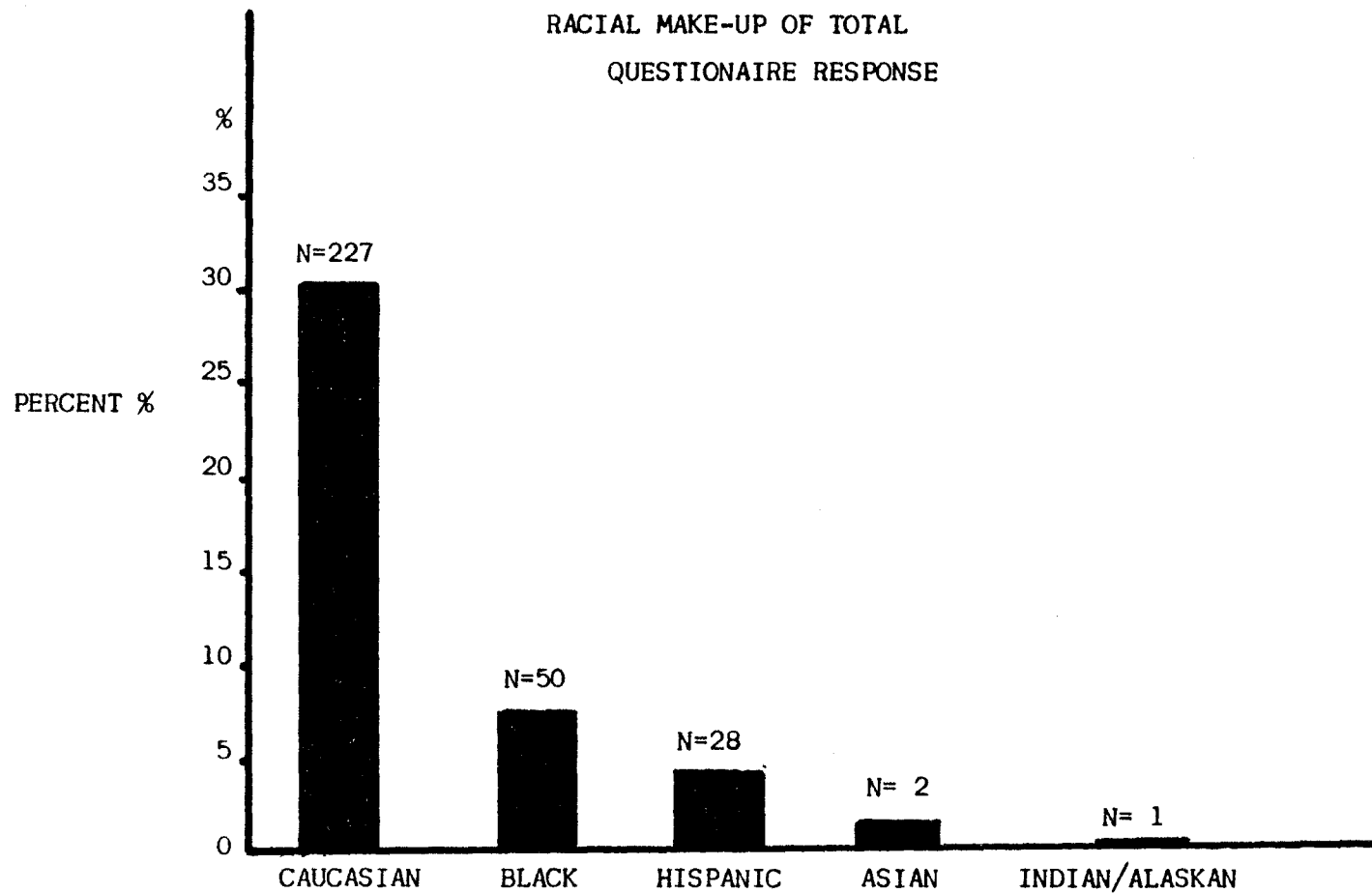
The experimenter included an explanatory letter detailing the purpose of the study and asking the students for their participation. The subjects were given two weeks in which to return the questionnaire.

Three hundred and eight students returned the questionnaires which was about a 40 percent rate of return. (See Figure 1) The small rate of return can be contributed to the fact that the questionnaires were sent out during Summer school and many of the students were out of town.

Racial identification and Scholastic Aptitude Test (SAT) scores were obtained from the computer print-out for the students enrolled in the School of General Studies.

Definitions

Socioeconomic Status. One of the most frequently used indices of socioeconomic status in survey research is occupational prestige, which is normally operationalized along the lines of Duncan (1961). Duncan's Socio-Economic Index will be used as a measure of socioeconomic status. In standard survey research procedure, each respondent is asked to give a description of his occupation. The



NUMBER OF QUESTIONNAIRES SENT OUT 763

NUMBER OF QUESTIONNAIRES RETURNED 308

FIGURE 1

respondent's description is later translated into an occupational code number to which a previously determined prestige score is attached. The definition of socioeconomic status, then, as it will be used in this study, is based on the Duncan Index. The occupational prestige scores reported are those of the father and mother and an average of their combined scores.

Birth Order. Birth order in this study is defined as the respondent's ordinal position in relationship to his or her siblings.

Birth Intervals. Minimum spacing in years between adjacent sibling age categories.

Family Size. The Confluence Model depends primarily on two variables--family size and birth order. To obtain family size, the students were asked to list the number and ages of their living brothers and sisters. The number of siblings living plus one for the respondent student becomes the family size.

Family Structure

Nuclear. Both parents living in the household.

Extended. Both parents and other relatives living in the household.

Fractured. The presence of only one parent in the household as a result of death, divorce, separation or other unspecified reasons.

Restructured. The entry of another adult into a single parent household.

Parental Absence. The period in an individual's life when absence occurred. Absence is measured

before age five or after age five.

The Statement of the Problem

This research proposes to identify and evaluate the effects of birth order and parental absence on the achievement of a selected population of college students.

1. The first subproblem. The first subproblem is to determine whether there are significant birth order effects on composite achievement for the selected population and, if so, if they differ from prior studies on other populations.

2. The second subproblem. The second subproblem is to determine whether there are significant birth order and family size effects on composite achievement for the selected population and, if so, in what ways they compare to those predicted by the Confluence Model.

3. The third subproblem. The third subproblem is to determine whether there are significant effects of birth order, family size, and parental absence on composite achievement for the selected population and, if so, in what ways they compare to those predicted by the Confluence Model.

The Hypotheses

General Hypothesis

There will be significant birth order and parental absence effects on the total score of the Scholastic Aptitude Test.

Specific Hypotheses

1. First-borns will score significantly higher than later borns on the composite of the Scholastic Aptitude Test.

2. Subjects from father absent homes will score lower on the composite of the Scholastic Aptitude Test than subjects from father present families.

3. There will be significant birth order, parental absence, and sex effects on the composite of the Scholastic Aptitude Test.

(a) Female subjects of all birth orders from a father absent home will score lower on the composite of the Scholastic Aptitude Test than female subjects from father present homes.

(b) Male subjects of all birth orders from a father absent home will score lower on the composite of the Scholastic Aptitude Test than male subjects from father present homes.

4. There will be significant birth order, early parental absence (before age five), and sex effects on achievement for the selected population.

Path Analysis

Path analysis developed by Wright (1960), and mainly used in population genetics, was popularized by Duncan (1966) in the social sciences. It is a powerful aid to axiomatic deductions "and".... a method applied to a causal model formulated by the researcher on the basis of knowledge and theoretical considerations" (Kerlinger, 1973, p. 305). The main focus of path analysis is the problem of interpretation of related variables.

As Duncan (1966, p. 7) says:

The great merit of the path scheme, then, is that it makes the assumption explicit and tends to force the discussion to be at

least internally consistent, so that mutually incompatible assumptions are not introduced surreptitiously into different parts of an argument extending over scores of pages. With the causal scheme made explicit, moreover, it is in a form that enables criticism to be sharply focused and hence potentially perchance, to the conduct of future inquiry.

The assumed causal scheme of variables is presented in a path diagram, which is a visual presentation of variables in their temporal sequence and presumed causal direction. In the causal model, a distinction is made between exogenous and endogenous variables. An exogenous variable is a variable whose variability is assumed to be determined by causes outside the causal model. Consequently, the determination of an exogenous variable is not under consideration in the model. An endogenous variable is one whose variation is explained by exogenous or endogenous variables in the system.

The model being used in this study is recursive. This means that the causal flow in the model is unidirectional, which means that at a given point in time a variable cannot be both a cause and an effect of another variable.

In order to simplify the presentation of path diagrams it is convenient not to present the residuals, and the assumptions pertaining to them are not ignored but are discussed in terms of the model.

A path diagram consists of a set of points, each point representing a variable, and a set of lines to each of which a numerical quantity has been assigned. The variables are measured on an interval scale.

Each endogenous (dependent) variable in a causal model may be represented by an equation consisting of the variables upon which it

is assumed to be dependent, and a term representing residuals, or variables not under consideration in the given model. For each independent variable in the equation there is a path coefficient indicating the amount of expected change in the dependent variable as a result of a unit change in the independent variable. Exogenous variables are assumed to be dependent on variables not included in the model, and are therefore represented by a residual term only.

Multiple regression is used to find each path coefficient which is expressed as a BETA. At each stage of regression for path analysis, a variable taken as dependent is regressed on the variables upon which it is assumed to depend. The calculated Betas are the path coefficients for the paths leading from the particular set of independent variables to the dependent variable under consideration.

When there is only one independent variable and one dependent variable, a univariate association is obtained with a Pearson product-moment correlation. However, a partial Pearson product-moment correlation is obtained when two or more independent variables are analyzed with the dependent variable. In path analysis, when there are two or more independent variables, indirect effects must be considered.

Path coefficients are used to determine causal relationships.

Wright (1934) defines a path coefficient as:

The fraction of the standard deviation of the dependent variable (with the appropriate sign) for which the designated factor is directly responsible, in the sense of the fraction which would be found if this factor varies to the same extent as in the observed data while all others (including the residual factors...) are constant (p. 162).

In summary, path coefficients indicate the direct effect of a variable

assumed to be the "cause" on the variable assumed to be an effect, controlling for all other variables.

General Path Model

By applying the assumption and methods of path analysis a model was developed. (See Appendix)

The temporal ordering of the variables to represent the perceived causal sequence is presented as follows:

Exogenous Variables

Sex of Respondent	(S)
Social Economic Status	(SES)
Race	(R)
Age of Respondent	(AR)
Birth Order	(BO)

Endogenous Variables (Mediating Variables)

Employment Status	(ES)
Family Size	(FSz)
Age of next oldest brother	(ANOB)
Age of next oldest sister	(ANOS)
Family Structure	(FSt)
Adults in the family	(AdF)
Parental Absence	(PA)

Dependent Variable

Total Score of the Scholastic Aptitude Test	(SAT)
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Measurement of Variables

Although race and family structure variables were classified

according to specific racial categories and family structures, they had to be statistically measured as white vs. other racial groups and nuclear family structure vs. other family structures. The aforementioned dichotomies were used for better interpretation despite the fact that information was lost as a result of this redefinition. The sample size limited specific analysis of each racial category and family structure.

Birth order is measured statistically as first-born vs. later born. The age spacing for birth order was defined as the adjacent spacing between the respondent and next oldest sibling.

Father absence was determined by the response to the question, "What adults lived with you before you graduated from high school?" If the father was absent, the decision was based on the presence of Mother only. (See Appendix B)

The statistics are reviewed and discussed in the "Results" section of Chapter IV.

CHAPTER IV

RESULTS

A Pearson-product moment correlation was done to determine the separate effects of the independent and antecedent variables on the Scholastic Aptitude Test total score. Table 1 contains the relevant Pearson correlations of the study. It is apparent from this table that the relationships between the independent variables--sex, race, socioeconomic status, age of respondent, birth order, family size, family structure, age of next oldest brother, age of next oldest sister, father absence, time of parental absence, employment status and the dependent variable, Scholastic Aptitude Test total score are negative and low.

Table 2 summarizes the direct effect of the antecedent variables on achievement. The correlations in Table 2 are generally low and nonsignificant. Race of the respondent, however, is moderately and negatively related to achievement at $-.36$. The subjects from the minority group scored higher on the SAT than the white subjects in the sample. This scoring effect is due to the "ethnic" origin of the School of General Studies. White students in the School of General Studies are there because they are academically deficient. Generally, white students who make application to the university are admitted to degreed programs. However, minority students are usually enrolled in the School of General Studies because they lack college preparatory courses such as a language and mathematics. Otherwise, the minority

Table 1

Pearson Correlation Coefficients

	Sex	Race	SES	Age	B.O.	Fam.Sz.	Fam.St.	A.N.O.B.	A.N.O.S.	F.A.	P.A.	E.S.	Ach.
Ach.	.030	-.289	.150	.065	-.05	-.09	-.049	-.027	-.054	.152	-.121	-.086	1.0
E.S.	-.081	.163	-.186	-.119	.135	.053	.05	.143	.039	-.099	.139	1.0	
P.A.	-.005	.150	-.101	-.001	.001	.032	.681	-.036	-.043	-.811	1.0		
F.A.	.005	-.313	.116	.08	.041	-.0007	-.626	.085	.073	1.0			
A.N.O.S.	-.032	-.056	-.114	-.056	.262	.111	-.04	.154	1.0				
A.N.O.B.	.058	.041	-.068	-.010	.336	.192	-.08	1.0					
Fam.St.	.09	.175	-.04	.037	-.09	-.059	1.0						
Fam.Sz.	-.017	.217	-.191	.009	.6320	1.0							
B.O.	-.012	.158	-.227	-.020	1.0								
Age	.056	.002	-.092	1.0									
SES	-.023	-.28	1.0										
Race	.025	1.0											
Sex	1.0												

Sex = Sex of Respondent

Race = Race of Respondent

SES = Socioeconomic Status of Parents

Age = Age of Respondent

B.O. = Birth Order

Fam.Sz. = Family Size

A.N.O.B. = Age of next oldest brother

A.N.O.S. = Age of next oldest sister

F.A. = Father Absence

P.A. = Time of Parental Absence

E.S. = Employment Status

Ach. = Achievement-SAT-Total score

Table 2

Correlation Coefficients of Antecedent Variables and Achievement

Dependent Variable	Antecedent Variables	Correlation Coefficients
SAT Total Score	Sex of Respondent	.03
	SES of Parents	.15
	Race of Respondent	-.36
	Age of Respondent	.07
	Birth Order of Respondent	-.05

students are of average ability.

Table 3 summarizes the direct effect of the endogenous variables on achievement. Findings of the relationship between the endogenous variables and achievement are low and nonsignificant. For example, time of parental absence is negatively related to achievement at $-.121$. Whereas, father absence is positively related to achievement at $.152$.

Multiple regression analysis was done to determine presumed relationships between the endogenous variables and the dependent variable achievement. A path analysis was then carried out to illustrate the hypothesized "causal" relationships obtained from the multiple regression findings.

Table 4 summarizes the regression findings for socioeconomic status of parents and those variables which logically interpret the direct relationship between socioeconomic status and achievement. Figure 2 illustrates the path findings reported in Table 4.

An examination of Figure 2A illustrates the following relationships: To begin with, there is a small but positive influence of SES on achievement ($.15$). This means that children coming from higher-SES backgrounds tend to do better on these types of standardized achievement tests. This finding of the influence of social class background on achievement has been illustrated many times in both the sociological and psychological literature (e.g. Boocock, 1972). Of interest here, however, is an examination of the influence of SES not only directly, but indirectly, on the achievement variable. When the variable Family Size is viewed as a "mediating" variable, Figure 2A shows that there is a small ($.137$) but positive relationship between

Table 3

Correlation Coefficients of Endogenous Variables and Achievement

Dependent Variable	Mediating Variables	Correlation Coefficients
SAT Total Score	Family Size	-.09
	Family Structure	-.05
	Time of Parental Absence	-.12
	Father Absence	.15
	Age of Next Oldest Sister	-.05
	Age of Next Oldest Brother	-.03

Table 4
Regression Findings for SES and Family Related Variables

Dependent Variable	Independent Variable	R ²	B	beta	Standard Error B	Univariate F Statistic	Path Analysis F Statistic
Total Score of SAT	SES of Parents	.03	.4800	.1371	.2014	5.678	4.2334
	Family Size		-4.461	-.0680	3.775	1.397	sig.=.01
			Residual Variance=.9848				
	SES of Parents	.02	.5191	.1483	.1981	6.864	3.8100
	Fam. Struct.		-13.252	-.0427	17.565	0.569	sig.=.025
			Residual Variance=.9899				
	SES of Parents	.03	.4875	.1392	.19803	6.062	5.3570
	Parental Abs.		-20.747	-.1072	10.944	3.593	sig.=.01
			Residual Variance=.9848				
	SES of Parents	.04	.4703	.1343	.1979	5.643	4.323
	Adults=Father's Presence		54.417	.1433	36.575	2.214	sig.=.01
	Parental Abs.		1.663	.0086	18.606	.008	
			Residual Variance=.9797				
	SES of Parents	.03	.4811	.1374	.2016	5.696	2.8879
	Employ. Status		-16.780	-.0588	16.432	1.043	sig.=.05
	Family Struct.		-12.403	-.0399	17.584	0.498	
			Residual Variance=.9848				
	SES of Parents	.04	.4825	.1378	.1983	5.920	3.7416
	Parental Abs.		-28.141	-.1454	14.954	3.541	sig.=.025
	Fam. Struct.		17.345	.0559	23.882	0.528	
			Residual Variance=.9797				
	SES of Parents	.04	.4611	.1317	.1982	5.414	3.4951
	Adult=Father's Presence		60.965	.1606	37.151	2.693	sig.=.025
	Parental Abs.		-6.002	-.0310	20.109	0.089	
	Fam. Struct.		24.308	.0783	24.191	1.010	
			Residual Variance=.9797				

Table 4 (cont.)

