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Meta-Analysis Of Studies Investigating The Effects Of Father Absence On Children's Cognitive Development

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META-ANALYSIS OF STUDIES INVESTIGATING THE EFFECTS OF FATHER ABSENCE ON CHILDREN'S COGNITIVE DEVELOPMENT

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ABSTRACT

META-ANALYSIS OF STUDIES INVESTIGATING THE EFFECTS OF FATHER ABSENCE ON CHILDREN'S COGNITIVE DEVELOPMENT

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The purpose of the present study was the integration of the father-absence research to determine the effects of father absence on children's cognitive development as assessed by standardized intelligence, aptitude, and achievement tests and school grades. The study used the quantitative integrative review methodology of meta-analysis through which the findings from individual studies were integrated and relations between the study findings and characteristics were explored. The meta-analytic approach involved transforming the findings of individual studies to a common metric (i.e., effect size), describing and coding the characteristics of the studies, and then using analysis of variance and multiple regression analysis to determine whether there were overall effects, subsample effects, and relations among the characteristics of the studies and the study findings.

Extensive manual and computer searches uncovered 137 father-absence studies representing 9,955,118 father-absent and father-present subjects from preschool to college age. Analysis of the

study findings at the highest level of aggregation yielded a mean effect size of -.26 reflecting a .26 standard deviation superiority of the father-present subjects over the father-absent subjects. Mean effect sizes were found to differ significantly as a function of age of the child at onset of the father absence, age of the subjects at time of study, sample size, sample geographic distribution, and number of matched/controlled factors in each study.

Five significant correlations between study characteristics and study effect sizes were obtained: (1) larger effect sizes were associated with father-absence onset during 7-12 years of age; (2) larger effect sizes were identified with younger study subjects; (3) larger effect sizes were associated with smaller study sample sizes; (4) larger effect sizes were related to narrow geographic distributions of study samples; and (5) larger effect sizes were associated with a greater number of matched or controlled factors in the study. Only 14% of the total variance in study effect sizes was accounted for by the composite set of predictors (i.e., study characteristics).

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CHAPTER 1

> It is most obvious that the family is breaking down, although I don't think people realize the extent to which the breakdown has occurred. It is probably one of the most radical changes in a basic institution in our society to have happened outside a time of national crisis (Brofenbenner, 1977).
>
> I'm aware of the voices of doom saying that the family is breaking apart, but some families did, are now, and always will fall apart. Most people bring up children as well as they can (Cohen, 1977).

Since 1960 the proportion of children living with two parents has fallen dramatically, while the proportion living with only one parent has more than doubled (Hofferth, 1985). Demographers predict that at least one-third and perhaps nearly one-half of all children born during the current decade will spend some portion of their lives in a one-parent household (Bumpass, 1984; Spanier & Glick, 1981; Watternberg & Reinhardt, 1979).

Mother-present, father-absent families make up the majority of one-parent families. In Statistical Abstracts 1985, the Bureau of Census records that 15.4% of the total family types (i.e., two-parent, father-absent, mother-absent) are mother-only families. Thus, father absence in America is an issue of national scope; over 14 million children in this country live in father-absent homes (Bureau of Census, 1984).

These changing family patterns have resulted in an increasing focus on the effects of father absence on children's cognitive development. Although the research (Lamb, 1975, 1976; Lamb & Bronson,

1980; Lynn, 1974) has stressed the importance of fathering to children in two-parent families, the effects of father absence are still contested. There is a wide discrepancy among research findings as to the effects of father absence due to divorce, separation, desertion, and death on children's cognitive development.

Conflicting Research

The research evidence concerning the impact of father absence on children's cognitive development is contradictory. There are data indicating that father absence is detrimental, that it has no effect, and that it may even stimulate the child's cognitive development. Traditionally, studies investigating the effects of father absence have focused on four measures of cognitive development: standardized intelligence tests, standardized tests of scholastic aptitude, standardized achievement tests, and school grades.

Many studies addressing the issue of the effects of father absence on children's cognitive development have concluded that father absence has negative consequences. For example, Broman, Nichols, and Kennedy (1975) studied 26,104 white and black four-year-old children from father-absent and father-present homes and found significant differences ($p < .05$) between Stanford-Binet Intelligence Scale scores for the two family groups. In a study of third through twelfth grade middle-class students, Boyd (1984) reported that father-absent students scored significantly lower ($p < .05$) than father-present students on the mathematics and reading subtests of the California Achievement Test. In another study of the effects of

father absence on school-age children, Blanchard and Biller (1971) compared the grade point averages of third-grade boys and found that the academic performance of the father-absent group was significantly lower ($\rho < .01$) than that of the father-present group.

However, other researchers investigating the effects of father absence have concluded that father absence does not significantly affect children's cognitive development. For example, Cortes and Fleming (1968) reported no significant differences in the Kuhlman-Anderson Intelligence Test scores of fourth-grade boys from father-absent and father-present homes. Carter and Walsh (1980) also examined the effects of father absence on elementary school children and found no significant differences in grade point averages between father-absent students and their father-present counterparts. In a study of 281 college freshmen, Black, Hale, and Stevenson (1981) compared Scholastic Aptitude Test scores of students from father-absent and father-present homes and reported no significant differences for the two family groups.

The results of some studies, however, indicate that father absence has positive effects on children's cognitive development. For example, Jones (1975) compared scores on the Henmon-Nelson Test of Mental Ability for 60 college students from father-absent homes with those of a comparison group from father-present homes and found that the students from father-absent homes scored significantly higher ($\rho < .05$). In a study of 180 middle-class children in grades six and seven, Collins (1981) reported that father-absent children

had significantly higher ($p < .01$) school grades than father-present children. Herzog (1974) also examined the effects of father absence on school-age children and found that boys from father-absent families scored significantly higher ($p < .05$) than boys from father-present families on the Vernon Graded Arithmetic Test.

Thus, the findings of father-absence studies vary in irregularity across contexts, classes of subjects, and countless other factors. Differences in age, gender, race, and socioeconomic status of the child and differences in reason for, length, and onset of the absence make necessary the consideration of a variety of factors in the evaluation of the effects of father absence on children's cognitive development. In addition, prior reviews (Herzog & Sudia, 1973; Hetherington, Cox, & Cox, 1981; Shinn, 1978) have stressed the importance of a systematic consideration of the methodological characteristics of the father-absence studies.

The plethora of contradictory research findings has created the need for a systematic analysis of the literature in order to determine what is known and not known about the effects of father absence. Light and Smith (1971) concluded, "progress in understanding the research will only come when we are able to pool, in a systematic manner, the original data from many studies" (p. 443). Glass and Smith (1977, 1979) pioneered one such technique of integration. This technique, meta-analysis, is a suitable one for examining the question of the effects of father absence on children's cognitive development.

Meta-Analysis

The information explosion in the behavioral sciences has focused attention on the lack of standardization in how reviewers arrive at general conclusions. A separate verbal description of all relevant studies is impossible and focusing on one or two studies chosen from hundreds will fail to accurately portray the entire body of research (Cooper, 1982). Reviewers also face problems when attempting to relate variance in study findings with variance in subject populations, scope conditions, and study methodologies.

During the last decade researchers have developed quantitative reviewing techniques as a remedy to the problems of integrating a large body of research evidence. Glass (1976, 1977), Hedges and Olkin (1983), Cohen (1977), Pillemar and Light (1980), Rosenthal (1984) and others have organized detailed quantitative procedures for carrying out integrative research reviews. Gene Glass (1977) coined the term "meta-analysis" that is now used to describe the set of techniques for quantitatively evaluating a given area of research.

Meta-analysis is a technique for analyzing a body of research on a particular topic by statistical analysis of the results from individual studies for the purpose of integrating the findings (Glass, McGaw, & Smith, 1981). The goal of meta-analysis is to draw, in a systematic manner, as much information as possible from existing evidence. The meta-analytic approach involves transforming the findings of individual studies to some common metric, coding various characteristics of the studies, and then using conventional

statistical procedures to determine whether there is an overall effect, subsample effects, and relations among the characteristics of the studies and the study findings.

Glass (1976, 1981) suggests that when most of the studies are investigations with a control group, as in the father-absence research, the standard measure of the findings should be a standard score difference expressed as an "effect size." The effect size is computed by dividing the mean difference of the experimental and control groups by the standard deviation of the control group. An effect size is calculated for each study and then an overall average effect size is computed. In addition, the effect sizes from individual studies are related to the methodological and substantive characteristics of the studies to help explain variations in study outcomes.

The integrative review methodology of meta-analysis is especially suitable for use in examining the large body of father-absence research. Meta-analysis is a systematic and replicable approach to integrating the contradictory findings extant in the father-absence studies. Furthermore, through the use of multivariate statistical procedures, meta-analysis provides a method for simultaneously investigating the relationships among study methods and populations, father-absence characteristics and conditions, and study findings.

The Problem

Statement of the Problem

The problem addressed in the present study was the integration of the father-absence research to determine the effects of father

absence on children's cognitive development. Through the integrative review methodology of meta-analysis, the answers to two major questions were sought:

1. Does the research indicate that father absence has an effect on children's cognitive development?

2. Does the research indicate that father-absence effects differ as a function of the reason for the absence?

In addition to exploring the effects of father absence on children's cognitive development, this meta-analysis investigated the relationships between the characteristics of the reviewed studies and the reported father-absence effects. Thus, answers to the following questions were sought:

1. What relationships exist between the length of the absence and the age of the child at the onset of the absence and the reported father-absence effects?

2. What relationships exist between the gender, age, race, and socioeconomic status of the child and the reported father-absence effects?

3. What relationships exist between the source, date, and number of matching factors of the study and the reported father-absence effects?

4. What relationships exist between the number of father-absence factors defined in the study and the reported father-absence effects?

5. What relationships exist between the size and geographical distribution of the study sample and the reported father-absence effects?

The third problem addressed in the present meta-analysis was the determination of the study characteristics that predict the reported father-absence effects. Toward this end, answers to the following questions were sought:

1. Which substantive and methodological features of the studies predict the reported father-absence effects?

2. To what extent and in which combination do these study features predict the father-absence effects?

Statistical Hypotheses

Study hypotheses are usually stated in the form of research or substantive hypotheses reflecting the researchers' expectations based on theory or previous research findings. However, the meta-analyst must avoid potential bias in the integration of past research that could result from a priori statements of expected outcomes (Cooper, 1982). Therefore, the hypotheses explored in this meta-analysis are stated in the statistical or null form.

1. For the five categories of reason for father absence (employment/military service, divorce/separation/desertion, death, combined, and not reported), there is no difference in mean effect sizes.

2. For the four categories of outcome measure of cognitive development (standardized intelligence test scores, standardized academic aptitude test scores, standardized achievement test scores, and school grades), there is no difference in mean effect sizes.

3. For the five categories of age at onset of the father absence (early--before age 6, middle--7-12 years, and late--over 12 years),

there is no difference in mean effect sizes.

4. For the four categories of length of absence (less than 2 years, 2 years or more, combined, and not reported), there is no difference in mean effect sizes.

5. For the three categories of gender of study subjects (male, female, and combined), there is no difference in mean effect sizes.

6. For the five categories of socioeconomic status of the study subjects (high, middle, low, combined, and not reported), there is no difference in mean effect sizes.

7. For the five categories of race of study subjects (Black, White, other, combined, and not reported), there is no difference in mean effect sizes.

8. For the six categories of age of subjects at time of study (preschool, elementary, junior high, high school, college, and combined), there is no difference in mean effect sizes.

9. For the five categories of date of the study (before 1965, 1965-1969, 1970-1974, 1975-1979, 1980 to date), there is no difference in mean effect sizes.

10. For the four categories of source of the study (book, journal, thesis/dissertation, and unpublished), there is no difference in mean effect sizes.

11. There is no difference in mean effect sizes by the total sample number of each study.

12. For the six categories of geographic distribution of the study sample (neighborhood/school, city, school district, college/

university, state, and nation), there is no difference in mean effect sizes.

13. There is no difference in mean effect sizes by the number of matched/controlled factors in each study.

14. There is no difference in mean effect sizes by the number of father-absence factors defined in each study.

15. There is no relationship between the composite set of predictors (i.e., reason for absence; outcome type; age of subject at onset of the absence; gender, socioeconomic status, race, and age of the subjects; date and source of the study; size and geographic distribution of the sample; number of matched/controlled factors; and number of father-absence factors defined) and the mean effect sizes.

Purpose of the Study

The purpose of the present study had eight parts: (1) to identify and collect all studies investigating the effects of father absence on children's cognitive development; (2) to determine the magnitude of effects of the father absence in each study; (3) to compare the effects of different types of father absence; (4) to compare the effects of father absence on different measures of cognitive development; (5) to relate the size of effect to the characteristics of the study subjects; (6) to relate the size of effect to the characteristics of the study; (8) to determine which substantive and methodological features of the study predict the reported father-absence effects; and (8) to determine to what extent

and in which combination these study features predict the reported father-absence effects.

Delimitations

1. The meta-analysis was limited to those studies which focused directly on father absence or included such a focus as part of a broader inquiry.

2. The meta-analysis was limited to those studies that investigated the effects of father absence on cognitive development.

Limitations

The studies included in the meta-analysis were limited to those studies which reported father-absence effects in quantifiable terms, i.e., studies which reported descriptive statistics or used statistical analyses which yielded data that could be converted to effect sizes.

Assumptions

Inclusion of all studies regardless of methodological characteristics did not bias the findings of the meta-analysis.

Definition of Terms

1. Father absence: To insure the inclusion of a maximum number of studies in the meta-analysis, a generic definition of father absence must be used. Therefore, for the purpose of this study, father absence was defined as the lack a biological father or step-father living in the home.

2. Cognitive development: "increasing complexity of awareness including perceiving, conceiving, reasoning, and judging through adptation to the environment and assimilation" (American Psychological

Association, 1978, p. 28). For the purposes of this meta-analysis, cognitive development was operationally defined as scores on standardized intelligence, academic aptitude, and academic achievement tests and school grades.