Dependent Variable	Independent Variable	R ²	B	beta	Standard Error B	Univariate F Statistic	Path Analysis F Statistic
Total Score of SAT	SES of Parents	.02	.4761	.1360	.2017	5.570	2.0133
	Family Size		-4.054	-.0618	3.844	1.113	sig.=.05
	Age of next oldest bro.		-1.029	-.033	1.780	0.335	
	Residual Variance=.9899						
	SES of Parents	.02	.4784	.1366	.2027	5.571	1.8397
	Family Size		-4.433	-.0675	3.797	1.363	sig.=.05
	Age of next oldest sist.		-.1339	-.0046	1.640	0.007	
	Residual Variance=.9899						

LEGEND FOR FIGURE

- 2 -

SE. S. = Socioeconomic Status of Parents
E.S. = Employment Status of Parents
F. SZ = Family Size
F. ST. = Family Structure
ADULTS = Father Absence
P.A. = Parental Absence
A.N.O.S. = Age of Next Oldest Sister
A.N.O.B. = Age of Next Oldest Brother
SAT TOTAL = Scholastic Aptitude Test Total

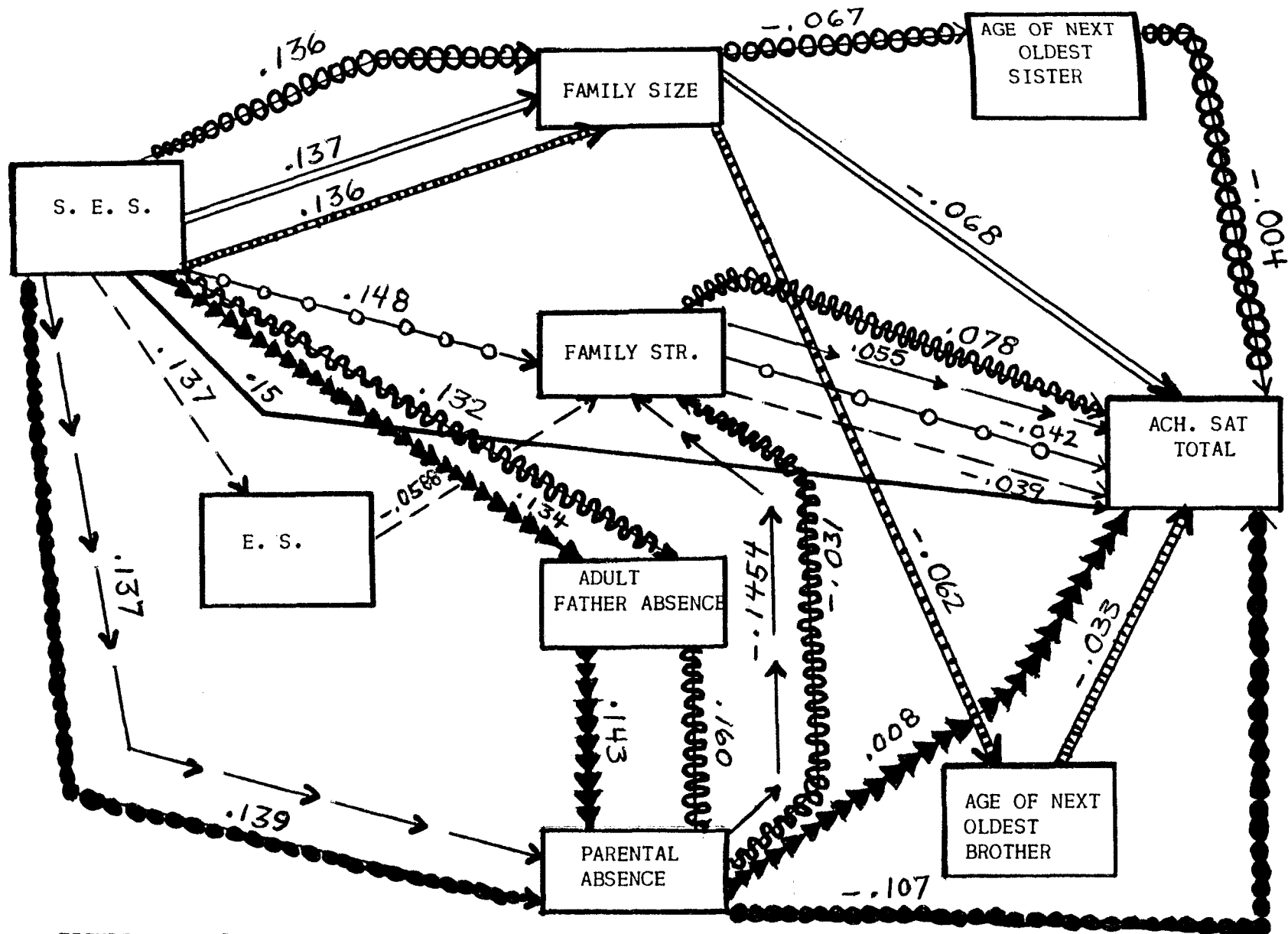


FIGURE..... 2

PATH MODEL OF S.E.S. AND FAMILY RELATED VARIABLES

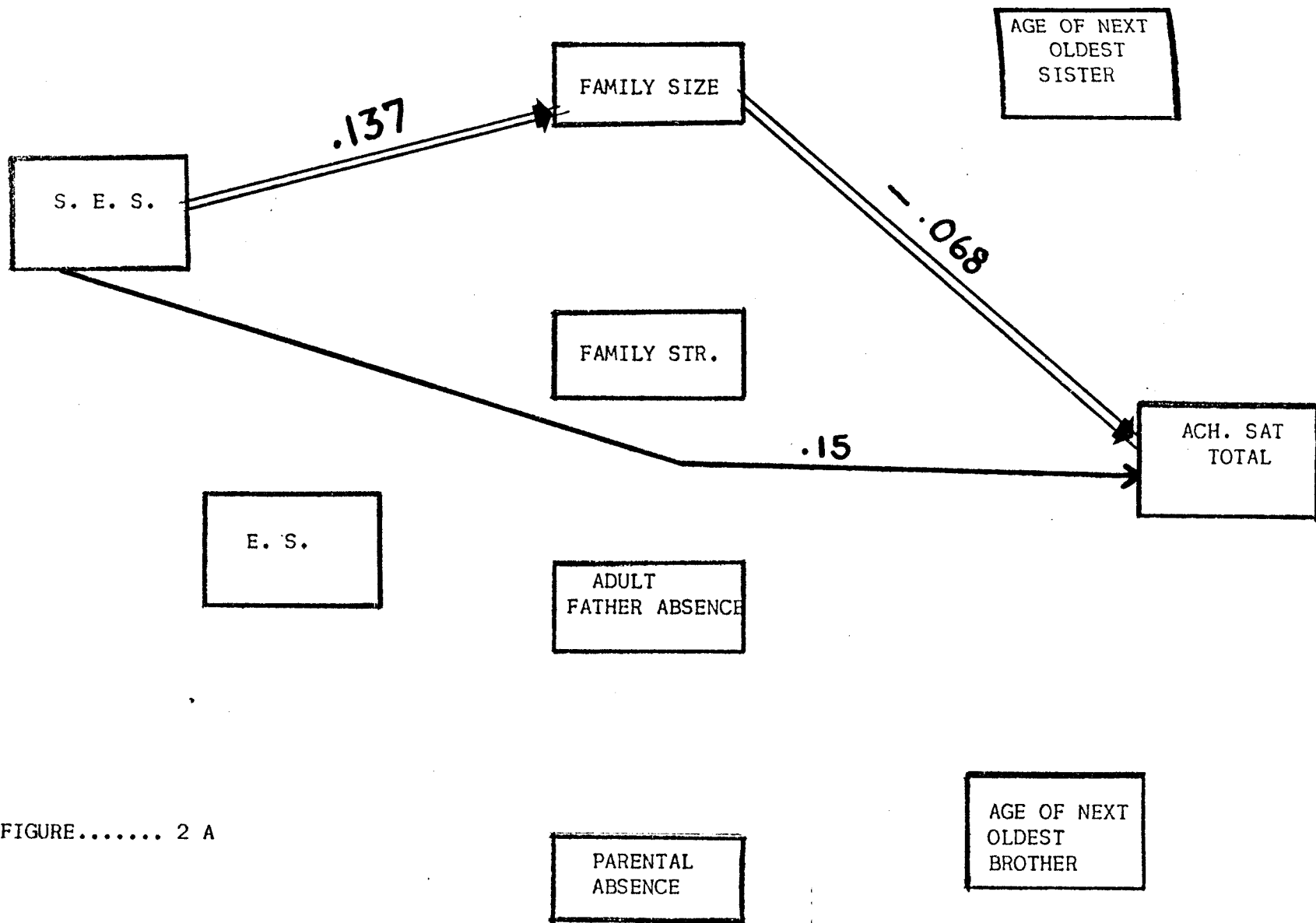


FIGURE..... 2 A

PATH MODEL OF S.E.S., FAMILY SIZE, AND ACHIEVEMENT

SES and Family Size and a nonsignificant path from Family Size to achievement. This means that General Studies students from higher SES levels tend to come from larger families, but that the effect of F.Sz. itself on achievement is negligible.

Sewall Wright (1921) developed the "multiplication rule" which allows us to examine the direct and indirect effects (Betas) which, when summed, equal the total correlation. In this manner, we can determine which causal paths have the most important effect upon a single variable.

When one examines the total indirect effect (.137) (.055), it can be seen that F.Sz. does not interpret the original relationship between SES and achievement. Therefore, Family Size in this study is not importantly related to achievement alone or as a significant mediating influence. The multiple R squared accounts for about 3% of the observed variance of which SES is the only significant contributor.

When socioeconomic status, family structure, and achievement are examined, the father's occupation is significantly related to the family structure (.148). (Figure 2B) Family structure, however, has a nonsignificant relationship with achievement of $-.0427$ ($F = 1.397$). When family structure is viewed as a "mediating" variable, it has a negligible effect on achievement. However, the influence of SES on family structure means that General Studies students coming from higher SES levels tend to come from nuclear family structures. The finding of the influence of SES on family structure is consistent with sociological findings that high socioeconomic levels are generally

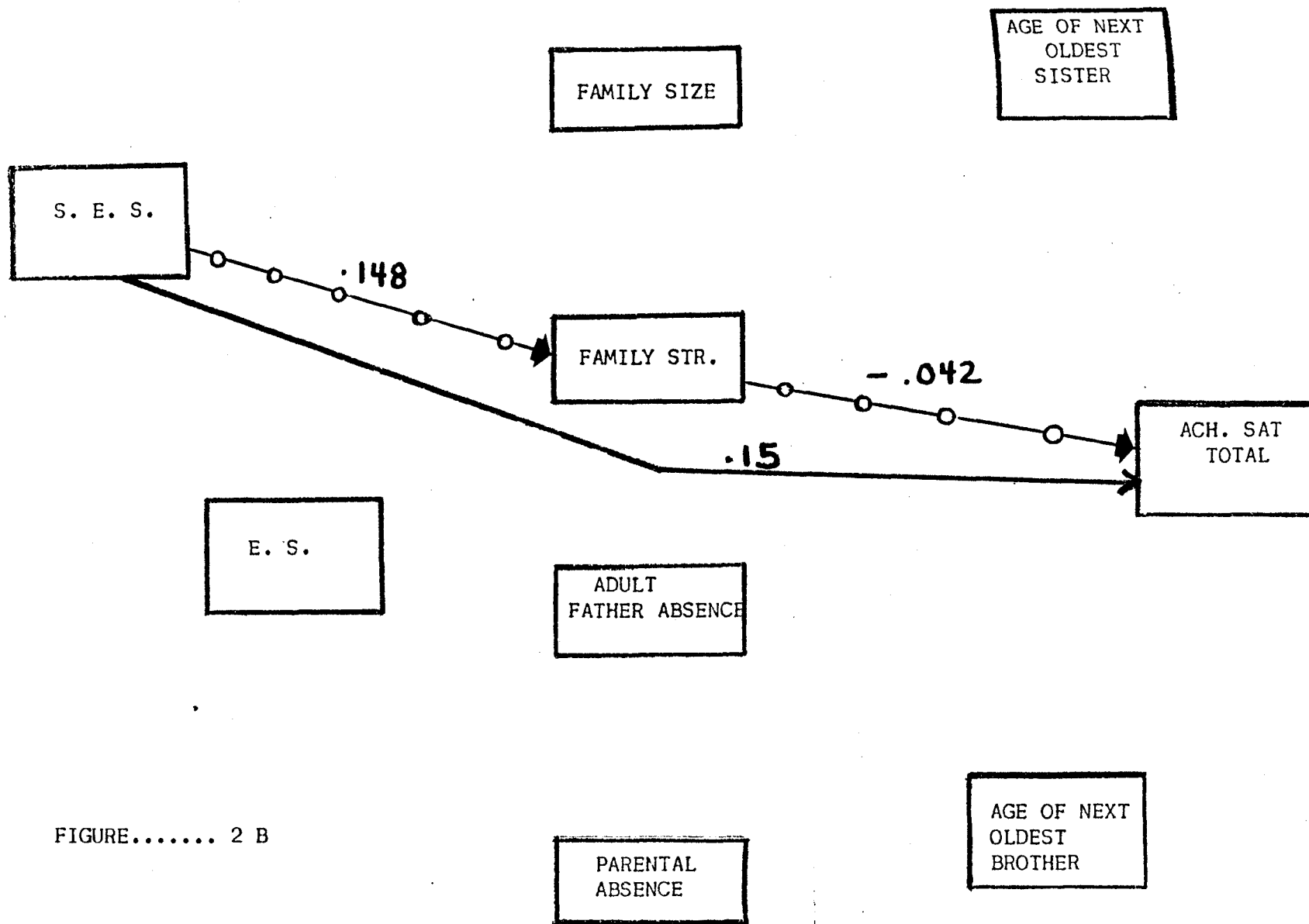


FIGURE..... 2 B

PATH MODEL OF S.E.S., FAMILY STRUCTURE, AND ACHIEVEMENT

associated with family stability (Poole & Kuhn, 1973). The lack of significance of family structure may be associated with the prevalence of extended families in the minority sample. Solomon et al. (1972) found nonsignificant results for achievement and extended families.

When one examines the total indirect effect (.148) (-.042), it can be seen that, similarly to Family Size, Family Structure does not interpret the original relationship between SES and achievement. The R squared accounts for about 2% of the observed variance to which socioeconomic status is the only significant contributor.

Next, socioeconomic status, time of parental absence, and achievement were examined. (Figure 2C) In this equation, socioeconomic status is statistically significant with a Beta of .139 ($F = 6.062$). The multiple R squared accounts for about 3% of the observed variance to which SES and time of parental absence are significant contributors. Therefore, SES of the father has a positive influence on the time of parental absence. It appears that when parental absence occurs after age five, children tend to perform poorly on tests of achievement. This finding of deleterious effects of father absence beginning after age five is consistent with other findings (Maxwell, 1961; Shelton, 1968). Most studies suggest that father absence during the preschool years may be more detrimental than later absence.

Upon examining the total indirect effect (.139) (-.107), it can be seen that time of parental absence does not substantially interpret the original relationship (.15) between SES and Achievement. Consequently, time of parental absence does not have a significant mediating influence.

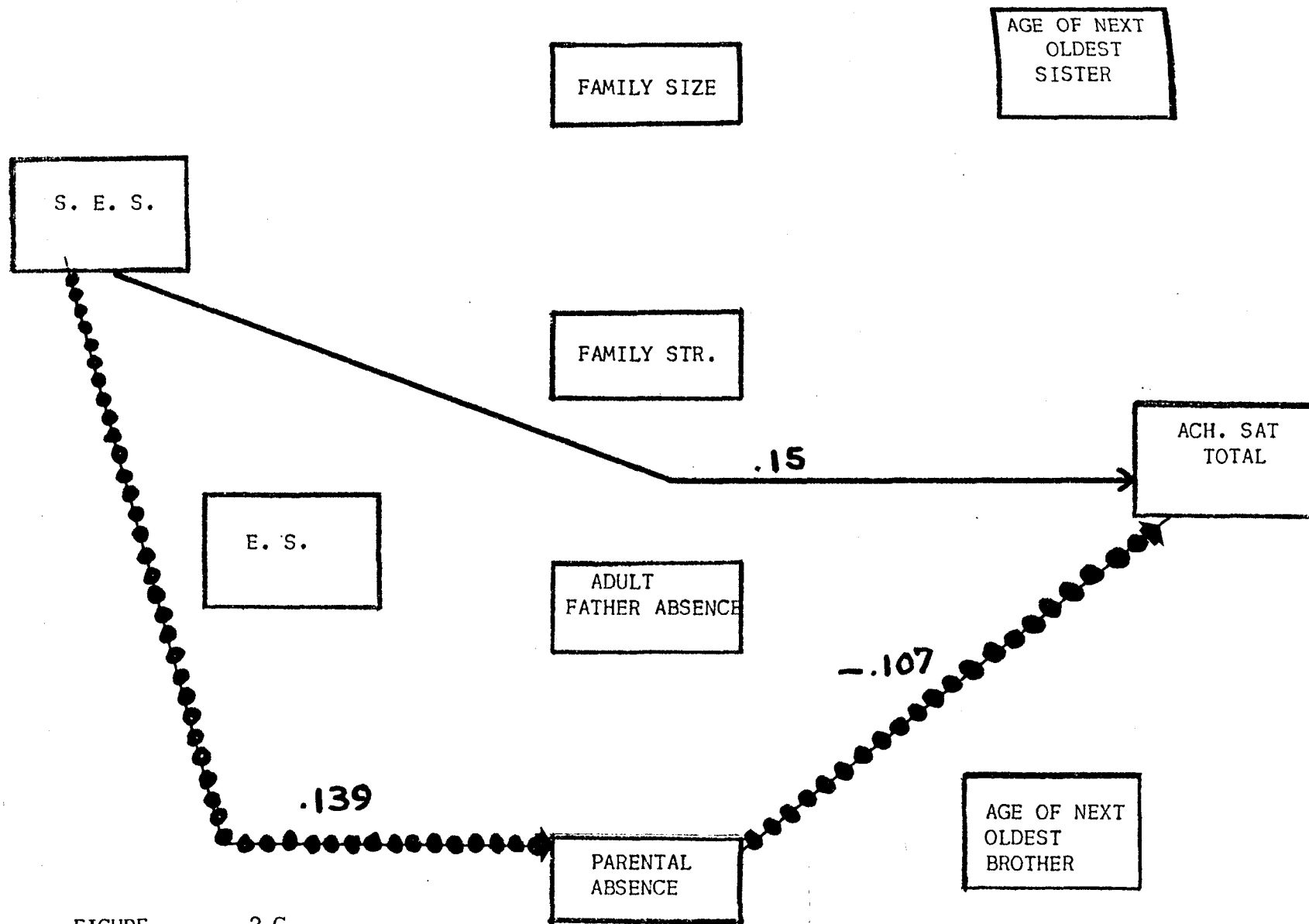


FIGURE..... 2 C

PATH MODEL OF S.E.S. , P.A. , AND ACHIEVEMENT

In Table 4 it was illustrated that when socioeconomic status, father absence, time of parental absence, and achievement were examined, significance was obtained for SES (.134) and father absence (.143). An examination of Figure 2D illustrates the following relationships: To begin with, there is a small but positive influence on SES or achievement (.15). When SES is examined indirectly with father absence and time of parental absence, we find a small but significant influence of SES on father absence (.134). High SES households tend to have more fathers present. In these households, fathers are present during the preschool years. However, time of parental absence had a negligible effect on achievement.

Father absence and time of parental absence does not interpret the direct effects of SES on achievement. The multiple R squared accounts for about 4% of the observed variance of which SES and father absence are the only significant contributors. Therefore, time of parental absence is not importantly related to achievement alone when SES and father absence are involved.