3. Meta-analysis: "the statistical analysis of a large collection of analysis results from individual studies for the purpose of integrating the findings" (Glass, 1976, p. 3).

4. Effect size: the mean difference between the experimental and control subjects divided by the standard deviation of the control group, $\Delta = \bar{X}_E - \bar{X}_C / s_C$ (Glass, 1977). When means and standard deviations are not reported, effect sizes are obtained by the solution of equations from t and F ratios or other inferential statistics (Glass, McGaw, & Smith, 1981).

5. Substantive features: characteristics of the studies that are specific to the problem studied. The substantive features investigated in this meta-analysis included the following study characteristics:

   a. Reason for father absence: employment/military service, divorce/separation/desertion, or death
   b. Outcome type: specific outcome measures used to determine the effects of father abence on children's cognitive development (i.e., standardized intelligence, academic aptitude, and academic achievement tests and school grades)
   c. Age of subjects at the onset of the absence

d. Length of the father absence

e. Gender of the study subjects

f. Socioeconomic status of the subjects

g. Race of the study subjects

h. Age of the subjects at the time of the study

6. Methodological features: general characteristics of the study. The methodological features investigated in this meta-analysis included the following study characteristics:

a. Sample size

b. Date of publication or presentation: before 1965, 1965-1969, 1970-1974, 1975-1979, or 1980 to date

c. Source of the study: book, journal, thesis/dissertation, or unpublished

d. Geographical distribution of the study sample: neighborhood/school, city, school district, college/university, state, or nation

e. Matching factors: the matching of relevant variables to insure comparable father-absent and father-present samples (i.e., gender, socioeconomic status, race, IQ, grade in school, and age at the time of the study)

f. Father-absence factors: the specification of characteristics of the father absence (i.e., reason for absence, length of absence, and age of the child at the onset of the absence).

Significance of the Study

As a consequence of the present meta-analysis of studies investigating the effects of father absence on children's cognitive development, information is made available to researchers, educators, parents, and professionals working with father-absent families. Borg and Gall (1983) state, "integrative research reviews such as meta-analyses are very useful in helping researchers and practitioners keep up with the current state of the knowledge in their interest areas" (p. 198). By focusing on the integration and evaluation of previous studies, this meta-analysis summarizes the reported and retrieved research concerning the effects of father absence on children's cognitive development.

The contradictory findings regarding the effects of father absence create a myriad of questions concerning the possible interaction effects of father absence with socioeconomic status, race, and cause of absence in families of given structure and composition. The number of interactions and combinations to be considered is overwhelming. It is hoped that the present meta-analysis creates some order out of the mass of father-absence data and provides systematic information researchers may need to design future investigations.

CHAPTER 2

REVIEW OF THE LITERATURE

Meta-analysts stress the importance of a thorough narrative description of all studies prior to quantitative analysis and integration of a body of research (Cooper, 1980; Pillemar & Light, 1980). When the reviewer intends to apply statistics to research integration, it is crucial that the qualitative and historical debates surrounding the research problem are thoroughly considered. Otherwise, the reviewer may be open to the criticism that statistical representations of study outcomes have been combined without regard for the theoretical issues underlying the empirical data. Therefore, rather than selectively presenting key research, this chapter qualitatively reviews the entire set of retrieved studies investigating the effects of father absence on children's cognitive development.

The set of retrieved studies includes 150 investigations of the father-absent family and the possible effects of father absence on children's cognitive development. Studies of "parent absence," "one-parent families," and "broken homes" are included since the missing parent is usually the father. The studies investigating the effects of father absence have focused on four measures of cognitive development: intelligence tests, tests of academic aptitude, achievement tests, and school grades. For this qualitative review of the research, the reported studies are divided into the same four categories.

Cognitive Development Measured by Intelligence Tests

Fifty-three studies using standardized intelligence tests in the study of the effects of father absence on children's cognitive development were identified. The results and synthesis of the research are presented in Table 1. Of the 53 identified studies, 12 showed significant negative effects ($p < .05$) of father absence, 5 showed negative effects of father absence not tested for significance, 25 showed no significant effects of father absence, and 2 showed significant positive effects ($p < .05$) of father absence. Nine studies reported mixed negative, positive, and no effects depending on variables related to the father absence such as onset and duration of the absence, gender and race of the child, and family socioeconomic status. A closer look at the research results within general effect categories yields further indication of the contradictory nature of the research evidence of possible relationships between father absence and children's cognitive development.

Studies Showing Negative Effects of Father Absence

Seventeen studies addressing the issue of the effects of father absence on intelligence test scores have concluded that father absence has negative consequences. For example, Smilansky (1982) studied 406 Israeli elementary-school children from father-absent and father-present homes and found significant differences ($p < .001$) in Milta Intelligence Test scores for the two family groups. In another study of elementary-school students, Allen (1970) also reported

differences in intelligence test scores with the father-absent students having significantly lower ($\rho < .05$) Wechsler Intelligence Scale for Children (WISC) scores than their father-present counterparts. Similarly, Crossman and Adams (1980) and Wadsworth, Burnell, Taylor, and Butler (1985) found that father-absent preschool children scored significantly lower ($\rho < .05$) than father-present children on standardized intelligence tests.

Researchers investigating the effects of father absence on high school students have also concluded that father absence has negative consequences. Corsica (1980) compared the Otis Intelligence Test scores of 44 students from father-absent and father-present homes and found that the father-absent students had significantly lower ($\rho < .05$) scores. In a study of tenth-grade students, Miner (1968) reported that father absence was significantly related ($\rho < .05$) to lower California Test of Mental Maturity scores.

Studies Showing No Effects of Father Absence

Nearly half (25 of 53) of the studies investigating the effects of father absence on intelligence test scores have concluded that father absence has no significant consequences. For example, Cortes and Fleming (1968) and Buceta (1982) reported no significant differences in the intelligence test scores of fourth-grade boys from father-absent and father-present homes. In another study of elementary-school students, Gatlin and Brown (1975) compared the Slossen Intelligence Test scores of father-absent and father-present children and found no significant differences between the

two family groups. Similarly, Hornstein (1980) reported no significant differences in the Otis Intelligence Test scores of father-absent and father-present fifth-grade girls.

Some studies with preschool and kindergarten children have also failed to find significant effects of father absence on intelligence test scores. Eiduson, Zimmerman, and Bernstein (1977) tested 200 father-absent and father-present infants and recorded no significant differences on the Bayley Scales of Infant Development. After comparing the Stanford-Binet Intelligence Scale scores of 287 preschool children from two-parent and one-parent homes, Kohn and Rosman (1974) concluded that there was no relationship between family status and cognitive development. Similarly, Derrick (1977) found no significant differences in Stanford-Binet Intelligence Scale scores of father-absent and father-present kindergarten children.

Studies Showing Positive Effects of Father Absence

Two researchers using intelligence test scores as outcome measures (Jones, 1975; Saslow, 1982) concluded that father absence has positive effects on children's cognitive development. In a study of 60 male college students from father-absent and father-present families, Jones (1975) found that the father-absent students had significantly higher ($p < .05$) verbal and quantitative scores on the Henmon-Nelson Test of Mental Ability. Saslow (1982) also reported differences in the intelligence test scores of children from father-absent and father-present families with the

father-absent children scoring significantly higher ($p < .02$) on the McCarthy Scales of Children's Abilities.