Next, socioeconomic status, employment status, and family structure were examined.(Figure 2E) Once more, SES has a small but positive influence on employment status (.137). Subjects from higher socioeconomic levels had fathers who were steadily employed. When the other "mediating" variables are included for examination, it was found that employment status did not influence the family structure. Likewise, family structure had little influence on achievement. The inclusion of these "mediating" variables did not interpret the original relationship of SES and Achievement (.15). The multiple R squared

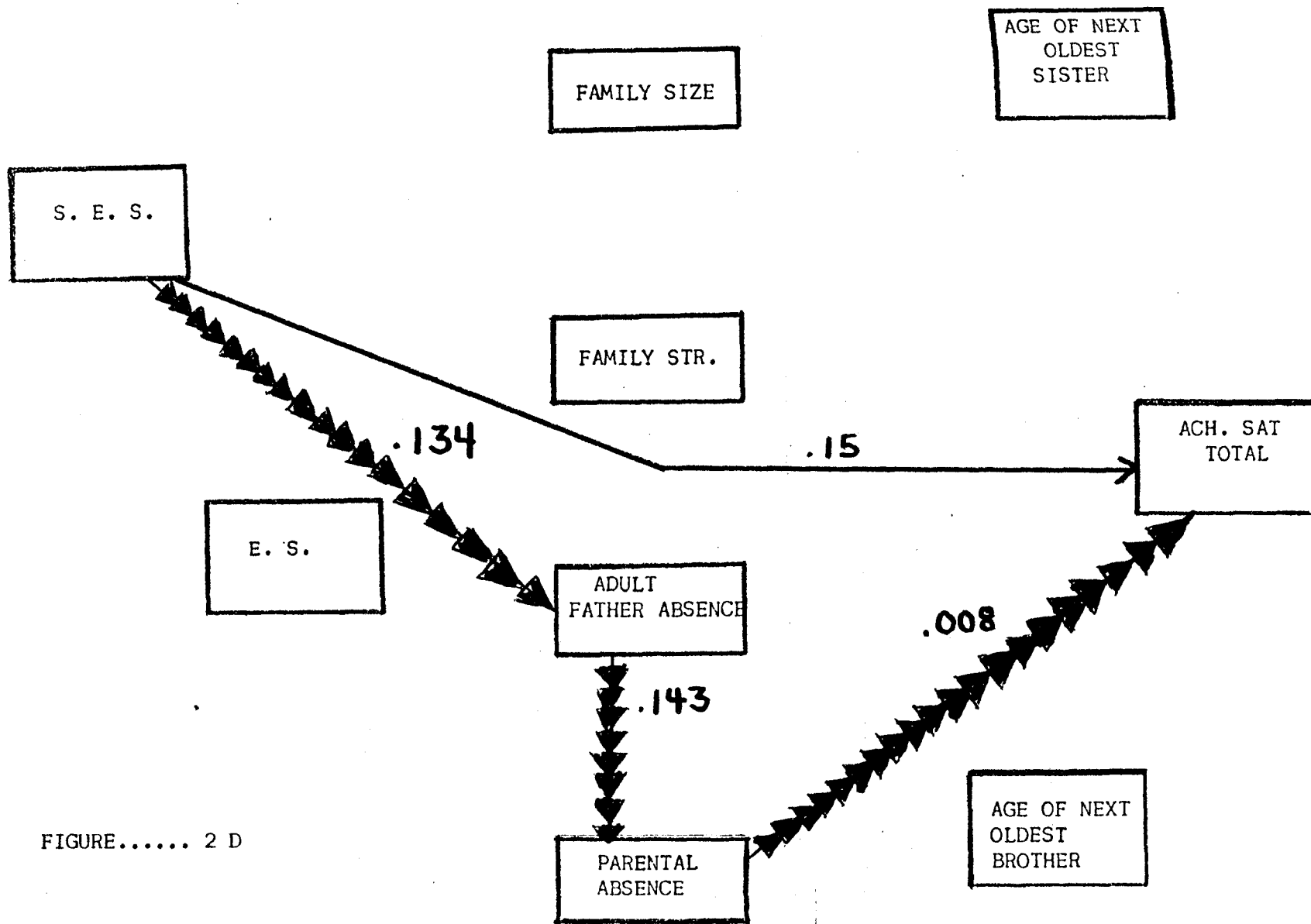


FIGURE..... 2 D

PATH MODEL OF S.E.S. , ADULTS, P.A. , AND ACHIEVEMENT

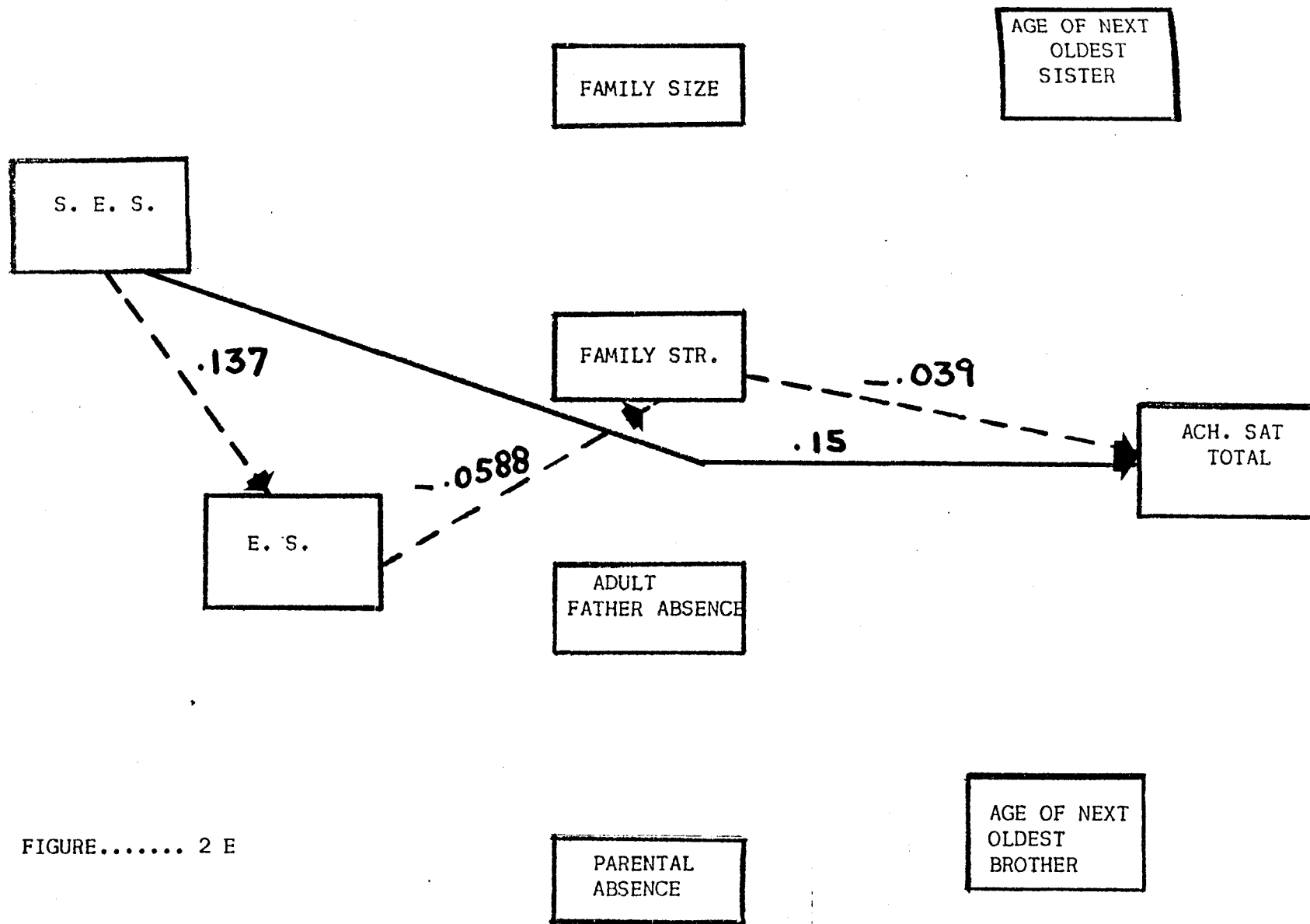


FIGURE..... 2 E

PATH MODEL OF S.E.S. ,EMPLOYMENT STATUS, FAMILY STRUCTURE, AND ACHIEVEMENT

accounts for about 3% of the observed variance. Therefore, we cannot make any assumptions about the equation involving SES, ES, F.St. and achievement.

When SES, time of parental absence, family structure, and achievement are examined, SES (.137) and time of parental absence (-.145) are statistically significant. (Figure 2F) This means that children coming from higher SES backgrounds will have more parental absence in the home after age five than children from lower SES backgrounds. However, parental absence after age five will have family structures which are non-nuclear as defined earlier in this research. Of course, this is a logical assumption because if a parent leaves the family, the nature of the family unit changes. Adding time of parental absence (-.145) and family structure (.056) does not substantially alter the original relationship between SES and achievement. The multiple R squared accounts for about 4% of the observed variance of which SES and time of parental absence are the only significant contributors.

The direct relationship between SES and achievement (.15) remains the same for each path being examined in the model. Socioeconomic status, father's absence, time of parental absence, family structure, and achievement were examined. (Figure 2G) The SES of the respondent was significantly related to father absence (.132) and father absence was significantly related to the time of occurrence of parental absence (.161). In this equation, the higher the socioeconomic level the more father presence in the household. Higher socioeconomic status lends itself to familial stability. When the relationship continues to father presence to time of parental absence, it is observed that there

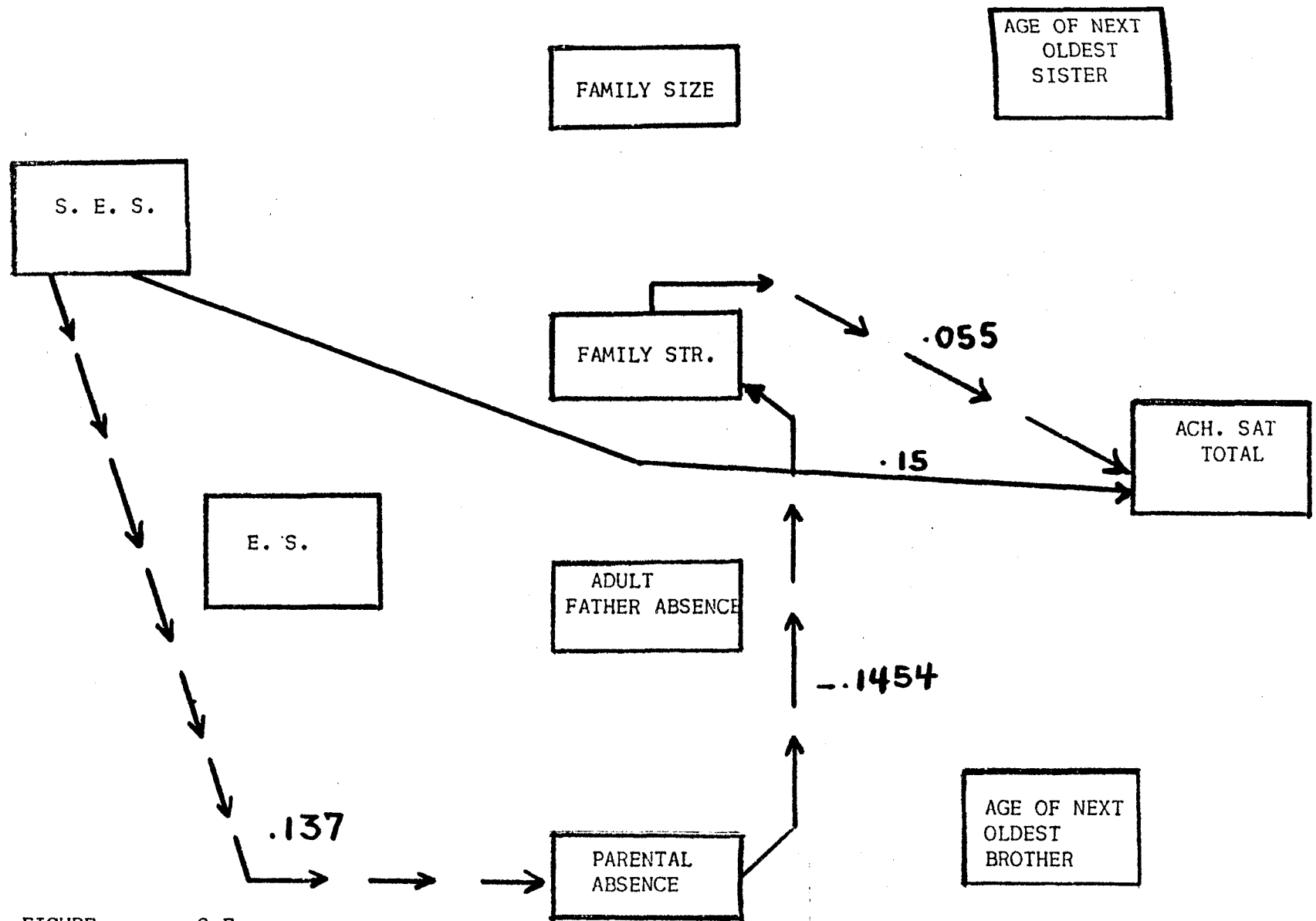


FIGURE..... 2 F

PATH MODEL OF S.E.S. , P.A. , FAMILY STRUCTURE, AND ACHIEVEMENT

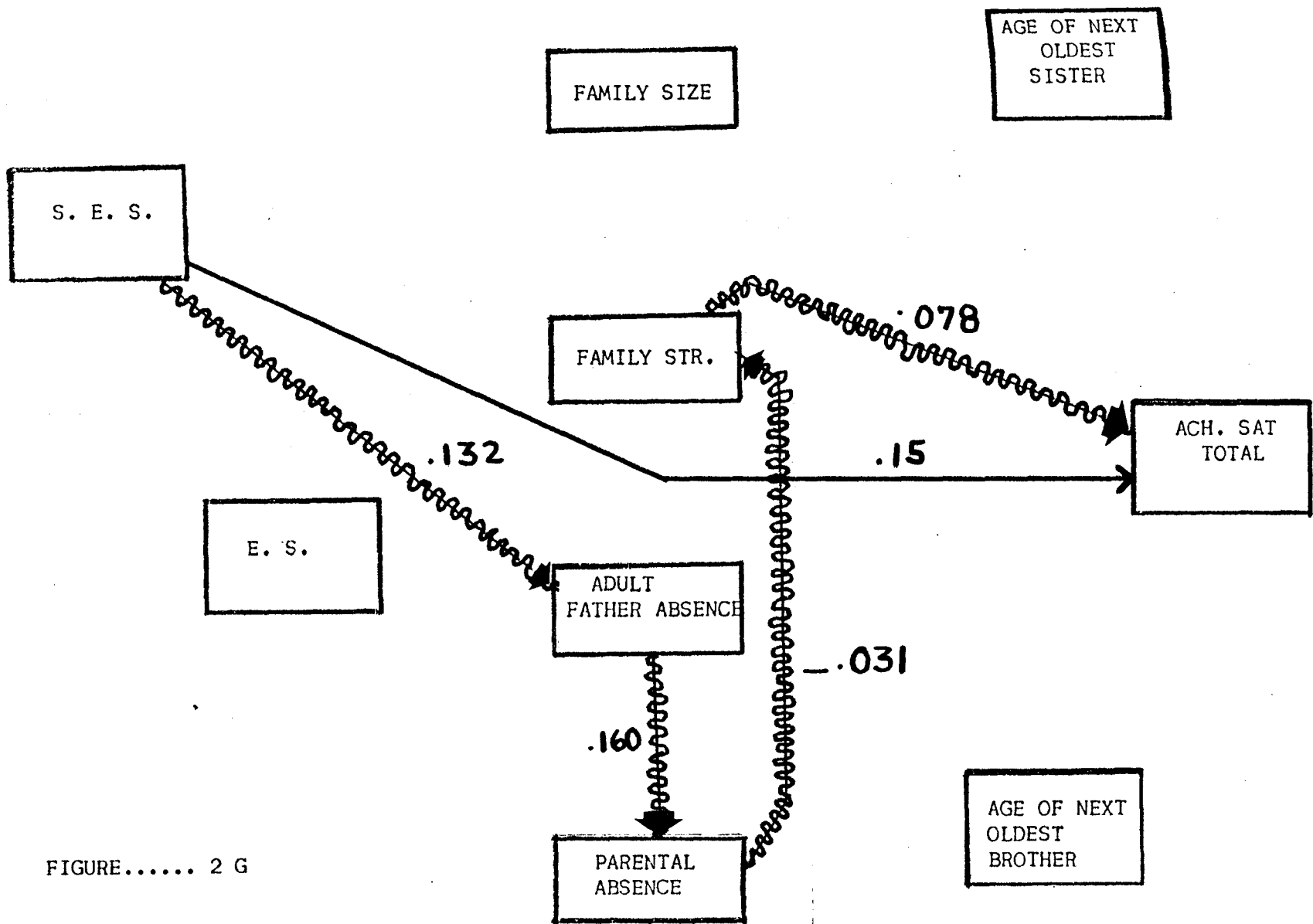


FIGURE..... 2 G

PATH MODEL OF S.E.S. , ADULTS, P.A. , FAMILY STRUCTURE, AND ACHIEVEMENT

will be more adults present before the age of five. However, parental absence after age five had a negligible effect on family structure as did family structure on achievement. Therefore, it is assumed that the introduction of the "mediating" variables do not interpret the original relationship between SES and achievement.

In order to determine the effects of age spacing on achievement, SES, family size, age of next oldest brother and achievement were examined. (Figure 2H) Socioeconomic status is significantly related to family size with a Beta of .1360 ($F = 5.570$). The multiple R squared accounts for about 2% of the observed variance of which SES is the only significant contributor. Similar findings were reported for SES, family size, age of next oldest sister, and achievement. (Figure 2I) According to the Confluence Model, age spacing should have a significant influence on achievement because of intellectual maturity and the opportunity to "teach" other siblings (Zajonc, 1975). In the present study, however, family size does not affect sibling spacing and sibling spacing does not influence achievement. The inclusion of family size, sex, and sibling spacing did not substantially alter the original relationship between SES and achievement.

In Table 4, the multiple R squared and Betas for each path are similar in dimension. When father absence (adults) and time of parental absence (PA) are introduced into the path equation, there is a slight increase in the multiple R squared. The "mediating" variables do not however interpret the direct effect of socioeconomic status on achievement.

Table 5 summarizes the regression findings for the race of the

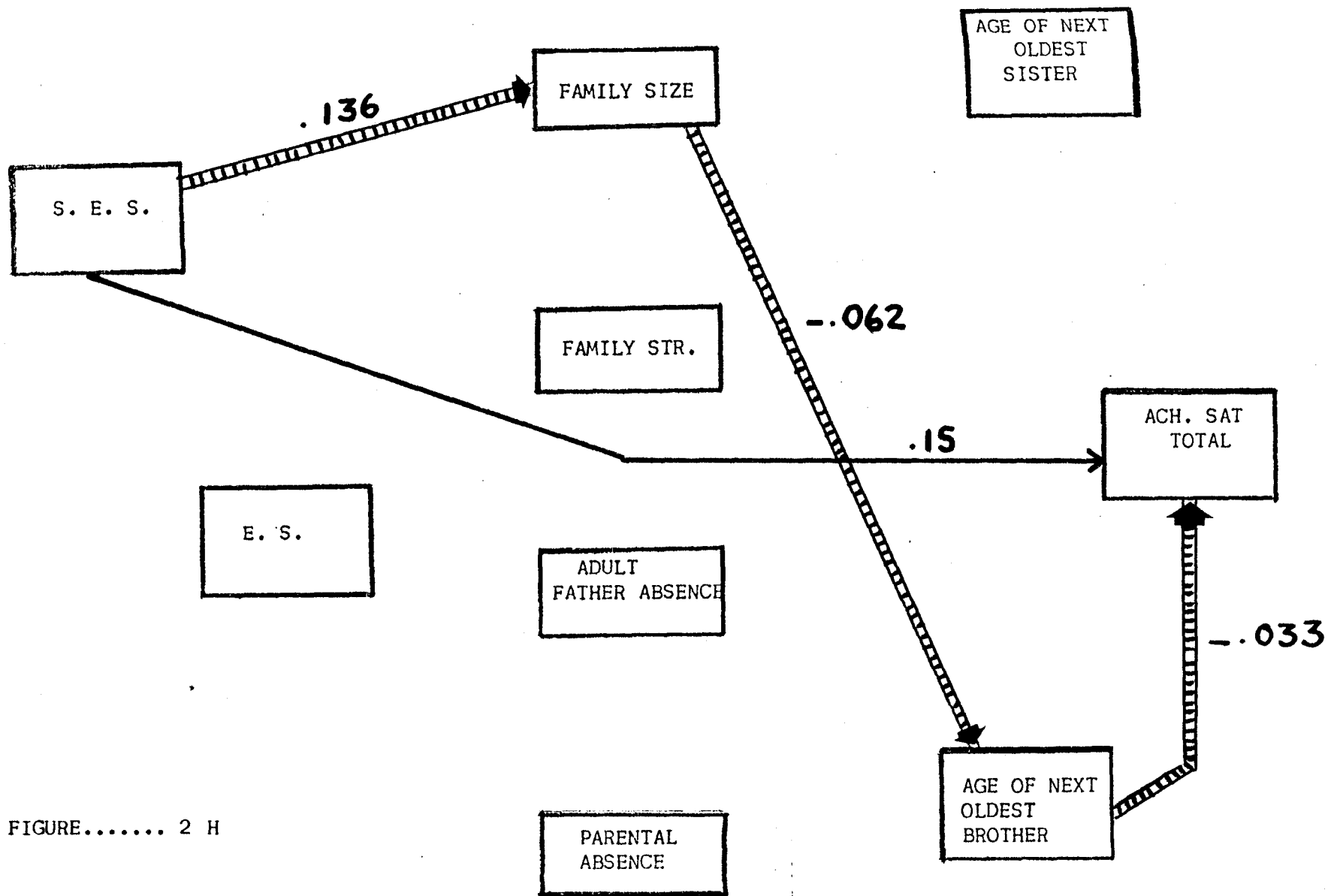


FIGURE..... 2 H

PATH MODEL OF S.E.S. , FAMILY SIZE, A.N.O.B. , AND ACHIEVEMENT

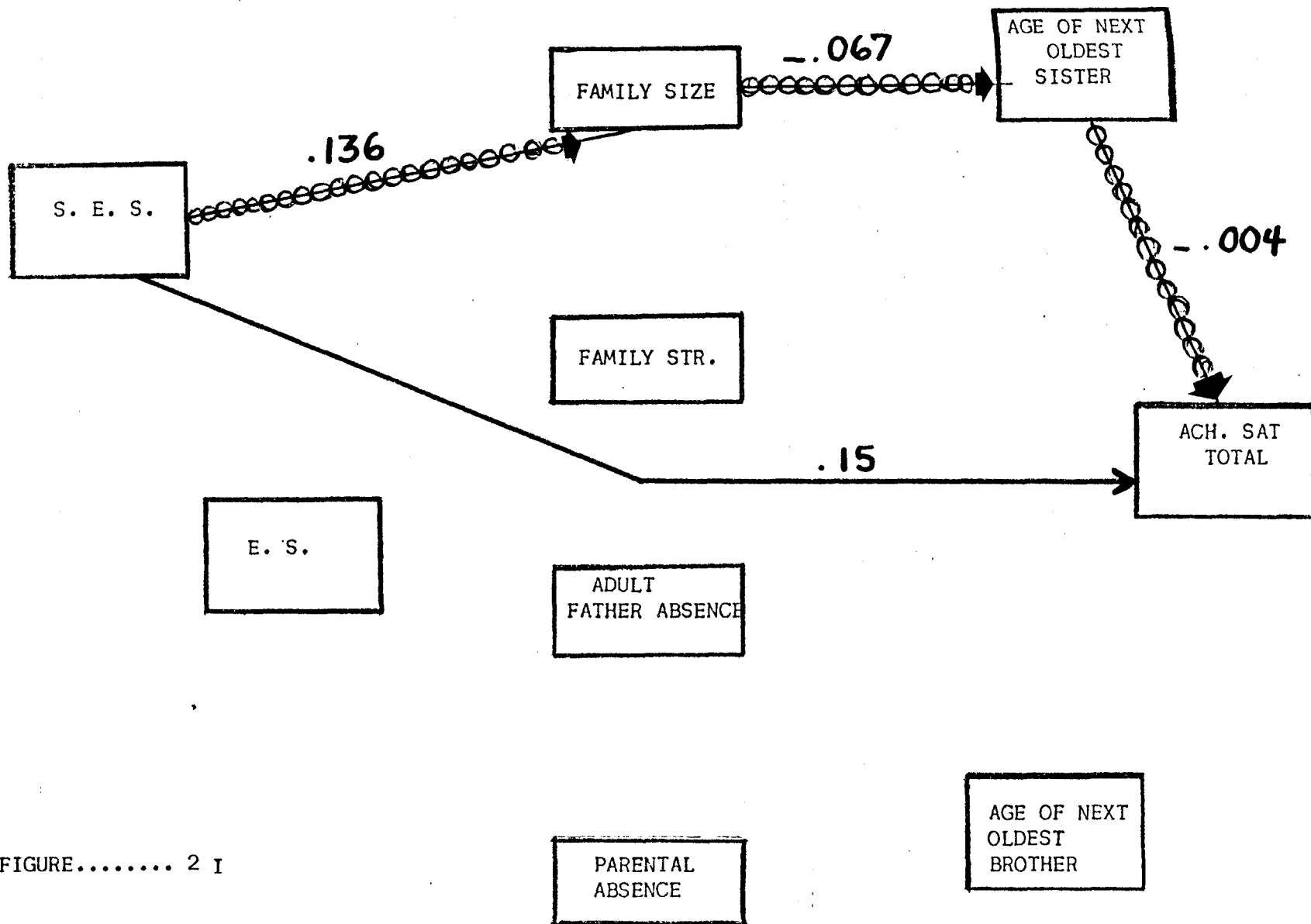


FIGURE..... 2 I

PATH MODEL OF S.E.S. , FAMILY SIZE, A.N.O.S. , AND ACHIEVEMENT

respondent and those variables which logically interpret the direct relationship between race and achievement. Figure 3 illustrates the path findings reported in Table 5.

When the direct path relationship between race and achievement is examined, a moderate, negative, and significant relationship is observed ($-.36$). This relationship indicates that the minority students performed better on the Scholastic Aptitude Test. These findings are consistent with the make up of the School of General Studies which is "ethnic" in nature.

In the path diagram, Race \longrightarrow Father Absence \longrightarrow Achievement, Race is significantly related to father absence with a Beta of $-.349$ ($F = 38.662$). Members of the minority race have more father absence than the white subjects in the study. When father absence is viewed as a "mediating" variable, Figure 3A shows the existence of a nonsignificant influence on achievement. The findings of this particular path indicate that there is more father absence among minority students, however, this absence does not impede the student's achievement. These findings are contrary to those of Landy and Sutton-Smith (1968) who found a decrease in achievement as a result of father absence.

The multiple R squared accounts for about 13% of the observed variance with race being the only significant contributor. When one examines the total indirect effect ($-.349$) ($.042$), it can be seen that father absence does not interpret the original relationship between Race and Achievement.

When time of parental absence is used as a mediating variable

Table 5
Regression Findings for Race and Family Related Variables

Dependent Variable	Independent Variables	R ²	B	beta	Standard Error B	Univariate F Statistic	Path Analysis F Statistic
Total Score of SAT	Race of Respond.	.13	-113.653	-.3491	18.2783	38.662	23.395
	Adults=Father's Presence		16.109	.0424	21.3198	0.571	sig.=.01
	Residual Variance=.9327						
	Race of Respond.	.13	-114.942	-.3531	17.8206	41.602	23.392
	Parental Abs.		-7.970	-.0412	10.5916	0.571	sig.=.01
	Residual Variance=.9327						
	Race of Respond.	.13	-116.832	-.3589	17.794	43.110	23.117
	Family Size		-1.070	-.0163	3.585	0.089	sig.=.01
	Residual Variance=.9327						
	Race of Respond.	.13	-113.231	-.3478	18.089	39.181	23.561
	SES of Parents		.18035	.0515	0.194	0.860	sig.=.01
	Residual Variance=.9327						
	Race of Respond.	.13	-118.849	-.3651	17.644	45.373	23.111
	Family Struct.		4.673	.0150	16.819	0.077	sig.=.01
	Residual Variance=.9327						
	Race of Respond.	.13	-113.877	-.3498	18.329	38.600	15.568
	Adults=Father's Presence		9.090	.0239	35.648	0.065	sig.=.01
	Parental Abs.		-4.354	.0225	17.709	0.060	
	Residual Variance=.9327						
	Race of Respond.	.13	-117.229	-.3601	17.744	43.649	15.660
	Employ. Status		-13.622	.0477	15.324	.790	sig.=.01
	Family Struct.		5.209	.0167	16.835	.096	
	Residual Variance=.9327						
	Race of Respond.	.14	-115.500	-.3548	17.8254	41.984	15.9685
	Parental Abs.		-17.982	-.0929	14.2433	1.594	sig.=.01
	Fam. Structure		23.754	.0765	22.5997	1.105	
	Residual Variance=.9274						

Table 5 (cont.)

Dependent Variable	Independent Variables	R ²	B	beta	Standard Error B	Univariate F Statistic	Path Analysis F Statistic
Total Score of SAT	Race of Respond.	.14	-113.675	-.3492	18.3232	38.488	11.9932
	Adults=Father's Presence		15.939	.0419	36.1656	0.194	sig.=.01
	Parental Abs.		-12.369	-.0639	19.1204	0.419	
	Fam. Structure		25.482	.0821	22.9667	1.231	
		Residual Variance=.9274					

LEGEND FOR FIGURE

- 3 -

RACE = Race of Respondent
F. SZ = Family Size
F. ST. = Family Structure
E.S. = Employment Status of Parents
SE. S. = Socioeconomic Status of Parents
P.A. = Time of Parental Absence
ADULTS = Father Absence
SAT TOTAL = Scholastic Aptitude Test - Total Score

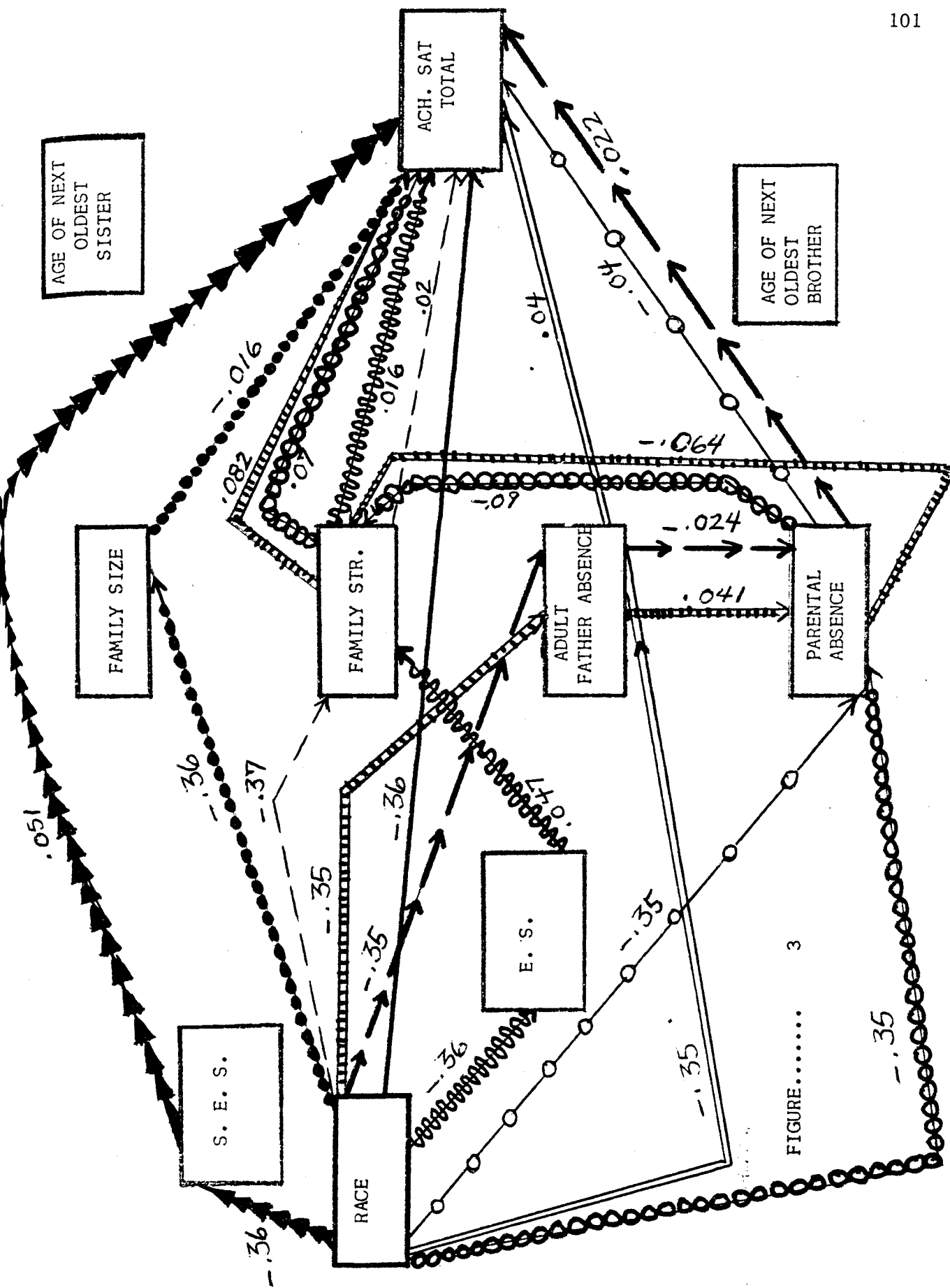


FIGURE..... 3

PATH MODEL OF RACE AND FAMILY RELATED VARIABLES

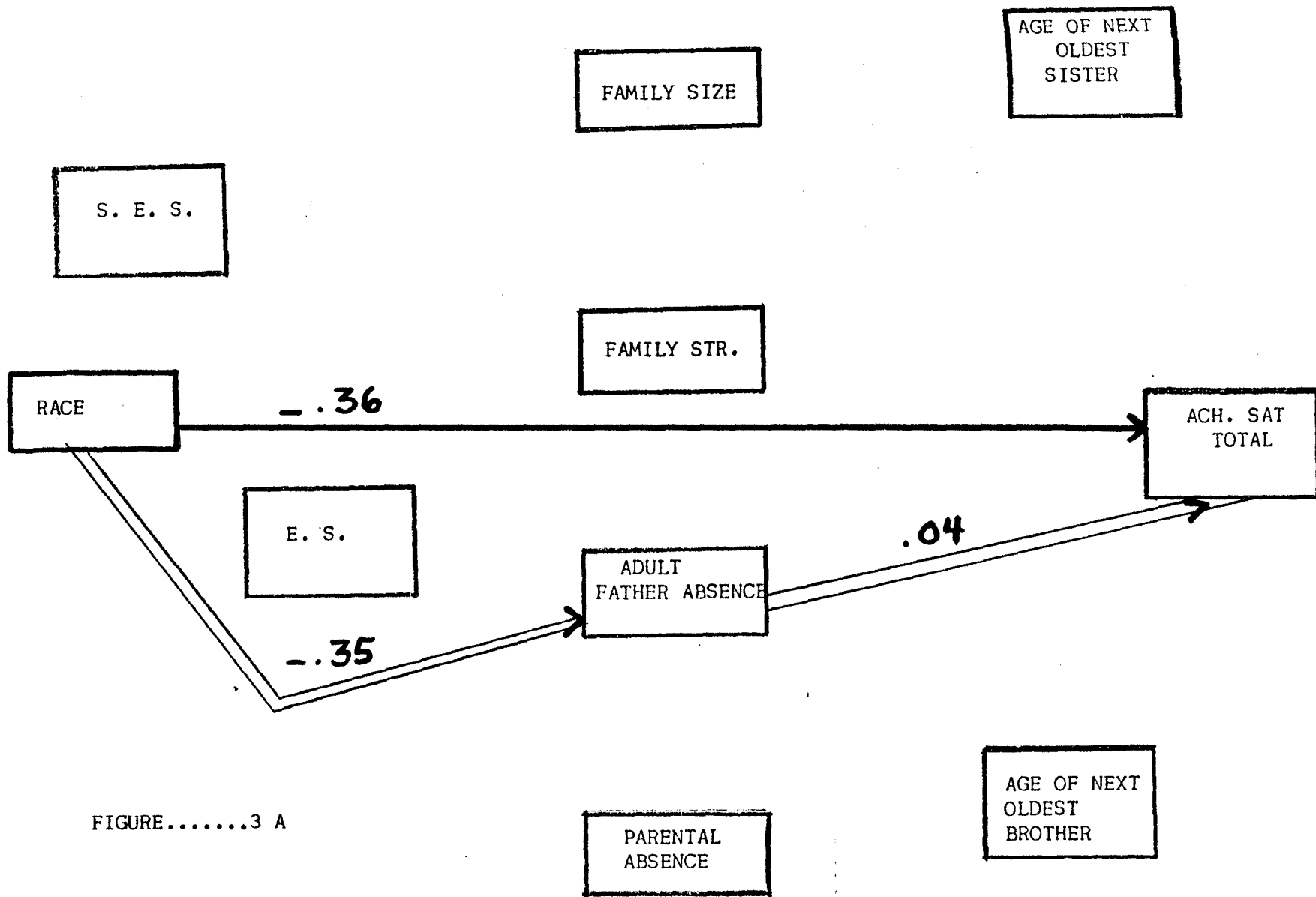


FIGURE.....3 A

PATH MODEL OF RACE, ADULTS, AND ACHIEVEMENT

between Race and achievement, Race is significantly related to time of parental absence ($-.353$). (Figure 3B) In this particular equation, students from the minority group experienced more parental absence after the age of five. Time of parental absence was not nevertheless a significant mediating influence on achievement. The multiple R squared accounts for about 13% of the observed variance with race being the only significant contributor. Therefore, it must be assumed that time of parental absence does not interpret the relationship between Race and achievement.

A comparison of SES \longrightarrow P.A. \longrightarrow Achievement and Race \longrightarrow P.A. \longrightarrow Achievement indicates that both SES and minority group status influence the time of parental absence. However in the SES \longrightarrow P.A. \longrightarrow Achievement path, the absence of a parent after age five had a small effect on the student's achievement. It has been theorized that the first five (5) years of a child's life are important to his or her cognitive development. Bloom (1964) argues that beneficial early experience is absolutely essential for cognitive growth. In the Race \longrightarrow P.A. \longrightarrow Achievement path, time of parental absence does not have a mediating influence on achievement.

In Table 5, when Race, Family Size, and Achievement are examined, we find a negative but significant relationship between Race and Family Size ($-.358$). (Figure 3C) This relationship indicates that students of the minority race tend to come from larger families. However, family size was nonsignificantly related to achievement ($-.041$) which means that F.Sz. has no influence on achievement.

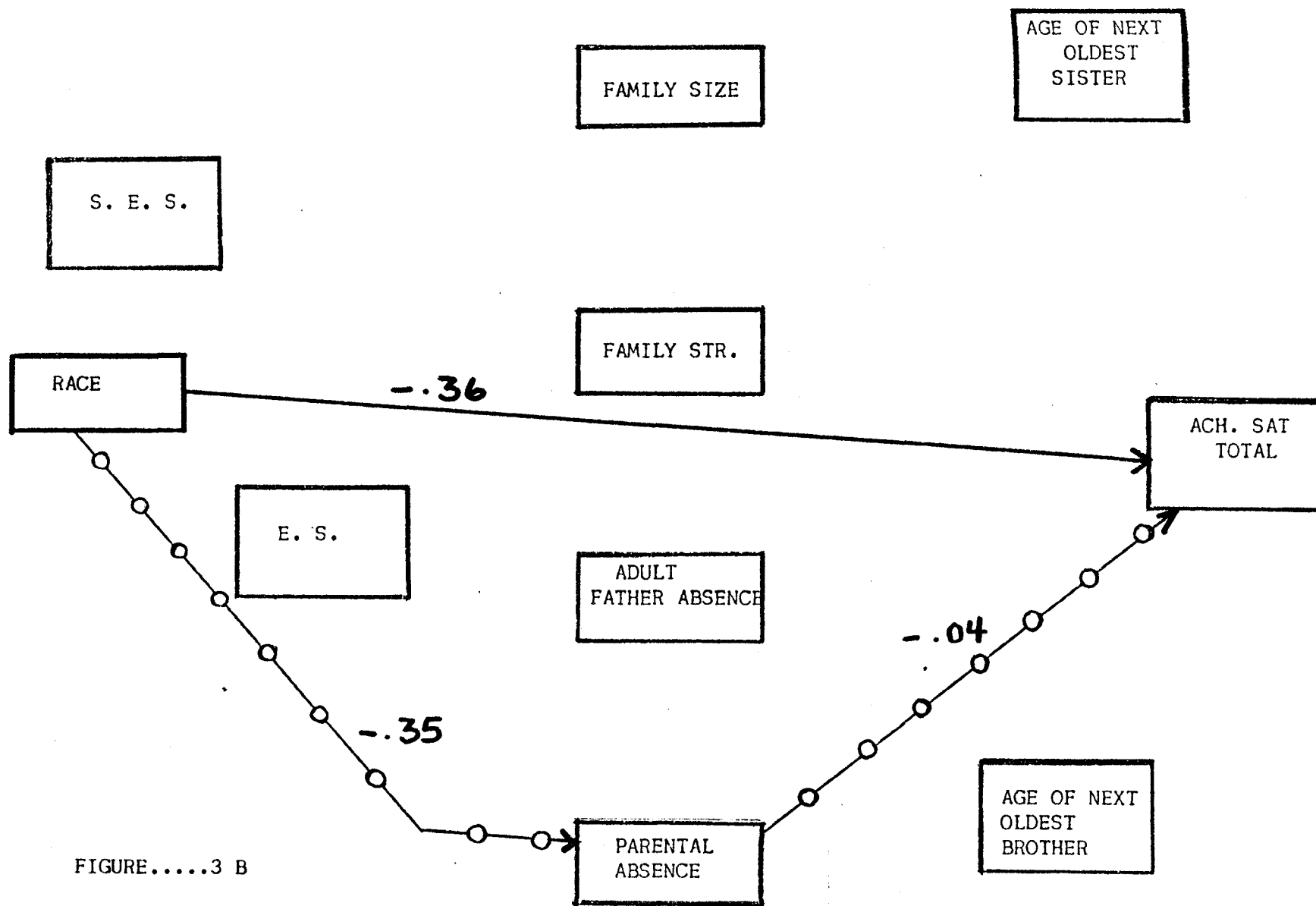
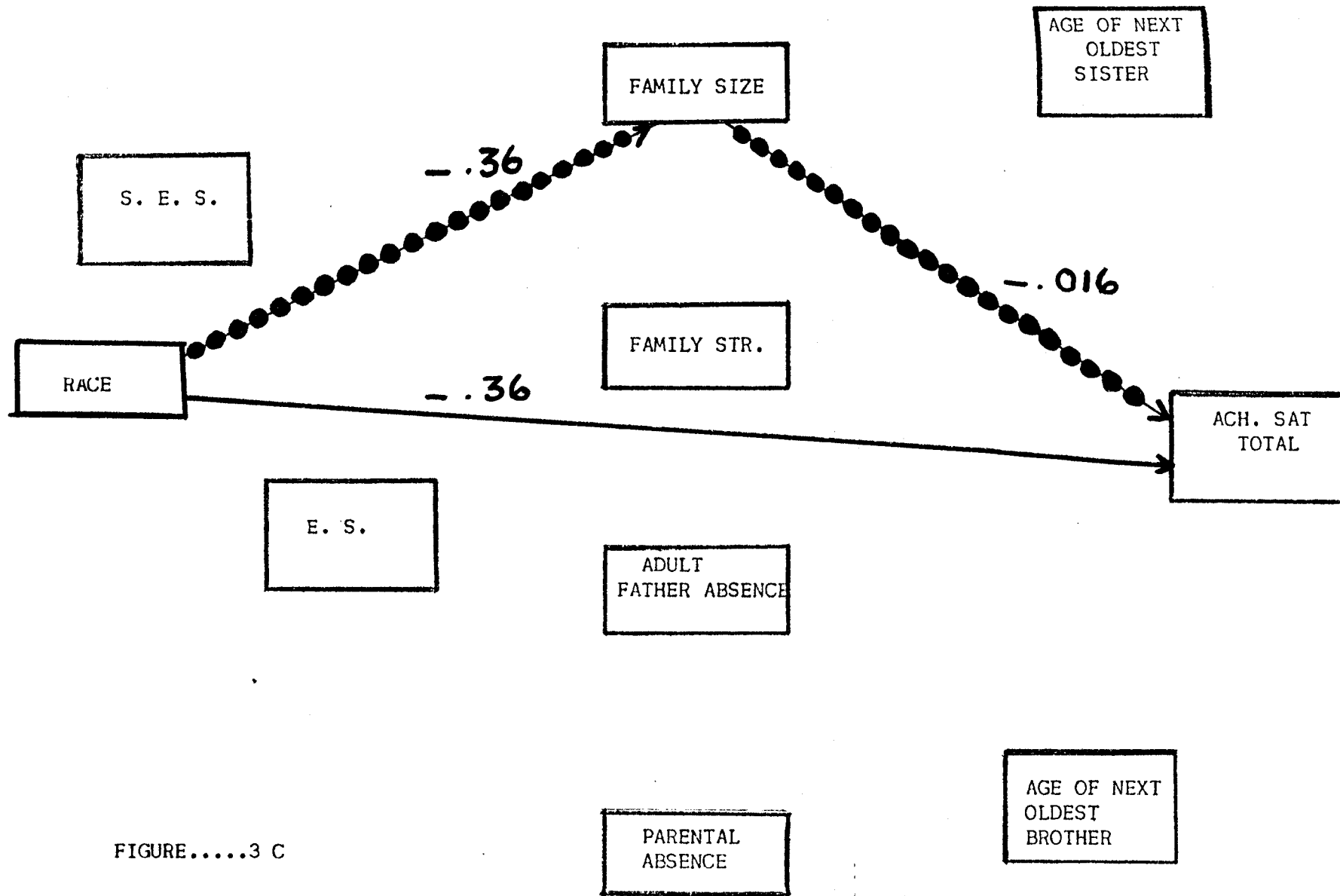