Studies Showing Mixed Effects of Father Absence

Nine studies addressing the issue of the effects of father absence on intelligence test scores have found mixed results. For example, in two studies (Lessing, Zagorin, & Nelson, 1970; Moffitt, 1981), father-absence effects differed as a function of family socioeconomic status. Moffitt (1981) compared intelligence test scores of father-absent and father-present Danish boys and found that within the middle socioeconomic status group the father-absent boys had significantly higher ($p < .01$) WISC scores while within the low socioeconomic status group there were no significant differences. In a study with American children, Lessing, Zagorin, and Nelson (1970) also found that middle-class father-absent boys had significantly higher ($p < .05$) WISC scores than their father-present counterparts. However, within the low socioeconomic status group, the results were reversed--the father-present boys had significantly higher ($p < .01$) WISC scores than the father-absent boys.

The effects of father absence on intelligence test scores also vary as a function of the gender of the population studied. For example, in a study of 855 Danish 13-year-olds, Bergman (1981) found significant negative effects ($p < .05$) of father absence for boys but not for girls. Pederson, Rubenstein, and Yarrow (1976) compared the intelligence test scores of 55 father-absent and

father-present infants and also found significant negative effects ($\rho < .05$) of father absence for only the boys.

Some studies have found that the effects of father absence on intelligence test scores differ by duration and onset of the absence. For example, Hetherington, Cox, and Cox (1978) compared the Wechsler Preschool and Primary Scale of Intelligence (WPPSI) scores for 92 father-absent and father-present children and reported that there were no significant differences in intelligence test scores at two months or one year following divorce, but at two years, the father-present children scored significantly higher ($\rho < .05$) on the performance scles. In a study of 292 psychiatric clinic referrals, Maxwell (1969) found that father absence before age 6 was not related to WISC scores but father absence after age 6 was significantly associated ($\rho < .05$) with lower scores.

Summary

Although 19 of the reviewed studies yielded differences in intelligence test scores of children from father-absent and father-present homes, 25 studies found no differences. Furthermore, 9 of the reviewed studies showed mixed negative, positive, and no effects depending on characteristics of the absence and the population studied. Thus, the review of the research indicates an ambiguity of results. The findings are further clouded by the possible mediating effects of variables related to the father absence and the population studied.

Cognitive Development Measured by Academic Aptitude Tests

Fourteen studies using academic aptitude tests in the study of the effects of father absence on cognitive development were identified. The results and synthesis of the research are presented in Table 1. Of the 14 identified studies, 5 showed significant negative effects ($\rho < .05$) of father absence, 2 showed no significant effects of father absence, and 4 showed positive effects of father absence not tested for significance. Three studies reported mixed negative and positive effects depending on variables related to the father absence and the population studied. A closer look at the research results within general effect categories yields further indication of the contradictory nature of the research evidence of possible relationships between father absence and cognitive development.

Studies Showing Negative Effects of Father Absence

Five studies using aptitude test scores as outcome measures have concluded that father absence has detrimental effects on children's cognitive development. For example, Simmons (1981) compared scores on the Short Test of Educational Aptitude for 165 eighth-grade students from father-absent homes with those of a comparison group from father-present homes and reported that students from father-absent homes scored significantly lower ($\rho < .05$). In another study with junior high school students, Farley (1977) found that children from one-parent families had significantly lower ($\rho < .001$) aptitude test scores than children from two-parent families.

Two studies with college populations also found that father absence had negative effects on academic aptitude test scores. Sutton-Smith, Rosenberg, and Landy (1968) compared American College Entrance Examination scores for 295 father-absent and 760 father-present male and female college students and reported that the father-absent students had significantly lower ($p < .001$) quantitative scores. In a follow-up study with female college students, Landy, Rosenberg, and Sutton-Smith (1969) also found that the father-absent students scored significantly lower ($p < .01$) on the quantitative scale of the American College Entrance Examination.

Studies Showing No Effects of Father Absence

Two researchers investigating the effects of father absence on aptitude test scores (O'Shields, 1977; Webb, 1970) have concluded that father absence has no significant effects. Webb (1970 studied 412 high school students from one-parent and two-parent homes and reported that there were no significant correlations between family status and School and College Aptitude Test scores. In a study of the Scholastic Aptitude Test scores of 294 father-absent and father-present college students, O'Shields (1977) also found that family status was not significantly related to aptitude test scores.

Studies Showing Positive Effects of Father Absence

Four studies using academic aptitude test scores as outcome measures have concluded that father absence has positive effects

on children's cognitive development. For example, in a study comparing the American College Entrance Examination scores of 25 father-absent and 25 father-present male college students, Altus (1958) found that the mean verbal aptitude score of the father-absent group was 6.28 points higher than that for the father-present group.

Several researchers have tested the hypothesis that growing up in a father-absent home leads to a pattern of relatively low quantitative and high verbal scores on aptitude tests. For example, Carlsmith (1964) compared the Scholastic Aptitude Test scores of father-absent and father-present college students and found that father absence was associated with relative superiority of verbal to quantitative aptitude. In a study of 40 male Harvard medical school applicants, Funkenstein (1963) reported that 77% of the father-absent students had higher verbal than quantitative scores while 37% of the father-present students had relatively higher verbal scores. In both of these studies, when the verbal scores of the father-absent and father-present students were compared, the scores of the father-absent students were higher.

Studies Showing Mixed Effects of Father Absence

Three studies addressing the issue of the effects of father absence on aptitude test scores have reported mixed results. For example, in a study of 1892 college freshmen, Nelsen and Maccoby (1966) found that father-absence effects differed as a function of the cognitive skill tested. Comparison of Scholastic Aptitude

Test scores indicated that father-absent students had higher verbal scores than their father-present counterparts. However, on the quantitative scale, the father-absent students had lower scores.

Two researchers (Chapman, 1977; Oshman, 1975) found that the effects of father absence on academic aptitude test scores varied as a function of the gender of the population studied. Chapman (1977) analyzed the Scholastic Aptitude Test scores of 92 college students from father-absent and father-present families and reported that father-absent girls had significantly higher ($\rho < .01$) verbal scores than father-present girls but that father-absent boys had significantly lower ($\rho < .01$) verbal scores than their father-present counterparts. In another study of the Scholastic Aptitude Test scores of college students, Oshman (1975) also found significant positive effects ($\rho < .05$) of father absence for female students and significant negative effects ($\rho < .05$) for male students.

Summary

The review of the research investigating the effects of father absence on academic aptitude test scores indicates an ambiguity of results. The evidence is neither clear nor firm enough to demonstrate whether father absence does or does not have an effect on children's cognitive development. In addition, differences in gender of the population studied and cognitive skills tested make necessary the consideration of the possible mediating effects of a variety of factors.