FIGURE.....3 B

PATH MODEL OF RACE , P.A. , AND ACHIEVEMENT



PATH MODEL OF RACE, FAMILY SIZE, AND ACHIEVEMENT

When Zajonc and Markus (1975) developed the Confluence Model, it was assumed that F.Sz. had an important influence on achievement. They predicted that as family size increased, achievement would decrease. In this study, Family Size does not mediate the effect between Race and Achievement. The multiple R squared accounts for about 13% of the observed variance with race being the only significant contributor. Similar results were obtained in the SES \longrightarrow F.S. \longrightarrow Achievement path.

Next, race, socioeconomic status, and achievement were examined. In this equation, race is statistically significant with a Beta of $-.3478$ ($F = 39.181$). The multiple R squared accounts for about 13% of the observed variance of which Race is the only significant contributor. Therefore, when Figure 3D is examined, the following relationships are illustrated: There is a negative but moderate relationship between race and SES ($-.347$). This means that minority students come from homes with higher occupational status. However the relationship between SES and achievement in this path was negligible ($.05$). The indirect path relationship between SES and achievement is somewhat lower than the original direct relationship between SES and achievement ($.15$).

Family structure was used as a "mediating" variable between race and achievement in Table 5. There was a negative relationship ($-.365$) between race and family structure. (Figure 3E) This means that minority students tend to come from nuclear family structures. The relationship between family structure and achievement was slight with a Beta of $.015$ ($F = .077$).

When the total indirect effect ($-.365$) ($.015$) is examined, it

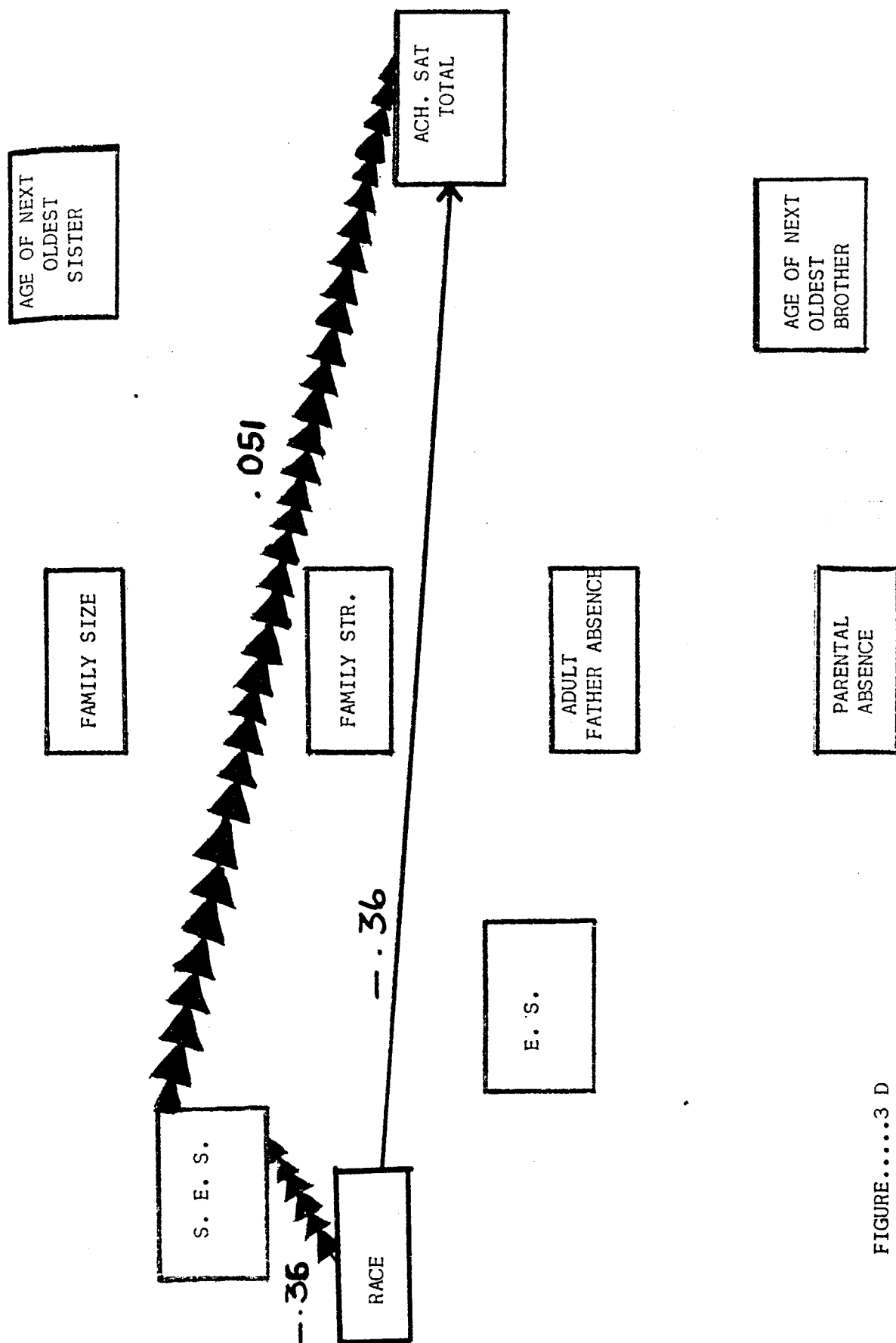


FIGURE.....3 D

PATH MODEL OF RACE, S.E.S., AND ACHIEVEMENT

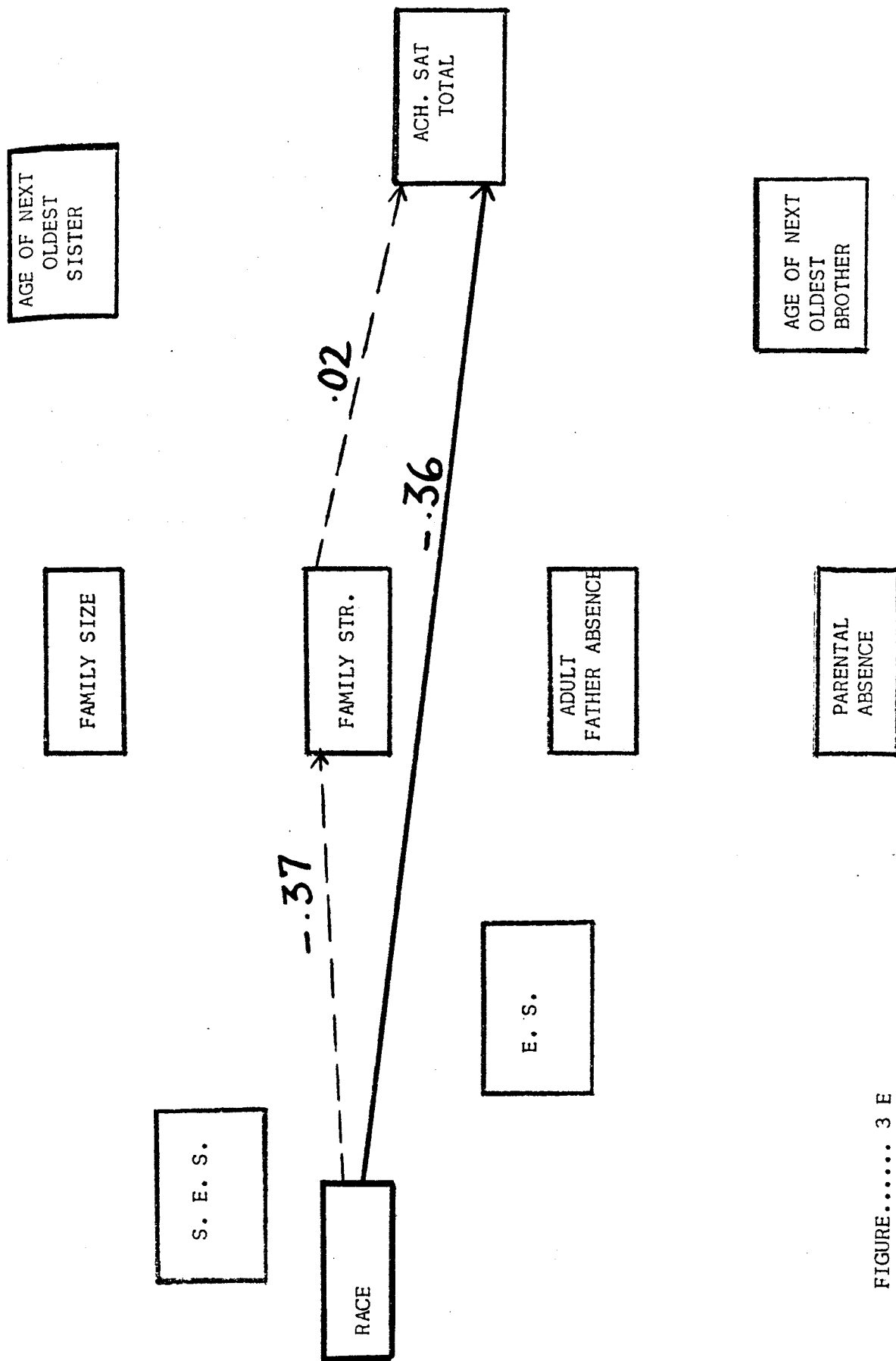


FIGURE..... 3 E

PATH MODEL OF RACE, FAMILY STRUCTURE, ACHIEVEMENT

can be seen that Family Structure does not interpret the original relationship between Race and Achievement. The multiple R squared accounts for about 13% of the observed variance with race being the only significant contributor. Therefore, family structure in this study is not importantly related to achievement alone or as a significant mediating variable.

Next, race, father absence, time of parental, and achievement were examined. Race is significantly related to father absence with a Beta of $-.349$. Minority students tend to come from homes with more father absence. When father absence and time of parental absence are viewed as mediating variables, Figure 3F shows that there are non-significant paths between parental absence and time of parental absence as well as between time of parental absence and achievement.

When the total indirect effect ($-.349$) ($.023$) ($.022$) is examined, it can be seen that father absence and time of parental absence do not interpret the original relationship between race and achievement. Therefore, father absence and time of parental absence in this study are not importantly related to achievement.

If we now turn our attention to race, employment status, family structure, and achievement we can see in Table 5 that race is negatively but significantly related to employment status with a Beta of $-.360$ ($F = 43.649$). From Figure 3G one finds that the strongest effect is the direct relationship between race and achievement ($-.36$). When employment status and family structure are viewed as mediating variables, Figure 3G shows that their effect on achievement is negligible.

In Table 5, minority students tended to come from families whose

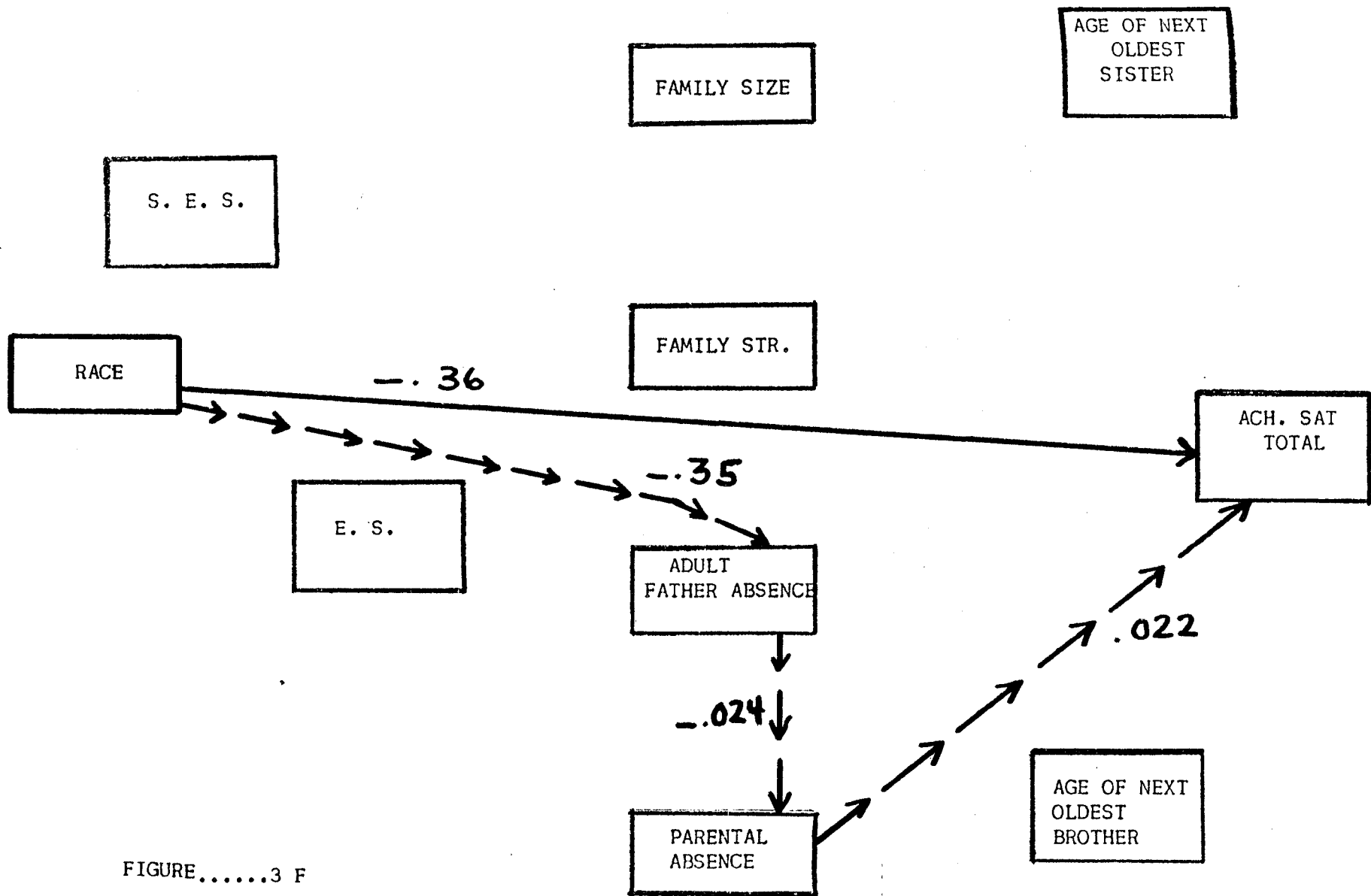


FIGURE.....3 F

PATH MODEL OF RACE, ADULTS, P.A. ,AND ACHIEVEMENT

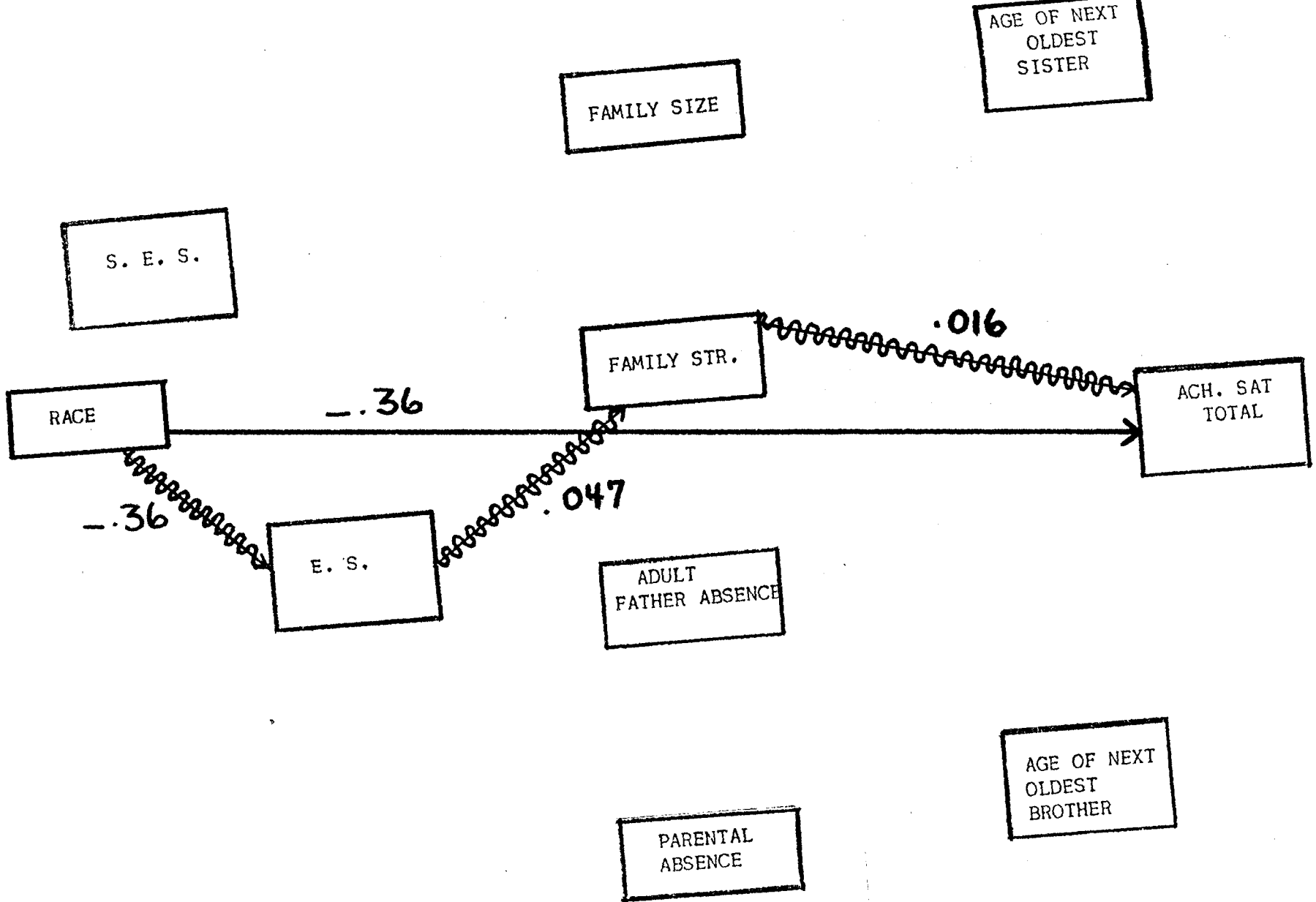


FIGURE.....3 G

PATH MODEL OF RACE, E.S. ,FAMILY STRUCTURE, AND ACHIEVEMENT

parents were employed. However, being employed had a small influence on family structure. This means that if the parents were employed, the family structure was basically nuclear in nature. Employment stabilizes the family unit.