Cognitive Development Measured by Academic Achievement Tests

Seventy-five studies using academic achievement tests in the study of the effects of father absence on cognitive development were identified. The results and synthesis of the research are presented in Table 1. Of the 75 identified studies, 32 showed significant negative effects ($\rho < .05$) of father absence, 2 showed negative effects of father absence not tested for significance, 26 showed no significant effects of father absence, and 2 showed significant positive effects ($\rho < .05$) of father absence. Thirteen studies reported mixed negative, positive, and no effects depending on variables related to the father absence and the population studied. A closer look at the research results within general effect categories yields further indication of the contradictory nature of the research evidence of possible relationships between father absence and cognitive development.

Studies Showing Negative Effects of Father Absence

Thirty-four studies using achievement test scores as outcome measures have concluded that father absence has detrimental effects on children's cognitive development. For example, Southworth (1984) compared scores on the Stanford Achievement Test for 42 children from one-parent homes with those of a comparison group from two-parent homes and reported that children from one-parent homes scored significantly lower ($\rho < .05$) on both reading and mathematics achievement. Mathematics achievement test scores were also found

by Edgar and Headlam (1982) and Thompson (1978) to be significantly lower ($\rho < .05$) for father-absent elementary-school children than for their father-present counterparts.

Three researchers investigating the effects of father absence on the reading achievement of elementary-school students (Cox, 1975; Sciara, 1977; Waldron, 1983) also concluded that father absence has negative consequences. Sciara (1977) studied 108 first-grade children from father-absent and father-present homes and found significant differences ($\rho < .01$) between Gates-McGinitie Reading Test scores for the two family groups. Cox (1975) also reported differences in the reading achievement of children from father-absent and father-present families with the father-absent students scoring significantly lower ($\rho < .05$). In a study of the Stanford Diagnostic Reading Test scores of 107 elementary-school pupils, Waldron (1983) found that father-absent students scored significantly lower ($\rho < .05$) than father-present students.

Studies Showing No Effects of Father Absence

Twenty-six studies investigating the effects of father absence on academic achievement test scores have concluded that father absence has no significant consequences. For example, Shilling and Lynch (1985) compared Educational Quality Assessment scores for 3160 eighth-grade students from father-absent, mother-absent, and two-parent homes and found no significant differences between the three groups. In a multivariate analysis of the Metropolitan Achievement Test scores of 148 black children in grades 3 through 8,

Carter and Walsh (1980) concluded that the father-absence factor did not contribute significantly to the variance in achievement test scores.

Other studies with elementary-school populations also failed to find significant effects of father absence on achievement test scores. Engemoen (1966) compared the Metropolitan Achievement Test scores of 35 first-grade children from one-parent and two-parent homes and found no significant differences. In a study of 416 white middle-class fourth and fifth grade students by Vroegh (1973), the achievement test scores of father-absent and father-present students were not significantly different at either grade level. Two other studies with fifth-grade students (Greenberg & Davidson, 1971; Scott, 1974) also found no significant differences in the Stanford Achievement Test scores of father-absent and father-present students.

Studies Showing Positive Effects of Father Absence

Two researchers using academic achievement test scores as outcome measures have concluded that father absence has positive effects on children's cognitive development. In a study of 99 boys from father-absent and father-present families, Herzog (1974) found that boys experiencing father absence during the age of 3-5 years had significantly higher ($p < .05$) Vernon Graded Arithmetic Test scores than father-present boys. In another study with a male-only population, Veasey (1974) compared Stanford Achievement Test reading scores for 14 Job Corps

volunteers from father-absent homes with a comparison group from father-present homes and found that the mean reading score of the father-absent group was higher than that for the father-present group.

Studies Showing Mixed Effects of Father Absence

Thirteen studies addressing the issue of the effects of father absence on achievement test scores have found mixed results. For example, in a study of the Wide Range Achievement Test scores of a national sample of white and black high school students, Goldstein (1983) reported differing effects of father absence depending on the race of the child. Within the white sample, the father-absent students scored significantly lower ($\rho < .01$) than the father-present students on mathematics achievement. Within the black sample, however, there were no significant differences in achievement between father-absent and father-present students.

Two researchers (Solari, 1976; Voza, 1984) found that father-absence effects on achievement test scores differed as a function of the age of the child at the time of study. In a comparison of the California Achievement Test scores of father-absent and father-present students in grades one through four, Voza (1984) reported that among the third graders the father-absent children scored significantly lower ($\rho < .05$) than the father-present children while among the second and fourth graders there were no significant differences. However, in another study with elementary-school

students, Solari (1976) found that father absence had significant negative effects ($p < .05$) on the Stanford Achievement Test scores of fifth and sixth grades students but not on the scores of first through fourth grade students.

Some studies have found that the effects of father absence on achievement test scores vary as a function of the gender of the population studied. Bergman (1981) compared the achievement test scores of 855 father-absent and father-present Swedish high school students and reported significant negative effects ($p < .05$) of father absence for boys but not for girls. Similarly, in a study of the Stanford Achievement Test scores of 162 junior high school students, Shelton (1963) found that father absence had significant negative effects ($p < .05$) for the boys only.

Summary

Although 36 of the reviewed studies yielded differences in achievement test scores of children from father-absent and father-present homes, 26 studies found no differences. Furthermore, 13 of the reviewed studies showed mixed negative and positive effects depending on characteristics of the absence and the population studied. Thus, the review of the research investigating the effects of father absence on academic achievement indicates an ambiguity of results. The findings are further clouded by the possible mediating effects of variables related to the father absence and the population studied.

Cognitive Development Measured by School Grades

Sixty studies using school grades in the study of the effects of father absence on cognitive development were identified. The results and synthesis of the research are presented in Table 1. Of the 60 identified studies, 22 showed significant negative effects ($\rho < .05$) of father absence, 5 showed negative effects of father absence not tested for significance, 26 showed no significant effects of father absence, and one showed significant positive effects ($\rho < .05$) of father absence. Six studies reported mixed negative, positive, and no effects depending on variables related to the father absence and the population studied. A closer look at the research results within general effect categories yields further indication of the contradictory nature of the research evidence of possible relationships between father absence and cognitive development.

Studies Showing Negative Effects of Father Absence

Twenty-seven studies addressing the issue of the effects of father absence on school grades have concluded that father absence has negative consequences. For example, Gray (1980) studied 96 elementary-school boys from father-absent and father-present homes and found significant differences ($\rho < .01$) in the school grades for the two family groups. Between 1973 and 1976, Conyers (1977) recorded the grade point averages of over 2000 ninth graders and reported that students from one-parent homes had a mean grade point average record that was significantly

lower ($p < .01$) than that associated with students from two-parent homes. Three other studies with junior high school populations (Campbell, 1932; Feldman & Feldman, 1975; Gerasch, 1983) also found that father-absent students had significantly lower ($p < .05$) school grades than their father-present counterparts.

A recent study comparing school grade records of children from single-parent and two-parent homes was conducted by the Kettering Foundation and the National Association of Elementary School Principals (NAESP). Statistical data on students' class standings in low, average, or high achievement groups based on grade point averages were gathered from elementary and secondary schools across the United States. The preliminary reports of the analysis based on 18,256 students (Brown, 1980; NAESP, 1980) showed differences between family groups--a larger proportion of children from one-parent families appeared in the low achievement group compared to those who lived with both parents. In subsequent multivariate analyses of the data, Evans and Neel (1980) and Zakariya (1982) found that one-parent students had significantly lower ($p < .05$) school achievement than two-parent students at both the elementary and secondary levels.

Studies Showing No Effects of Father Absence

Twenty-six of the studies investigating the effects of father absence on school grades have concluded that father absence does not have significant consequences. For example, Kitano (1963) reported no significant differences in the school grades of elementary-

school boys and girls from father-absent and father-present homes. Similarly, some studies with secondary-school students (Bowman, 1981; Buchinal, 1964; Perry & Pfhul, 1963; Wasserman, 1972) also failed to find significant effects of father absence on school grades. In addition, two studies with college students (Gale, 1974; Woo, 1981) reported no significant differences between school grades of father-absent and father-present samples.

From 1971 to 1977 Wallerstein and Kelly (1980) conducted a longitudinal study of the effects of divorce on children involving 60 volunteer families with 131 children ranging in age from 3-18 years. As one aspect of the study, Wallerstein and Kelly recorded the school grades of children at six months, one year, and five years following the parental divorce. At the six months follow-up, one-third of the children were good to excellent students, one-third had average achievement, and one-third were doing poor to failing work. At the one year follow-up, 55% of the children were achieving good to excellent grades while 20% received average grades and 25% declined in performance. Five years following separation, school grades were essentially the same as in the beginning with two-thirds of the children doing average school work or better and one-third having poor or failing grades. Wallerstein and Kelly (1980) concluded, "divorce did not significantly alter school performance of the group as a group, although there were changes within it in the direction of improved or deteriorated academic functioning" (p. 279).

Studies Showing Positive Effects of Father Absence

One researcher using school grades as an outcome measure concluded that father absence has positive effects on cognitive development. Collins (1981) recorded the teacher evaluations of school achievement for 180 students in grades 6 through 8. The students were divided into three groups depending on family type--two-parent, divorced father-absent, or stepfather. In overall school achievement, the teachers rated the father-absent group significantly higher ($p < .01$) than either the father-present or the stepfather family groups.

Studies Showing Mixed Effects of Father Absence

Six studies addressing the issue of the effects of father absence on school grades have found mixed results. For example, one study (Collins, 1969) reported different effects for the age of the subjects at time of study. Collins (1969) studied the school grades of 300 father-absent and father-present black students in grades 4, 6, and 8 matched on gender and socioeconomic status. There were no significant differences in school grades among the fourth and eighth graders, but among the sixth graders, the father-absent students had significantly lower ($p < .01$) arithmetic grades.

In two studies with father-absent and father-present high school students, Hunt and Hunt (1975 & 1977) found differing effects of father absence depending on the race of the child. In the first study, Hunt and Hunt (1975) compared the school

grades of 358 father-absent and father-present boys and reported that in the white sample father absence was significantly related ($\rho < .05$) to lower school grades while in the black sample there was no significant relationship. In the second study, Hunt and Hunt (1977) compared the school grades of 338 father-absent and father-present girls and found that in the white sample father absence was significantly related ($\rho < .01$) to higher school grades while in the black sample there was no significant relationship.

Some researchers have found that the effects of father absence on school grades vary as a function of the gender of the population studied. For example, Shelton (1968) compared the school grades of 162 junior high school students and reported significant negative effects ($\rho < .01$) of father absence for boys but not for girls. However, Epps (1969) studied the school grades of high school students and found opposite results--father absence had significant negative effects ($\rho < .05$) for girls but not for boys.

Summary

The review of the research investigating the effects of father absence on school grades indicates an ambiguity of results. The evidence is neither clear nor firm enough to demonstrate whether father absence does or does not have an effect on children's cognitive development. In addition, differences in age, gender, and race of the population studied, socioeconomic status of the family, and characteristics of the absence make necessary the consideration of the possible mediating effects of a variety of factors.

Factors Associated with Cognitive Development and Father Absence

Throughout this review of the literature of the effects of father absence on cognitive development, references have been made to a number of dimensions along which the effects of father absence appear to vary. These dimensions include reason for the absence, duration of the absence and the age of the child at onset of the absence, gender and race of the child, age of the child at time of study, family configuration, and family socioeconomic status. In this section, studies that have provided information on how these dimensions may affect the cognitive development of father-absent children are examined.

Reason for the Father Absence

Most of the studies reviewed confound the effects of reason for the father absence by combining all reasons into an undifferentiated category of "father-absent" or "one-parent" homes. Father absence in these studies may refer to children who have experienced paternal death, divorce, separation, desertion, or temporary father absence due to employment or military service. Only 19 of the 150 reviewed studies identified categories of reason for father absence and compared effects. In all cases, father absence because of death was compared with father absence because of marital disruption (divorce, separation, or desertion).

In assessing the effects of father absence on cognitive development, four of the studies surveyed (Bachman, 1970; Ferri,

1976; McNeal, 1973; Santrock, 1972) found that father absence because of marital disruption had more detrimental effects than father absence due to death. Bachman (1970) recorded intelligence test scores of a national sample of 2514 male tenth graders and reported that students who had experienced father absence because of divorce scored a mean five points below the students who had experienced father absence because of death. In two studies with junior high school students, Santrock (1972) and McNeal (1973) also found that students who were father absent because of divorce had significantly lower ($p < .05$) achievement test scores than students who were father-absent because of death. Finally, Ferri's (1976) longitudinal study of 11,385 British children showed that on National Foundation for Educational Research Achievement Tests children who lived in father-absent families because of divorce scored significantly lower ($p < .05$) than the other family groups--intact or father-absent due to death.

Conversely, three of the studies surveyed (Crescimbeni, 1965; Curtis & Nemzek, 1938; Oshman, 1975) found that father absence because of death had more detrimental effects on children's cognitive development than father absence because of marital disruption. Crescimbeni (1965) compared Metropolitan Achievement Test scores for 92 children from father-absent homes with those of a comparison group from two-parent homes and found that significant differences ($p < .05$) between two-parent and father-

absent children were largest for absence due to death, followed by absence due to divorce, separation, or desertion. In a study of 200 high school students, Curtis and Nemzek (1938) reported that students who were father-absent because of death had significantly lower ($p < .01$) school grades than students who were father-absent because of divorce. Finally, Oshman (1975) found that male college students who experienced father absence due to death had significantly lower ($p < .05$) Stanford Achievement Test scores than father-present students or father-absent divorced-family students.

However, the results of 12 of the reviewed studies suggest that reason for the father absence is not an influential factor in determining effects. Three studies comparing achievement test scores of father-absent and father-present elementary-school children (Barton, 1981; Clarke, 1961; Ryker, Rogers, & Beaujard, 1971) reported no significant differences between children experiencing father absence due to divorce or separation and children experiencing father absence because of death. Six studies with junior and senior high school populations (Condit, 1960; Epps, 1969; Essen, 1971; Goldstein, 1983; Rosenthal & Hansen, 1980; Seraydarian, 1983) found no significant differences in achievement test scores or school grades between students who were father-absent due to death and students who were father-absent due to marital disruption. Three studies with college populations (Black, Hale, & Stevenson, 1981; Chapman, 1977; Weitz & Wilkinson,

1957) also found no significant differences in grades or achievement test scores for reason of father absence.