As one looks at race, time of parental absence, family structure, we find a negative relationship between race and time of parental absence with a Beta of $-.354$ ($F = 41.984$). An examination of Figure 3H illustrates the nonsignificance of the mediating variables, time of parental absence, family structure. Therefore, it is assumed that minority students experience more parental absence after age five but parental absence and family structure do not influence the original relationship between race and achievement ($-.36$). The multiple R squared accounts for 14% of the observed variance with race being the only significant contributor.

Finally, the relationships of race, father absence, time of parental absence, family structure, and achievement were examined. (Figure 3I) Again, race was significantly related to father absence ($-.349$) which means that minority students tend to come from homes without fathers. The total indirect effect ($-.349$) ($.041$) ($-.063$) ($.082$) did not interpret the original relationship between race and achievement.

Minority students accounted for more observed variance in the paths than the socioeconomic status of the parents. Tables 4 and 5 examined traditional sociological variables and their relationship to achievement. The findings in these tables indicate the socioeconomic status of the parents has a relatively weak influence on

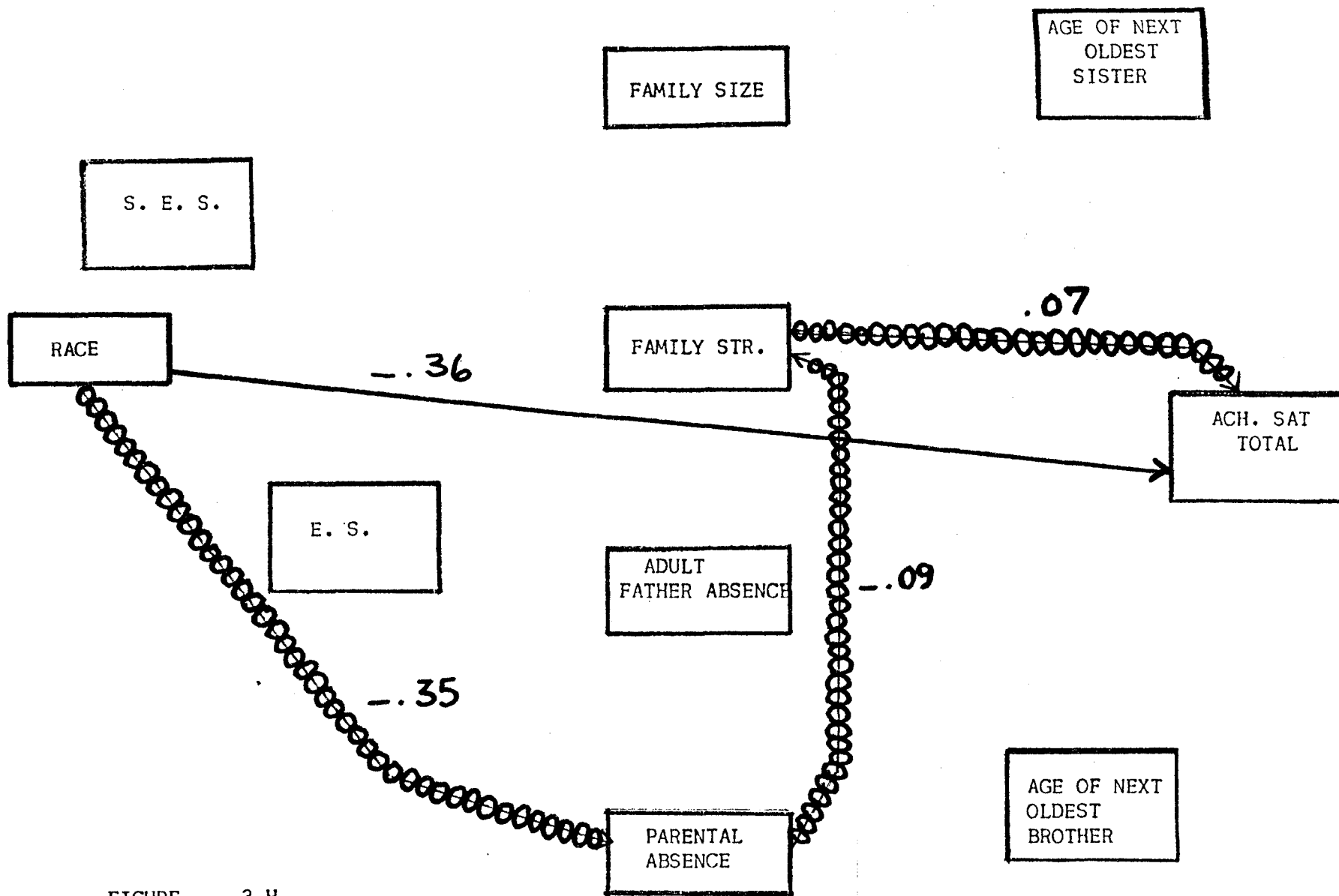


FIGURE.....3 H

PATH MODEL OF RACE, P.A. , FAMILY STRUCTURE, AND ACHIEVEMENT

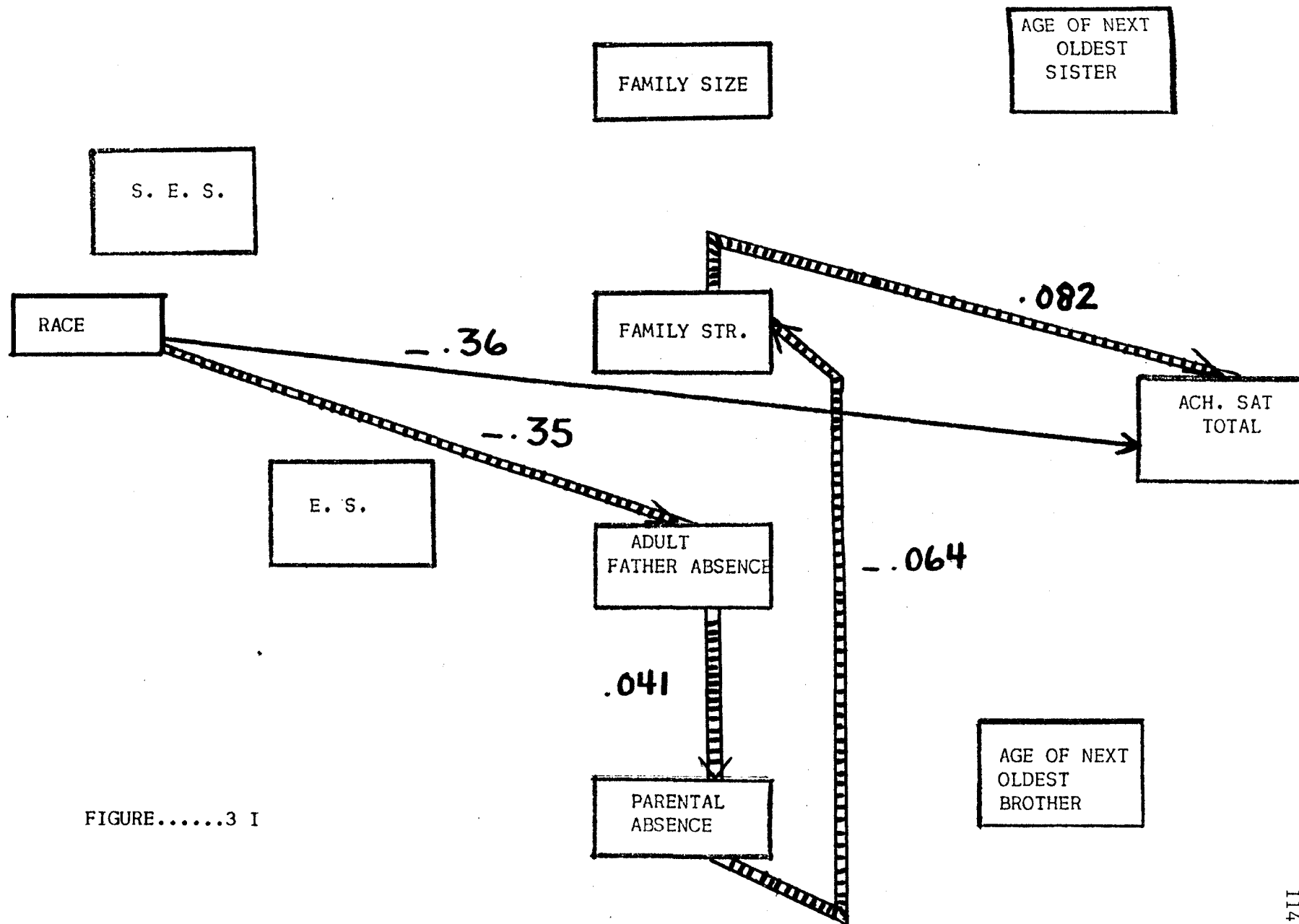


FIGURE.....3 I

PATH MODEL OF RACE, ADULTS, P.A. ,FAMILY STRUCTURE, AND ACHIEVEMENT

achievement and that the minority students performed better on the SAT than the whites in the study.

Several assumptions can be advanced concerning the achievement of minority students in the School of General Studies. Minority students may be academically prepared for college, but are undecided about a degree; or they may be headed towards a degree which the university does not offer. Consequently, they are enrolled in the School of General Studies until they have reached a decision regarding a degree. Some of the minority students did not take college preparatory courses in high school because they had decided not to attend college. However, these students took the SAT and performed well and decided to attend college, but they lacked the necessary requirements for entrance into a degreed program.

In order to make further assumptions about family configuration and achievement, birth order will be examined in conjunction with other familial variables. Table 6 summarizes the path coefficients including birth order as a mediating variable. Figure 4 illustrates the path findings reported in Table 6. In all instances involving the birth order variable, it can be seen that it is nonsignificant in relationship to achievement. The random sampling did not control for family size or birth order. It appears this lack of sampling control leads to nonsignificance.

When father absence, family size, birth order, and achievement were examined, father absence was significantly related to family size with a Beta of .152 ($F = 7.221$). It appears that this is a spurious relationship because it is assumed that there will be a decrease in

Table 6
Regression Findings for Birth Order and Family Related Variables

Dependent Variable	Independent Variables	R ²	B	beta	Standard Error B	Univariate F Statistic	Path Analysis F Statistic
Total Score of SAT	Adults=Father's Presence	.03	57.660	.1518	21.456	7.221	3.347
	Family Size		-6.236	-.0950	4.779	1.703	sig.=.01
	Birth Order		.1131	.0013	6.037	0.000	
	Residual Variance=.9848						
	Adults=Father's Presence	.03	62.332	.1641	36.883	2.856	2.769
	Parental Abs.		2.311	.0119	18.777	0.015	sig.=.05
	Birth Order		-4.905	.0592	4.697	1.090	
Residual Variance=.9848							
	Adults=Father's Presence	.03	63.705	.1677	36.932	2.975	2.263
	Parental Abs.		2.434	.0125	18.785	0.017	sig.=.05
	Age of Next Oldest Bro.		-1.612	-.0522	1.859	0.752	
	Birth Order		-3.464	-.0418	4.984	0.483	
Residual Variance=.9848							
	Adults=Father's Presence	.125	26.029	.0947	77.276	0.113	1.111
	Parental Abs.		40.836	.0990	106.400	0.147	nonsig.
	Age of Next Oldest Sis.		13.056	.4121	8.696	2.254	
	Birth Order		-2.320	-.0332	21.064	0.012	
Residual Variance=.9874							
	Parental Abs.	.02	-23.878	-.1234	10.999	4.713	2.013
	Age of Next Oldest Bro.		-1.475	-.0477	1.864	0.626	sig.=.05
	Birth Order		-2.994	-.0361	4.993	0.360	
Residual Variance=.9899							

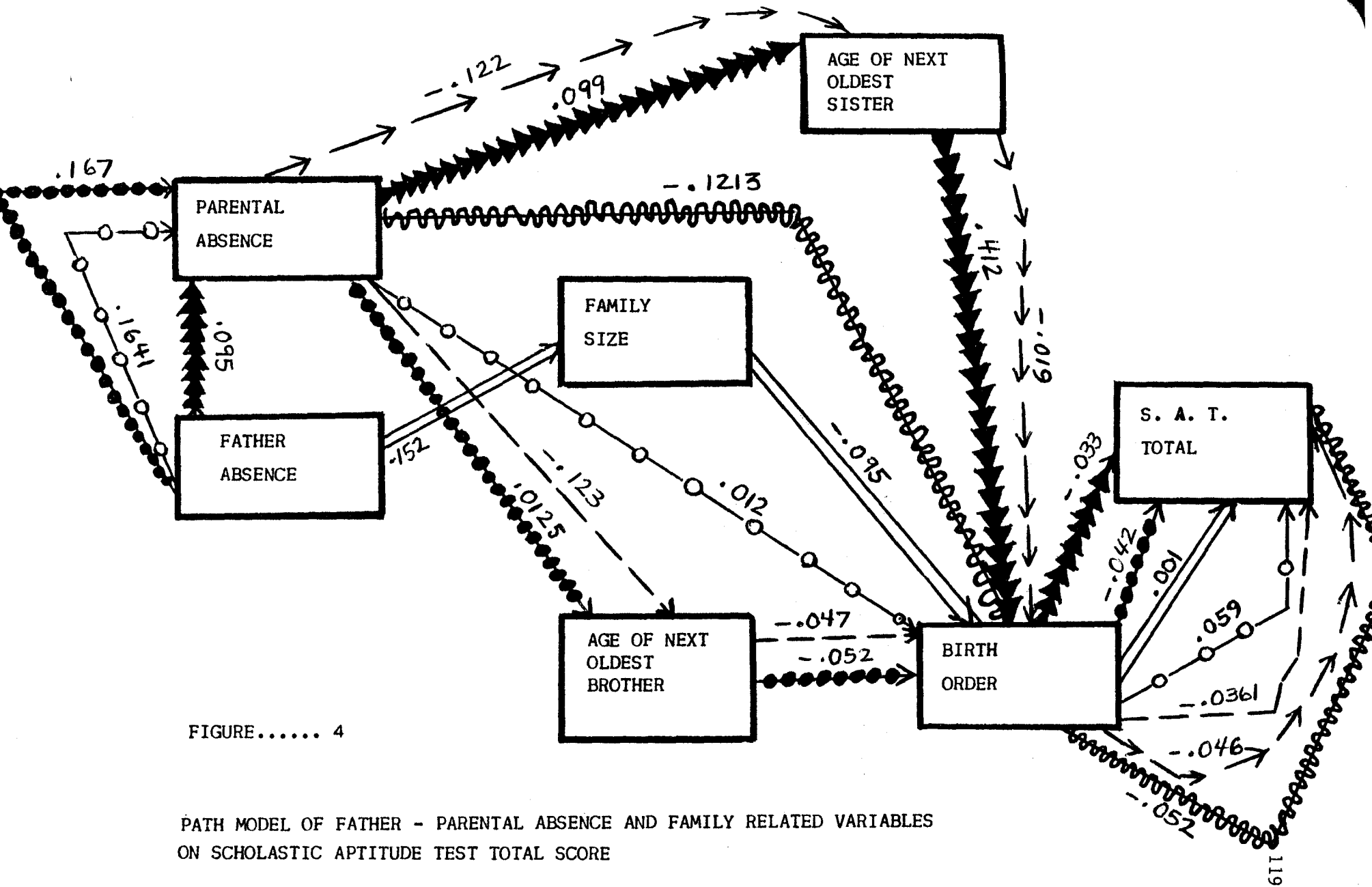
Table 6 (cont.)

Dependent Variable	Independent Variables	R^2	B	beta	Standard Error B	Univariate F Statistic	Path Analysis F Statistic
Total Score of SAT	Parental Abs.	.02	-23.6134	-.1220	11.004	4.604	1.8397
	Age of Next Oldest Sis.		-.5719	-.0199	1.690	0.114	nonsig.
	Birth Order		-3.890	-.0469	4.877	0.636	
	Residual Variance=.9899						
	Parental Abs.	.02	-23.471	-.1213	10.980	4.569	2.7102
	Birth Order		-4.324	-.0522	4.699	0.847	
	Residual Variance=.9899						

LEGEND FOR FIGURE

- 4 -

P.A. = Time of Parental Absence
ADULTS = Father Absence
F. SZ = Family Size
A.N.O.S. = Age of Next Oldest Sister
A.N.O.B. = Age of Next Oldest Brother
B.O. = Birth Order
SAT TOTAL = Total Score on Scholastic Aptitude Test
SE. S. = Socioeconomic Status of Parents
RACE = Race of Respondent
E.S. = Employment Status



family size when father absence occurs.

Figure 4A shows that there is a nonsignificant relationship between family size and birth order ($-.095$). Likewise, a nonsignificant relationship was found between birth order and achievement ($.001$).

The total indirect effect ($.151$) ($-.095$) ($.001$) does not interpret the direct relationship between father absence and achievement ($.15$). Therefore, family size and birth order in this study are not importantly related to achievement. However, Belmont (1973) and Zajonc (1975) have shown that there is a relationship between birth order and achievement. Their findings indicate a decrease in intelligence with increasing birth orders.

The following path findings for father absence, time of parental absence, birth order, and achievement resulted in significance for the father absence variable with a Beta of $.164$ ($F = 2.856$). (Figure 4B) Father absence had a positive but small relationship with time of parental absence. This means that there was more father absence before age five in this path. The total indirect effect ($.164$) ($.011$) ($.059$) does not interpret the direct relationship between father absence and achievement. Again, birth order in this study proves to be an unimportant factor in relationship to achievement which is consistent with the direct effects of birth order and achievement ($-.05$). The multiple R squared accounts for about 3% of the observed variance with father absence being the only significant contributor.