When all the studies comparing the effects of father absence for death and marital disruption are examined, the impact of the reason for the father absence cannot be definitively assessed. Therefore, reason for father absence must be considered as a possible moderating influence on the relationship between father absence and cognitive development. Furthermore, examination of the data in several of the studies comparing the effects of father absence by reason for the absence (Chapman, 1977; Oshman, 1975; Santrock, 1972) suggests that the effects of father absence may also be influenced by the duration of the absence.

Duration of the Father Absence

In a review of father-absence research, Shinn (1978) introduced an hypothesis concerning the possible moderating effects of the length of the absence: "If father absence has detrimental effects on children's cognitive development, we might expect longer absences to have greater effects than shorter ones" (Shinn, 1978, p. 313. Unfortunately, very few research studies have identified and even fewer have compared duration of father absence. Only 8 of the 150 reviewed studies noted the duration of the father absence and compared effects.

The results of five of the studies that compared effects by duration of the absence indicate that negative effects on children's cognitive development increased with longer father absences.

In two studies of the school grades and achievement test scores of elementary-school students (Blanchard & Biller, 1971; Savage & Newhouse, 1978), a combination of early onset (0-5 years of age) and long duration (5 years) was more detrimental to cognitive development than later onset (over 5 years of age) and shorter duration (2 years). Hetherington, Cox, and Cox (1978) compared the intelligence test scores of father-absent and father-present preschool children and also found that negative effects increased with length of the father absence. Two studies with college populations (Landy, Rosenberg, & Sutton-Smith, 1969; Thomas, 1969) also reported that standardized intelligence and aptitude test scores were lower, the longer and earlier the onset of the father absence.

However, the results of three of the reviewed studies indicate that the number of years the father was absent does not cause any significant differences in the effects of father absence. The investigations of Douglas, Ross, and Simpson (1968) and Ferri (1976), both longitudinal studies of representative British populations, failed to find systematic patterns of deficit as a function of duration of the absence. Similarly, Sutton-Smith, Rosenberg, and Landy (1968) reported no significant association between the number of years of father absence and Scholastic Aptitude Test scores for female college students.

Thus, any evidence of the effect of duration on the relationship between father absence and cognitive development

is inconclusive. Furthermore, three of the studies (Blanchard & Biller, 1971; Landy, Rosenberg, & Sutton-Smith, 1969; Savage & Newhouse, 1978) that did find some moderating influence of duration on the effects of father absence linked the length of the absence to the age of the child at the onset of the absence.

Age at Onset of the Absence

Santrock (1972) hypothesized that if the absence of the father predisposes the child to miss certain cognitive experiences, then earlier father absence would be more disruptive to cognitive development than later absence:

> The disruption during the 6-11 period of the child's life may be cushioned by his reliance on peer attachments. The trauma of father absence in later years of the child's life when the father does not play as important a part may not be as negative as in earlier years. In the earlier years of the child's life the father plays a more substantial role than peers do in the child's psychological development (Santrock, 1972, p. 466).

In support of Santrock's (1972) age-at-onset hypothesis, some researchers have indeed found the most detrimental effects of father absence for onset before age 6 (Blanchard & Biller, 1971; Hillenbrand, 1976; Jones, 1975; Landy, Rosenberg, & Sutton-Smith, 1969; Santrock, 1972; Savage & Newhouse, 1978).

Other researchers, however, have linked father-absence effects to other age-at-onset categories. For example, in a study of preschool and kindergarten boys in Barbados, Herzog (1974) found that boys with late father absence (3-5 years old) had significantly lower ($p < .05$) Chicago Intelligence Test

scores than father-present boys while there were no significant differences for the early father-absent boys (birth-2 years old). However, another study (Santrock & Wohlford, 1970) shows a curvilinear trend for an age-at-onset analysis with children in the 3-5 year old group having higher grade point averages than those younger or older.

Several researchers found the most detrimental effects of father absence for onset during the elementary school years. In Maxwell's (1961) study of 292 psychiatric clinic referrals, father absence before age 6 was not related to WISC scores but father absence at ages 6-10 was significantly associated ($p < .05$) with lower scores in comprehension, picture completion, and coding. Kelly, North, and Zingle (1965) analyzed the reading achievement test scores of 262 junior high school students and reported that students who experienced onset during grades one through three had lower scores. Similarly, Shelton (1968) found the most detrimental effects of father absence on school grades and Stanford Achievement Test scores for students who experienced onset during the first three years of school.

The eleven studies cited thus far suggest that age at onset has a mediating influence on the effects of father absence. However, 8 of the 19 studies that compared father-absence effects by age of the child at onset of the absence found no significant differences. In three longitudinal British studies (Douglas, Ross, & Simpson, 1968; Essen, 1979; Ferri, 1976), no effects of age at

onset of the father absence were found. Two studies comparing achievement test scores for elementary-school children (Barton, 1981; Berry & Poncini, 1982) also reported no differences for age at onset of the father absence. Similarly, Fink (1980) found no significant association between age at onset of father absence and Iowa Test of Basic Skills scores for high school girls. Finally, two studies with college student populations (Chapman, 1977; Oshman, 1975) also found no differences in effects for age at onset of the father absence.

The inconsistent findings of the studies relating reported effects of father absence to the age of the child at the onset of the separation preclude the formation of any firm conclusions about the mediating influence of age at onset of father absence. The findings are further clouded by the lack of comparability of classification periods across studies. Some studies use general age-at-onset classifications of "before age 5" and "after age 5" while other studies use small year-span categories of 0-2, 3-5, 6-9, or 10-11 years of age. Thus, while there is suggestive evidence that age at onset may have some influence on the effects of father absence, this evidence cannot be generalized across studies.

Age of the Child at Time of Study

Researchers have found a link between father absence and relatively poor performance on measures of cognitive development for a wide range of ages. Negative effects of father absence on the cognitive performance of very young children (infant through

age 5) were found by Broman, Nichols, and Kennedy (1975), Ginsberg and Russell (1981), and Pedersen, Rubenstein, and Yarrow (1976). Some studies have found negative effects of father absence for elementary school age children (Deutsch & Brown, 1964; Guidubaldi & Perry, 1984; Kohn, 1977) and other studies have found negative effects of father absence for secondary school age students (Belcher, 1961; Boyd, 1984; Stetler, 1959). However, only 6 of the 150 reviewed studies compared father-absence effects by age or maturational level of the child.

Of the six studies comparing the effects of father absence by age of the child, three found that father-absence effects varied for children of different ages. First, in a study of 80 boys and girls tested at ages 6 and 12 (Rees & Palmer, 1970), there were no significant differences in Stanford-Binet Intelligence Scale scores between father-absent and father-present children at age 6; but at age 12, father-absent children scored significantly lower ($\rho < .02$) than their father-present counterparts. In a comparison of the second through fourth grade California Achievement Test scores of father-absent and father-present students, Voza (1984) found that among the third graders the father-absent children scored significantly lower ($\rho < .05$) than the father-present children while among the second and fourth graders there were no significant differences. Finally, in another study with elementary school students, Solari (1976) found that among fifth and sixth grade students father absence had significant negative effects ($\rho < .05$)

on Stanford Achievement Test scores while there were no significant effects for first through fourth grade students.