The age of the next oldest sibling was examined in relationship with familial variables. Father absence, time of parental absence, age of next oldest brother, birth order and achievement were entered

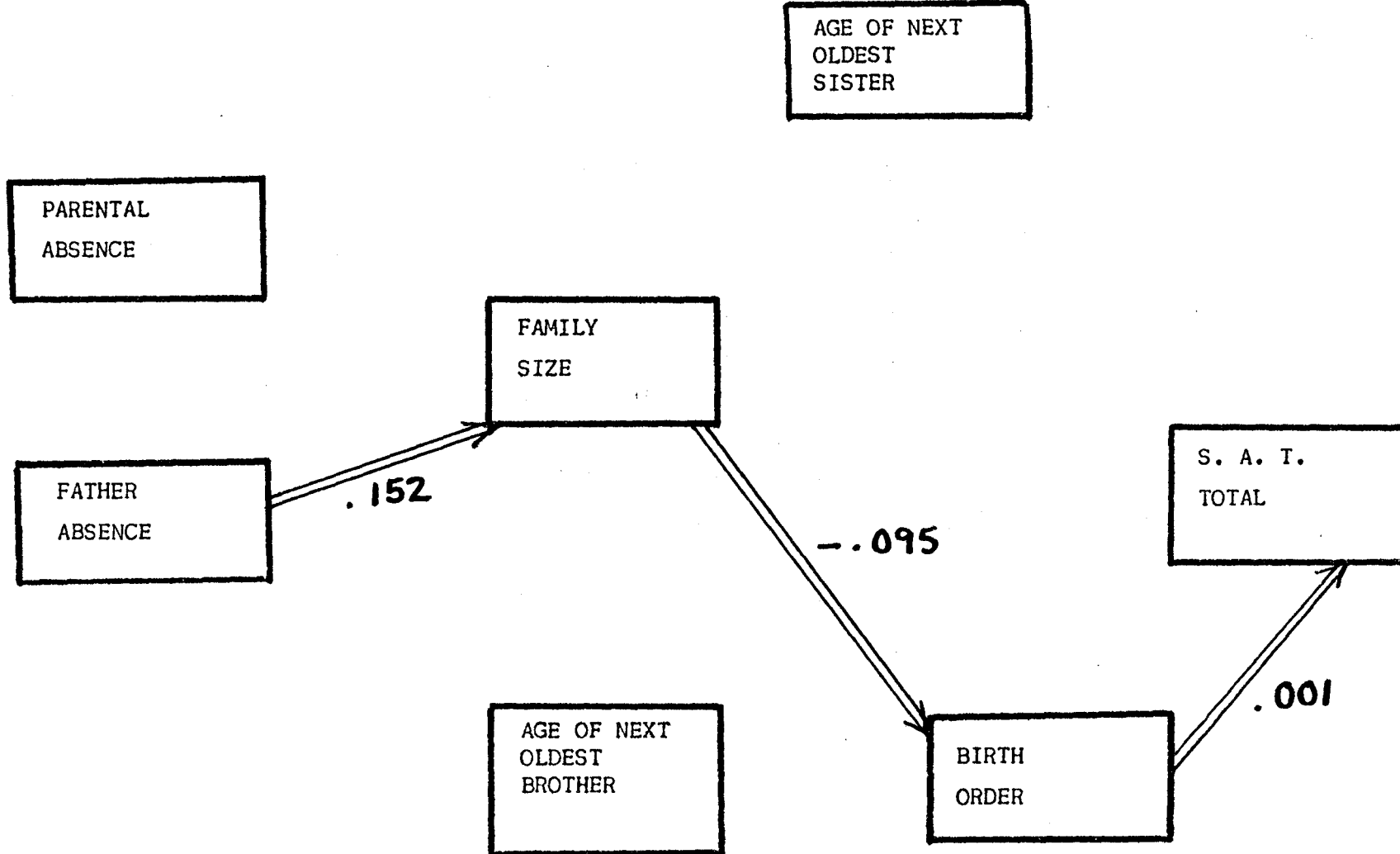


FIGURE..... 4 A

PATH MODEL OF FATHER ABSENCE, FAMILY SIZE, B.O. ,AND S.A.T. TOTAL

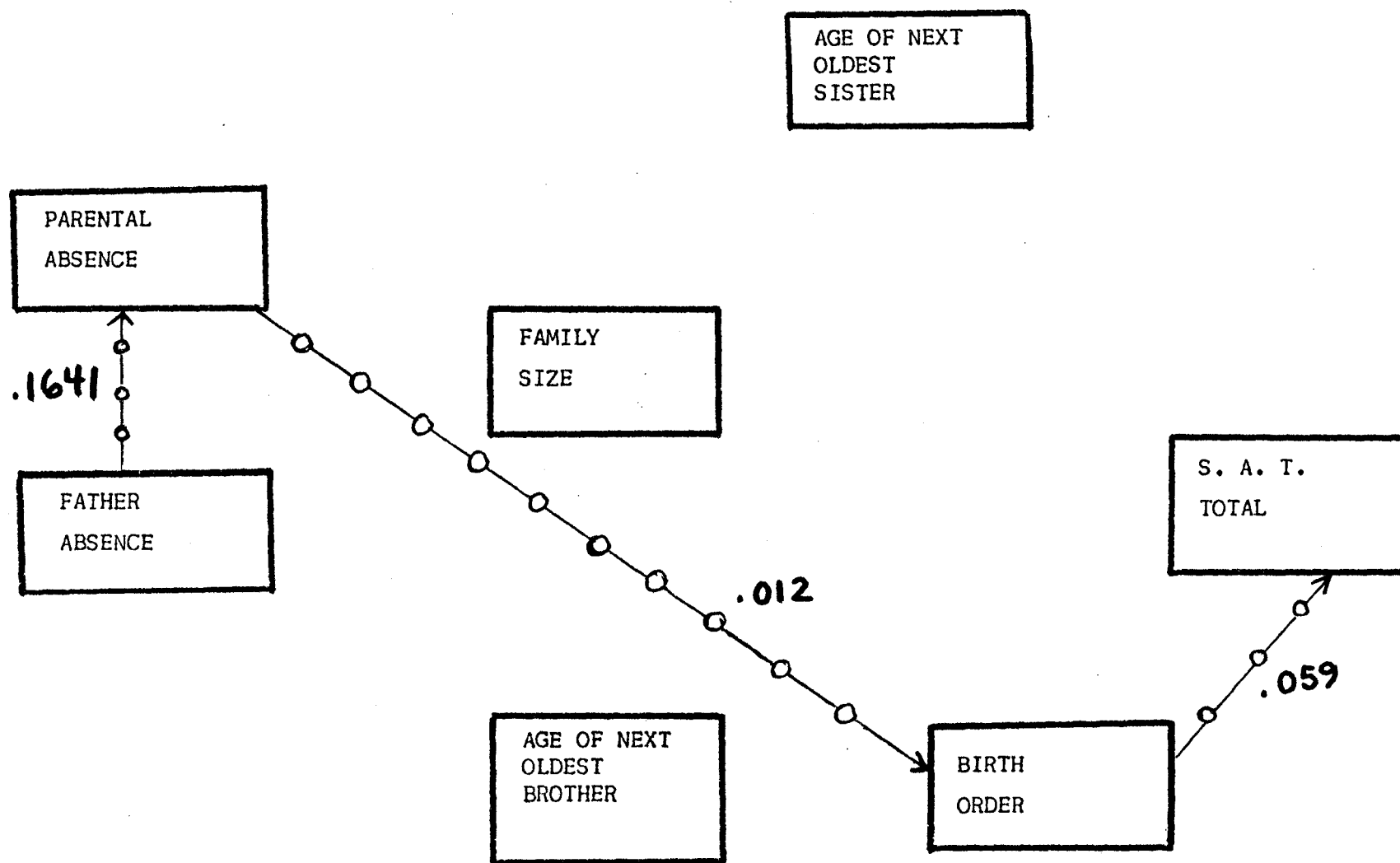


FIGURE..... 4 B

PATH MODEL OF FATHER ABSENCE, P.A., B.O., AND S.A.T. TOTAL

into the multiple regression equation. (Figure 4C) Father absence is significantly related to the time of parental absence with a Beta of .168 ($F = 2.975$). The relationship was examined in a previous path and it appears the effects are spurious in nature. Beyond father absence, the "mediating" variables are not statistically related to each other and do not interpret the original relationship between father absence and achievement.

Table 6 illustrates that when age of next oldest sister is examined in the following path diagram: Father Absence \longrightarrow Parental Absence \longrightarrow Age of next oldest sister \longrightarrow Birth Order \longrightarrow Achievement, significance is only observed for the relationship between age of next oldest sister and birth order with a Beta of .412 ($F = 2.254$). (Figure 4D) The other findings in this path do not differ significantly from those found when age of next oldest brother was included in the equation. The multiple R squared accounts for 3% of the observed variance of which in the case of ANOB, father absence is the only significant contributor. Whereas in the equation including ANOS, the multiple R squared accounts for 3% of the observed variance of which ANOS is the only significant contributor.

Next, time of parental absence, birth order, and achievement were examined. Time of parental absence is significant with a Beta of $-.121$ ($F = 4.569$). (Figure 4G) An examination of Figure 4 illustrates the following relationships: There is a small but negative relationship between time of parental absence and achievement ($-.121$). This means that parental absence occurring after age five influenced the birth order in the family which is a component of family size.

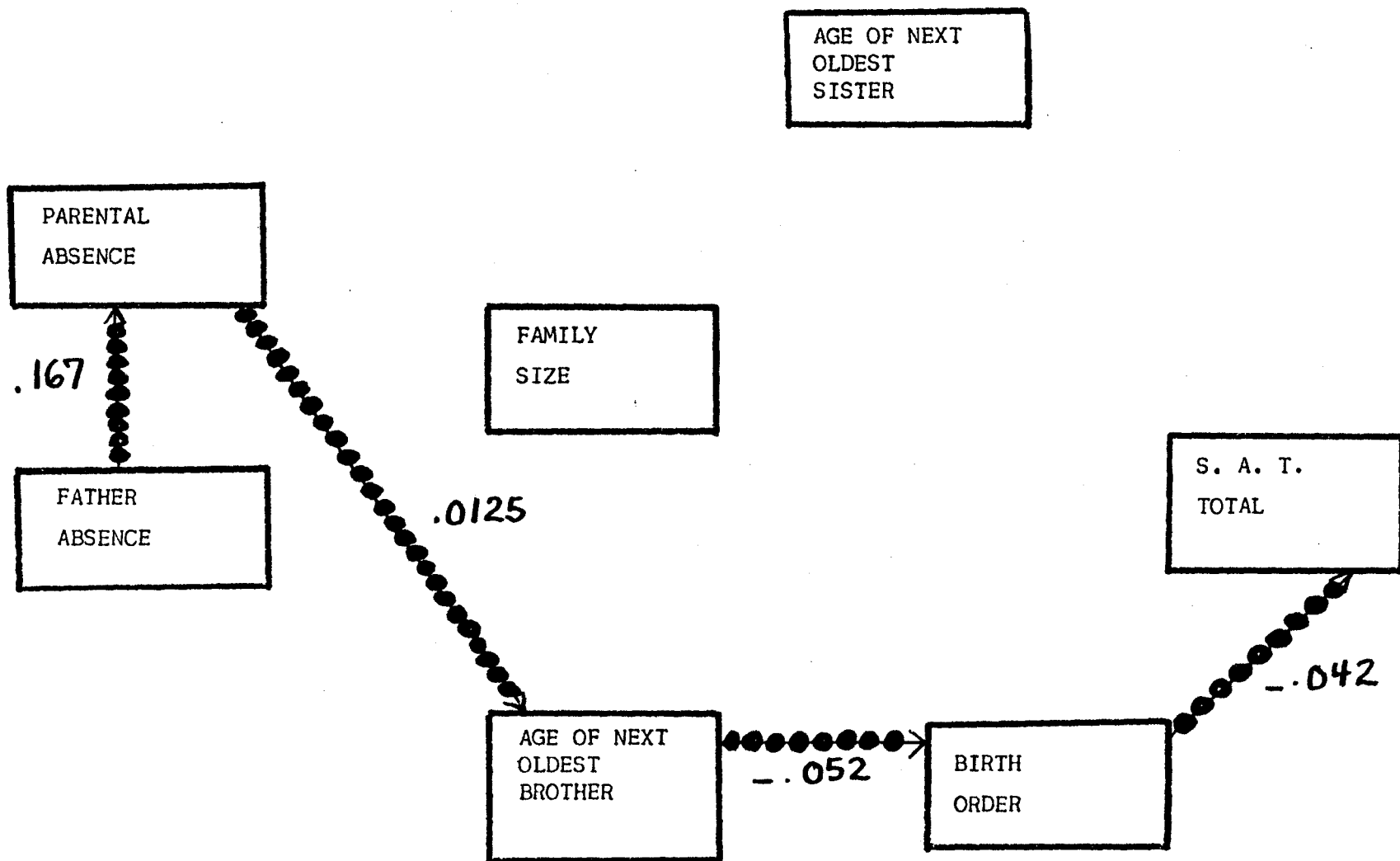


FIGURE..... 4 C

PATH MODEL OF FATHER ABSENCE, P.A., A.N.O.B. ,B.O. , AND S.A.T. TOTAL

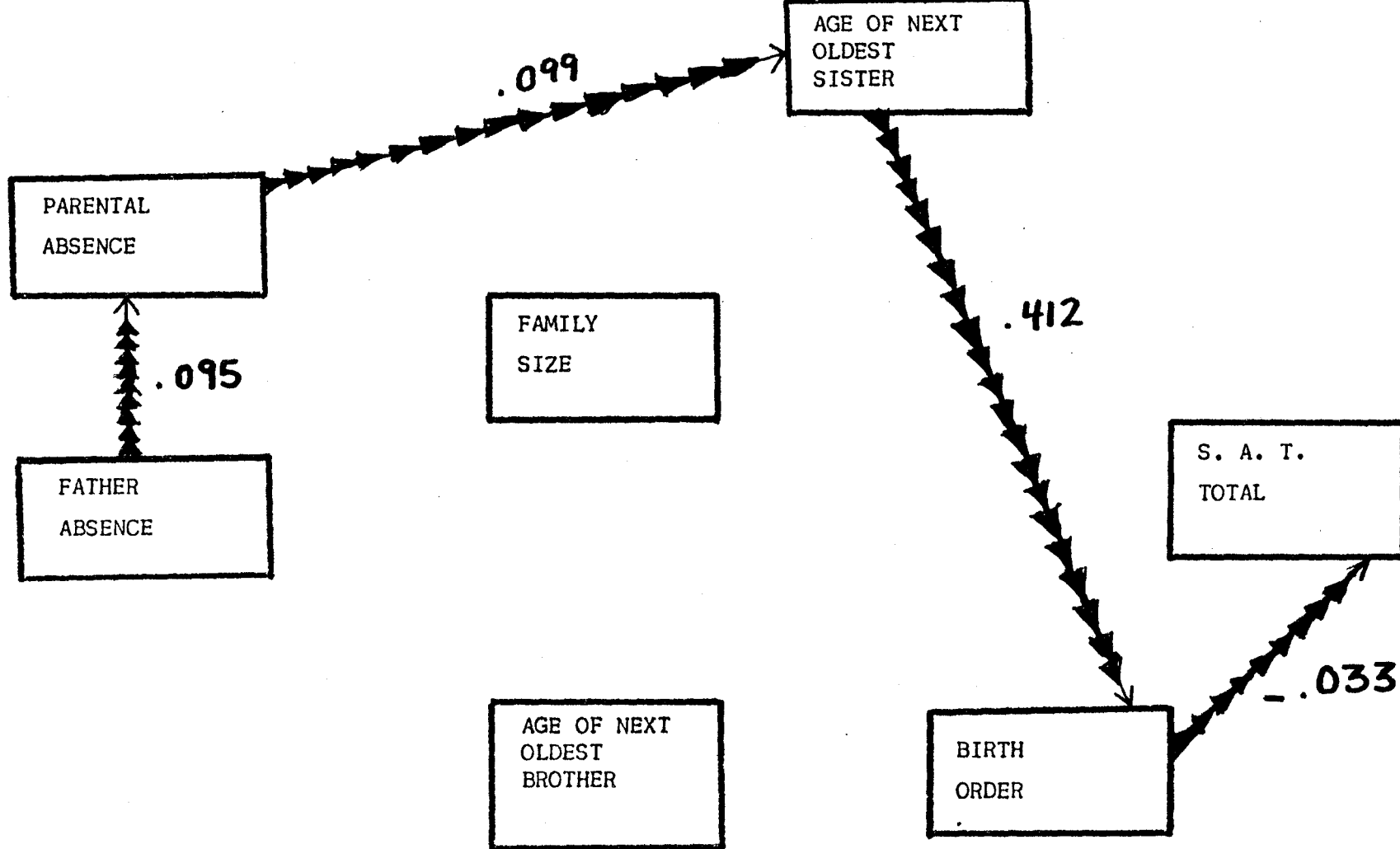


FIGURE..... 4 D

PATH MODEL OF FATHER ABSENCE, P.A. , A.N.O.S. , B.O., AND S.A.T. TOTAL

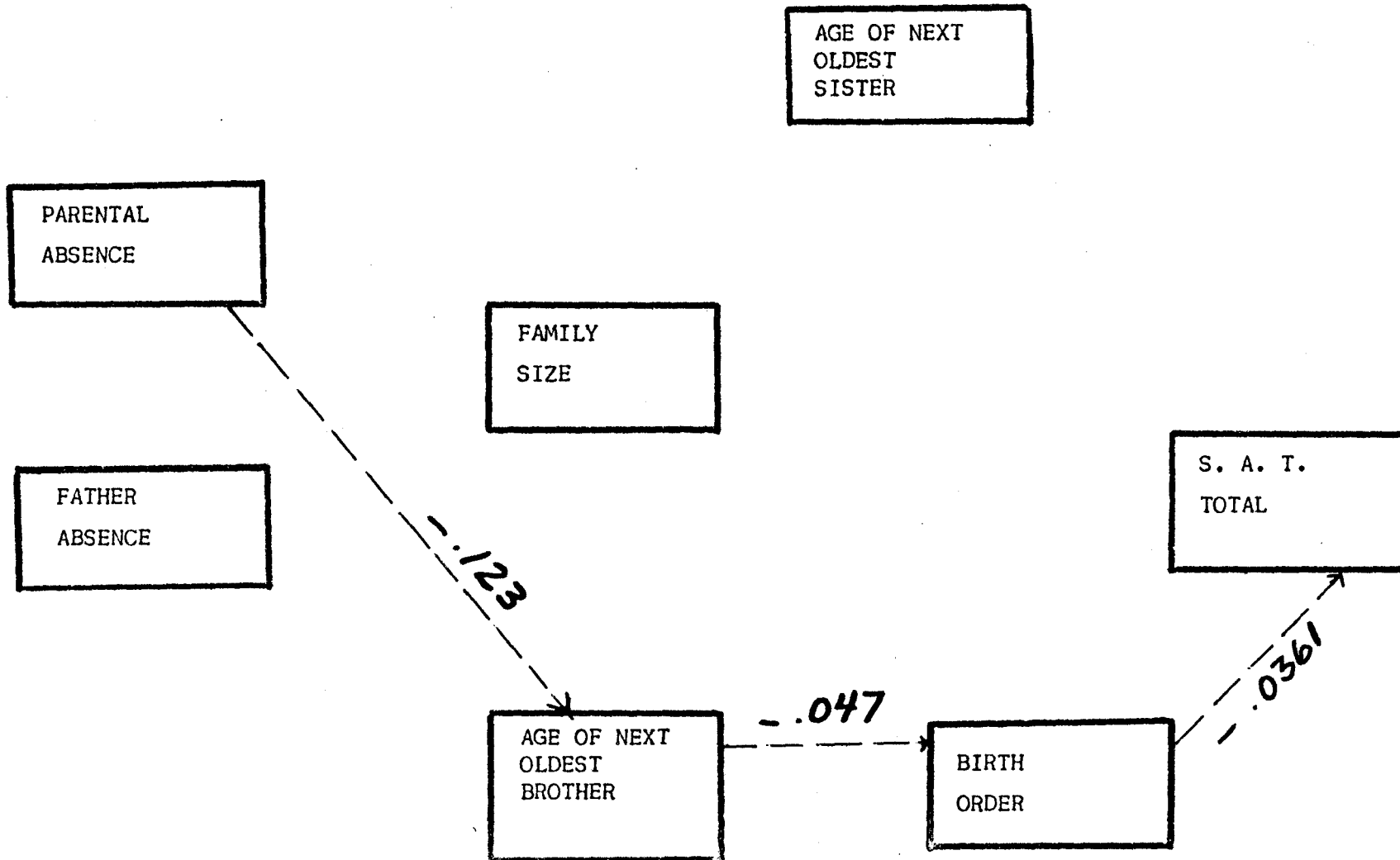


FIGURE..... 4 E

PATH MODEL OF P.A., A.N.O.B. , B.O., AND S.A.T. TOTAL

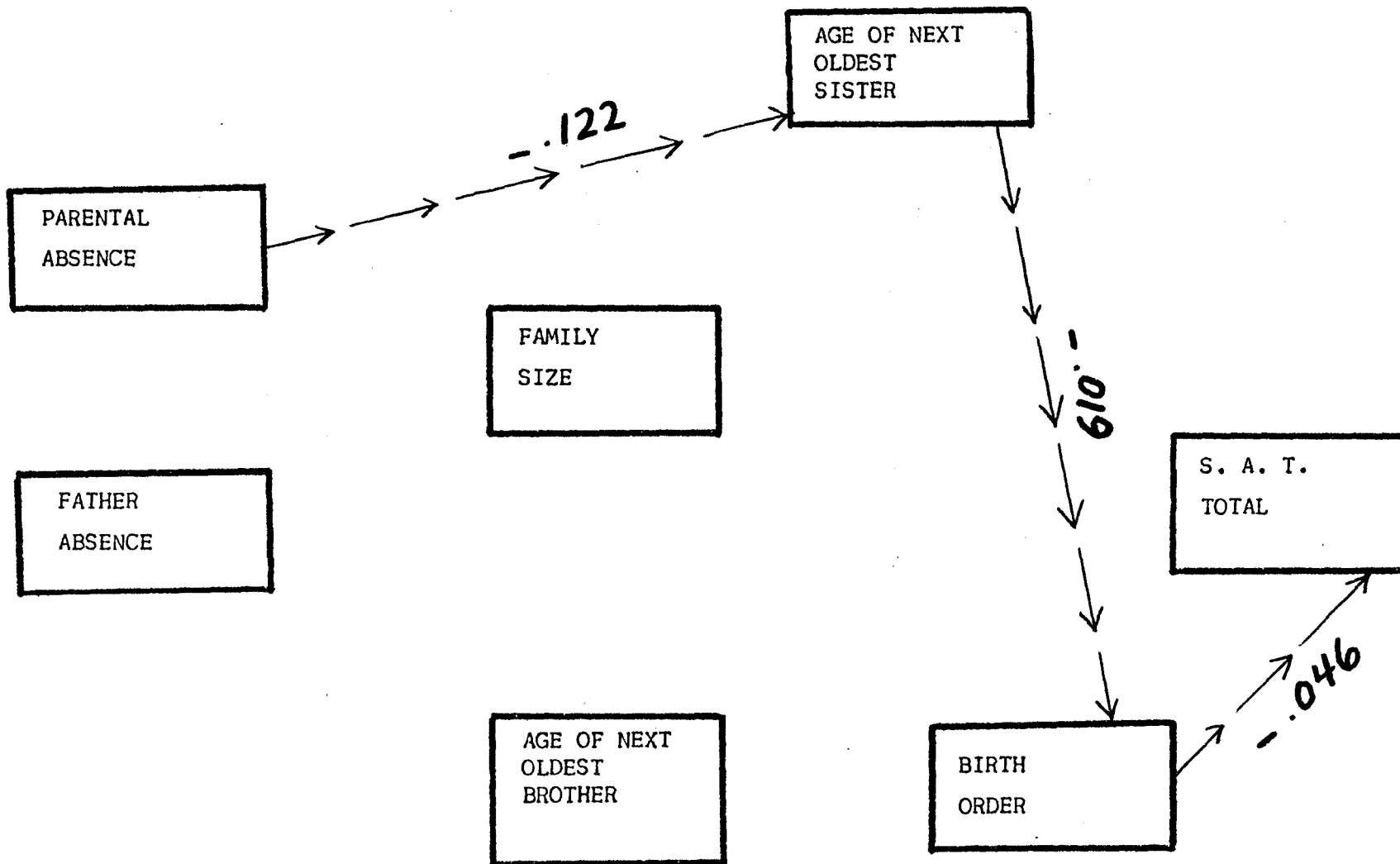


FIGURE..... 4 F

PATH MODEL OF P.A. , A.N.O.S., B.O. , AND S.A.T. TOTAL

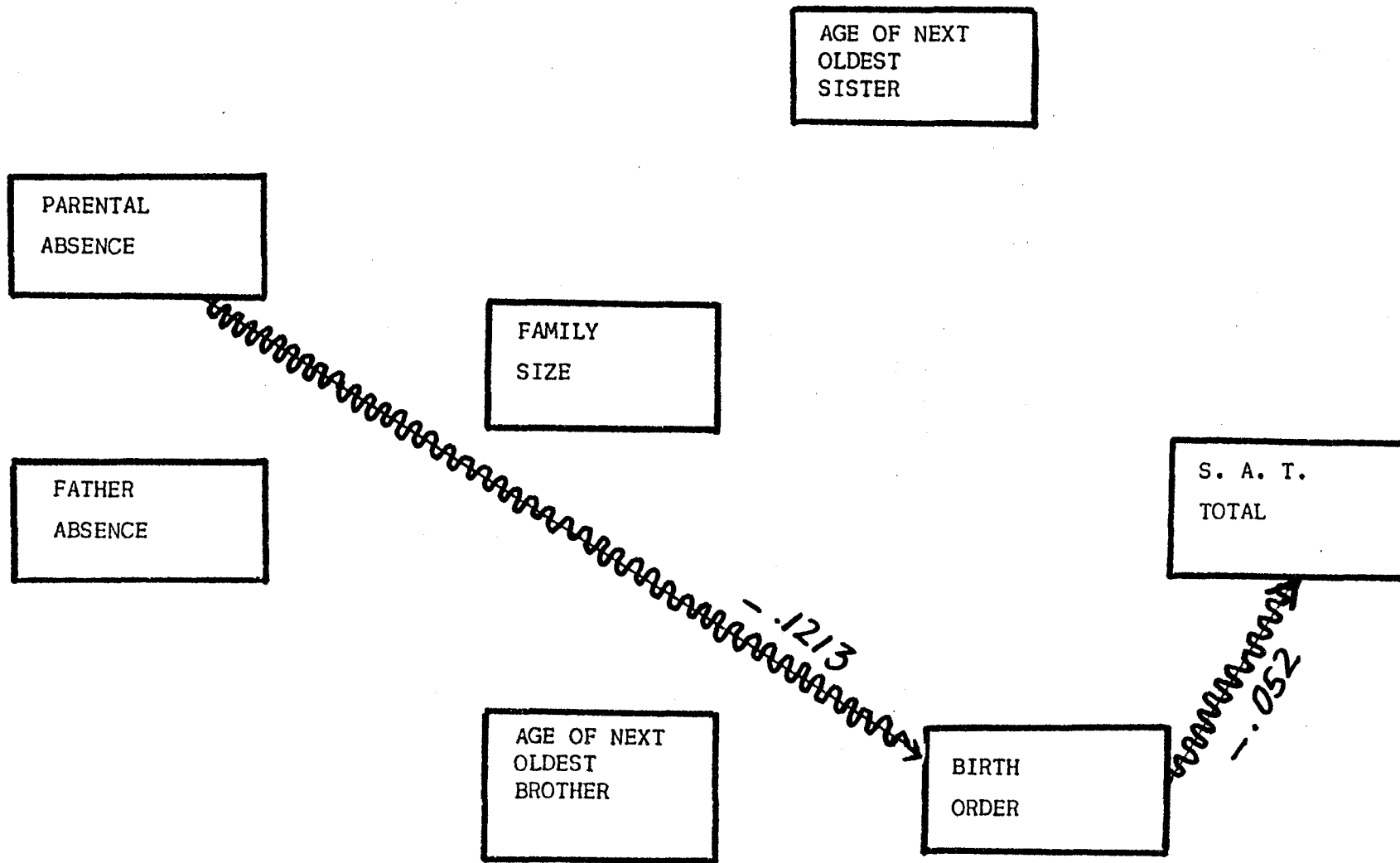


FIGURE..... 4 G

PATH MODEL OF P.A., B.O., AND S.A.T. TOTAL

The total indirect effect ($-.047$) ($-.036$) does not mediate the original relationship between time of parental absence and achievement. Upon examination of Table 6, it appears age spacing and birth order have negligible effects on achievement.

The results in Table 6 are similar in that whenever birth order and parental absence are analyzed in relationship to achievement, the multiple R squared are consistent in value. The mediating variables do not interpret the findings of the direct relationship between the antecedent variables and the dependent variable.

It appears that no findings of the Confluence Model seemed to have operated well within the path analysis framework of the present study. When all family influences investigated in this study are placed in a statistical analysis with measures of social class and race, we find that these two variables are stronger than whatever family effects there are. Likewise the findings suggests that much of the family size effect may be an artifact of the SES measure. There were no appreciable birth order effects shown as was predicted by the Confluence Model.

In Table 7 a summary of the researched hypotheses is presented. Predictions based upon birth order were unsupported. However, when parental absence was examined in relation to performance on the Scholastic Aptitude Test, a deleterious effect was revealed which lends support to hypothesis two.

Limitations, implications, and directions for further research will be presented in the "Discussion" section. The Confluence Model will be discussed in terms of its relationship to the findings of the

present research.

Table 7
Summary of Supported and Unsupported Hypotheses

Hypothesis	Supported	Unsupported
1. First-borns will score significantly higher than later borns on the composite of the Scholastic Aptitude Test.		X
2. Subjects from father absent homes will score lower on the composite of the Scholastic Aptitude Test than subjects from father present families.	X	
3. There will be significant birth order, parental absence, and sex effects on the composite of the Scholastic Aptitude Test.		
A) Female subjects of all birth orders from a father absent home will score lower on the composite of the Scholastic Aptitude Test than female subjects from father present homes.		X
B) Male subjects of all birth orders from a father absent home will score lower on the composite of the Scholastic Aptitude Test than male subjects from father present homes.		X
4. There will be significant birth order, early parental absence (before age five), and sex effects on achievement for the selected population.		X

CHAPTER V

DISCUSSION

The results in the previous chapter presented several presumed causal relationships involving familial variables and achievement. This chapter will consider the implications of these findings as they apply to intellectual development and appropriate areas for further research.

The present research attempted to incorporate father absence into the Confluence Model developed by Markus and Zajonc (1975). The model itself does not predict what will happen to the "pool of intellectual capacity" as a result of father absence. However, Zajonc (1976) does make certain suppositions regarding father absence and intelligence. He offers the suggestion that a one-parent home constitutes an inferior intellectual environment.

Specific predictions based on the Confluence Model appear to have somewhat limited utility for predicting specific relationships between father absence, time of parental absence, birth order, family size, family structure, employment status, sibling spacing, and achievement. However, the path analysis models developed in this research did reveal the significance of socioeconomic status and race as related to the achievement of students enrolled in the School of General Studies at Purdue University-Calumet.

When the previously mentioned family influences are concurrently analyzed with socioeconomic status, it was found that

socioeconomic status goes beyond what family effects are present. Standard path analysis approaches suggest that much of the family effects noted may be an artifact of socioeconomic status measures. Socioeconomic status had significant influence on family size, family structure, father absence, time of parental absence, and employment status. High socioeconomic status was associated with smaller families, nuclear family structures, more employment, and less parental absence.

Race was the only variable which had any measurable significance ($-.36$) in this research. This statistical measure was consistent throughout all path equations. As reported in the previous chapter, the minority students in the School of General Studies performed better on the Scholastic Aptitude Test than the white students. This finding can be considered an "anomaly" when compared to the national trends of the Scholastic Aptitude Test. There is a high degree of cultural specificity in the contents of the Scholastic Aptitude Test which traditionally favors white students. In order to obtain a better prediction from the Confluence Model, hypotheses should be based upon the use of "culture fair" testing instruments such as the Raven Progressive Matrices.

A particular concern of this study was to address the question of whether birth order and "father" significantly affected achievement as previously predicted by the Confluence Model. The relationship between birth order and achievement was low and nonsignificant ($.05$). Here again, the Confluence Model does not operate well within this particular phase of the study.

Zajonc (1975) stresses the "opportunity to teach" as being a viable component of the Confluence Model. However, when sibling spacing was examined in the path model, it failed to produce any significant findings for this sample.

The failure to obtain significance between the multiple effects of birth order and parental absence for achievement suggest that the Confluence Model does not adequately explain the results obtained in this study. The dominant effects which appear in this study are socioeconomic status and race.

Social processes vary within different family configurations, and their variations could help explain the findings in the present study. Comparisons of different social settings at different times may help in understanding the relationship of birth order, parental absence, and achievement.

It is important to recognize that father absent families are different from father present ones because of the complex of events which follow divorce, separation, or death of a parent. Changes in economic and occupational status as well may produce profound changes in the schema of parent-child interaction. A wide range of social and emotional problems may develop in a father absent family.

Limitations

The path analysis approach used in this study was intended to determine as closely as possible the presumed causal relationships between the independent and dependent variables. This analysis resulted in a highly complicated path model which was subsequently

reduced to three smaller models. In order to develop the smaller models, many of the variables had to be redefined, specifically race and family structure. As a result of this redefinition, pertinent information was lost during the process. The effects of different family structures on achievement was lost when family structure was simply defined as nuclear versus other family structures. Likewise, when race was defined as white versus other racial categories, pertinent data was lost pertaining to the effects of specific racial categories on achievement.

Predictions in this study were based on the Confluence Model by Zajonc and Markus (1975) with the use of random sampling rather than the use of a control group. Consequently, the results lack application to a similar group of subjects. The sampling process should have utilized more controls. Specific birth orders and family sizes should have been selected rather than a random sampling which produced disproportionate birth orders and family sizes. The lack of control for birth order comparisons of both sexes, different age groups, and variable birth intervals prevented the author from doing a detailed analysis of all aspects of birth order and its influence on achievement.

As mentioned in the previous section, father absence creates an entirely different schema for those who remain in this type of family structure. The present study did not control for socioeconomic factors such as sharp decreases in income due to fathers' absence.

To counter the effects of disproportionate family sizes and birth orders, a larger sample size would have produced a wider range

of family sizes, birth orders, birth intervals, and family configurations. The inability to generalize the present findings is due to the small sample size and lack of an appropriately defined control group.

In order to more accurately make predictions based on the Confluence Model, a "culture fair" test such as the Ravens Progressive Matrices used by Belmont and Marolla (1973) may have produced more profound family size and birth order effects. The Scholastic Aptitude Test is a highly verbal testing instrument which may reflect the respondent's socioeconomic status and ethnicity.

The failure to obtain statistical significance between multiple effects of family configuration and performance ability suggests that path analysis alone does not adequately explain and interpret the results. The use of analysis of variance would have allowed for a closer examination of interaction effects with birth order, parental absence, and achievement. However, due to the difficulty of defining the variables used in the study, path analysis was judged to be the most appropriate statistical measure for this research.

Finally, because the Confluence Model lends itself to parsimony, it appears the model is not suited for analysis of such varied factors as those included in this study.

Implications

The most apparent and potentially significant result of this study is that socioeconomic status and race have been shown to be significantly related to the performance on the Scholastic Aptitude

Test. Although the influence of socioeconomic status had a small but significant (.15) influence on achievement, it appears that socioeconomic status in this present study does support the theory that SES affects family configuration and achievement. Likewise, race had an influencing effect on family size, socioeconomic status, parental absence, and achievement.

The influence of socioeconomic status on achievement indicates a direct relationship with a high socioeconomic status generating a higher level of achievement.

It appears that race, for this particular group, becomes important because of the difference in established goals of the subjects before entering the university. The minority students may be highly motivated because initially they had not planned to attend college but upon performing satisfactorily on the SATs they were encouraged and motivated for college.

Directions for Further Research

It is the author's opinion that the Confluence Model needs to predict achievement as it is influenced by changing family configurations. Too little is known about the combined effects of birth order and parental absence on achievement. In order to use achievement scores in a meaningful manner, it is desirable to have some gauge of the influences of familial factors on achievement. The family as an objective unit for social analysis is strikingly different from the family as a set of internalized relations and prescriptions for interaction and development (Laing, 1972). Because the Confluence

Model at this juncture offers no integration of the social and emotional content of father absence with the cognitive consequences of such an event, it provides little direction in analyzing the implications of the significant interaction that occurs between mother and child in this type of family structure. Consequently, there remains a conspicuous need to elaborate the Confluence Model in such a manner that it can relate features of family structure and functioning to the wider social context of the family, and in turn coordinate the interpersonal realm of the family with its cognitive realm.

Birth order researchers usually ignore racial and ethnic differences, and researchers interested in race and ethnicity have ignored the effects of birth order and birth interval. If the two lines of research could be combined, the I.Q.-score difference between blacks and whites, for instance, could be accounted for more fully.

Understanding the effects of sibling structure variables may depend on the particular cultural setting in which the family is found. For example, sex and age role expectations for children in a given birth position and their siblings are at least partially determined by cultural traditions and general social conditions. This is another area in which further careful study is needed.

The correlated effects of heredity and environment, as well as their interactions, cannot be readily evaluated within the context of the present Confluence Model. Although specific derivations with implications for the analysis of genetic effects on intelligence follow directly from the Confluence Model. Longitudinal research on

within-family cognitive development would shed light on the genetic-environmental issue regarding intelligence.

SUMMARY

This study examined the effects of family configuration, specifically birth order and parental absence on the total score of the Scholastic Aptitude Test. The Ss (n=308) were students enrolled in the School of General Studies at Purdue University-Calumet. Their ages ranged from 17-52.

Predictions were based on the Confluence Model developed by Markus and Zajonc (1975) from an analysis of the data by Belmont and Marolla (1973). Specifically, predictions of academic deficits due to parental absence and birth order as derived from the Confluence Model were investigated.

Path analysis was used to measure presumed relationships between family size, family structure, birth order, employment status, race, SES, father absence, time of parental absence, age of next oldest brother, age of next oldest sister, and achievement. Three models were developed utilizing SES, race, and father absence as independent variables and achievement (SAT) as the dependent variable.

The results indicate that the socioeconomic status of the parents and race are significantly related to performance on the Scholastic Aptitude Test. The findings in this study do not support the predictions based on the Confluence Model. There were no independent effects for birth order and parental absence relative to performance on the SAT. The path analysis of family related variables

including father absence, time of parental absence, employment status, age of next oldest brother, age of next oldest sister, family size, and family structure, were all nonsignificantly related to achievement on the Scholastic Aptitude Test.

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APPENDIX A

RESEARCH QUESTIONNAIRE ON FAMILY STRUCTURE

Name _____

Birthdate _____
 Month Date Year

Sex _____ (Male) _____ (Female)

Father's Job _____ Father Now Working _____ (Yes) _____ (No)

Mother's Job _____ Mother Now Working _____ (Yes) _____ (No)

How old are your brothers and sisters? List the current ages of all of your brothers and sisters (include half and stepbrothers and sisters as your brothers and sisters if they live or lived with you)

Current ages of brothers _____

Current ages of sisters _____

Are all of your brothers and sisters alive? _____ (Yes) _____ (No)

If you answered "No", would you please indicate below what year the person died and how old he or she was at the time of death.

Sex	_____	Age	_____	Year	_____
	_____		_____		_____
	_____		_____		_____

Circle your birth position in your family.

Only	1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th
Child	Born	Born	Born	Born	Born	Born	Born	Born	Born	Born

What adults lived with you before you graduated from high school? Check the box or boxes which apply to you.

<input type="checkbox"/> Both Natural Parents	<input type="checkbox"/> Stepmother	<input type="checkbox"/> Grandmother
<input type="checkbox"/> Mother	<input type="checkbox"/> Stepfather	<input type="checkbox"/> Aunt
<input type="checkbox"/> Father	<input type="checkbox"/> Grandfather	<input type="checkbox"/> Uncle

List other adults than those mentioned above

If you did not live with both parents before graduation from high school, parental absence was due to:

☐ Death
☐ Divorce
☐ Separation
☐ Other---Please Specify

Parental absence from above occurred:

☐ Before age 5
☐ After age 5

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APPENDIX B

APPENDIX B

Family Structures

<u>Category</u>	<u>Frequency</u>
Nuclear	213
Extended	33
Restructured	18
Fractured	44
Total	<u>308</u>

Adults in the Family

<u>Category</u>	<u>Frequency</u>
Both Parents	243
Mother	47
Father	12
Grandfather	1
Grandmother	4
Foster Parents	1
Total	<u>308</u>

APPROVAL SHEET

The dissertation submitted by Joy A. Moss O'Shields has been read and approved by the following committee:

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Associate Professor, Foundations, Loyola

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The final copies have been examined by the director of the dissertation and the signature which appears below verifies the fact that any necessary changes have been incorporated and that the dissertation is now given final approval by the Committee with reference to content and form.

The dissertation is therefore accepted in partial fulfillment of the requirements for the degree of Doctor of Education.

November 19, 1979
Date

Joy Rogers
Director's Signature