Three of the studies comparing the father-absence effects for children of different ages found no significant differences for age of the child at the time of the study. Hess, Shipman, Brophy, and Bear (1968) and Hess, Shipman, Brophy, Bear, and Adelberger (1969) followed 81 urban black families and their 3-year-olds through the children's second grade in school and compared the Stanford-Binet Intelligence Scale scores of the father-absent and father-present children. At age 4, the mean intelligence scores of the children in both groups were equal (Hess et al., 1968); near the end of the second grade, neither the mean differences nor the average gain scores were significant (Hess et al., 1969). Similarly, Atkinson and Ogston (1974) compared the grade point averages of father-absent and father-present students grouped by age, 8-12 years or 13-16 years, and found no significant differences between the father-absent and father-present students in either age category.

Any evidence of the effect of age or maturational level of the child on the relationship between father absence and cognitive development is inconclusive. Longitudinal studies including an analysis of intra-individual changes in the cognitive performance at different age levels of children experiencing father absence may provide evidence needed to assess the effects of age of the child at the time of study. Until

these data are available, no firm conclusions can be made regarding the modifying effects of age of the child on the relationship between father absence and cognitive development.

Family Configuration

Family configuration characteristics including sibling gender, ordinal position, and family size are other factors that may have some influence on the relationship between father absence and cognitive development. For example, paternal absence may have a much different effect on a 5-year-old boy who is an only child than on a 5-year-old boy who has an older brother. Unfortunately, only 4 of the 150 reviewed studies investigated how family configuration characteristics may affect the cognitive development of father-absent children.

Family size and ordinal position may have an effect on the cognitive development of the child. Zajonc (1976) surveyed studies showing that family size is negatively correlated with intelligence and school achievement and that later-born children (who are born into large families) score lower than earlier born children in most circumstances. Zajonc and Markus (1975) explained these data with a confluence model in which intellectual growth is dependent upon the child's intellectual environment, represented as a function of the absolute intelligence levels of all individuals in the family. The birth of new children (whose absolute intelligence levels are low) dilutes the intellectual environment and slows cognitive development. Similarly, the absence of a

parent has a negative impact on the average intellectual environment and the child's cognitive growth.

Fowler and Richards (1979) tested the usefulness of the confluence model in predicting the cognitive development of father-absent and father-present children. Contrary to expectations based on the confluence model, no high magnitude negative relationships were found between father absence or family size and cognitive development. Ilardi (1960) and Sutherland (1930) also found that the size of the family was not a significant factor influencing the cognitive development of father-absent children.

However, Sutton-Smith, Rosenberg, and Landy (1968) found that family size was a factor influencing the cognitive development of father-absent children. In this study of the Scholastic Aptitude Test scores of over 2000 father-absent and father-present college students, the magnitude of father-absence effects increased with the number of children in the family: "Father-absence effects were strongest in three-child families, moderate in two-child families, and minimal in one-child families" (Sutton-Smith, Rosenberg, and Landy, 1968, p. 1219).

In the same study, Sutton-Smith et al. (1968) found that sibling sex-status also mediated the effects of father absence. In the two-child family, the greatest differences between father absence and presence were produced when the child had an opposite-sex sibling. Thus, first-born boys with a younger male sibling differed only directionally on all aptitude scores when

father absence and presence were compared while first-born boys with a younger sister showed a significant lowering ($\rho < .05$) of scores with father absence. With girls, the first-born girls with a younger brother showed a significant lowering ($\rho < .05$) of scores while first-born girls with a younger sister showed no such differences.

Thus, there is suggestive evidence that family configuration characteristics may mediate father-absence effects. However, the paucity of relevant research studies precludes the formation of any firm conclusions regarding the possible effects of family configuration on the cognitive development of father-absent children.

Gender of the Child

Twenty-six of the 150 reviewed studies confined their samples to males while only 4 of the studies focused exclusively on females. Detrimental effects of father absence were found in 9 of the 26 studies with male-only populations and in 3 of the 4 studies with female-only populations. Detrimental effects were found for females in 77 of the 124 studies that included them. This number is similar to the proportion of studies (87 of 146) that demonstrated negative effects for males.

Of the 120 studies of mixed male and female samples, 46 compared the effects of father absence by gender. Eleven of these studies found stronger negative associations between father absence and cognitive development for males than for females (Bain, Boersma, &

Chapman, 1983; Collins, 1969; Jantz & Sciara, 1975; McNeal, 1973; Oshman, 1975; Pringle, Butler, & Davie, 1966; Rees & Palmer, 1970; Santrock, 1972; Simmons, 1981; Sutton-Smith, Rosenberg, & Landy, 1968; Webb, 1970). Seven of the studies comparing father-absence effects for males and females found negative effects of father absence on the cognitive development of males but found no effects on the cognitive development of females (Barton, 1981; Bergman, 1981; Chapman, 1977; Gregory, 1965; Lloyd, 1972; Pedersen, Rubenstein, & Yarrow, 1976; Shelton, 1968). These results suggest that father absence has more detrimental effects on the cognitive development of males than on the cognitive development of females.

However, the results of five studies show stronger negative associations between father absence and cognitive development for females than for males (Annuniziata, 1981; Fowler & Richards, 1979; Ilardi, 1966; Mofidi, 1980; Solari, 1976). In addition, four of the studies comparing father-absence effects for males and females found negative effects on the cognitive development of females but found no effects on the cognitive development of males (Bernstein, 1976; Epps, 1969; Hillenbrand, 1976; Seraydarian, 1983). These results suggest that father absence has more detrimental effects for females than for males.

Nineteen of the studies surveyed found that gender had no moderating effect on the relationship between father absence and cognitive development. The results of eleven of these studies showed equally deleterious effects of father absence for males and females

(Belz & Geary, 1984; Broman, Nichols, & Kennedy, 1975; Ferri, 1976; Lessing, Zagorin, & Nelson, 1970; Sciara, 1975; Sciara & Jantz, 1974; Smidchens & Thompson, 1978; Willerman, Naylor, & Myrianthropoulos, 1970; Wilson, 1969; Zold, 1975). In comparing the father-absence effects for males and females, eight studies found no negative effects for either gender (Averitt, 1981; Bales, 1979; Black, Hale, & Stevenson, 1981; Hammond, 1979; Kelly, North, & Zingle, 1965; Nelsen & Maccoby, 1966; Pleas, 1976; Solomon, Hirsch, Scheinfield, & Jackson, 1972). These results suggest that gender has no moderating influence on the effects of father absence.

When all the studies comparing the effects of father absence for male and female samples are examined, the impact of gender cannot be definitively assessed. Furthermore, some studies found that girls consistently scored above boys on measures of reading and language achievement regardless of family status (Ferri. 1976; Hammond, 1979; Solomon et al., 1972). Thus, although the interaction between gender and father-absence effects cannot be firmly established, the possible differences in achievement attributed to gender alone must be considered.

Family Socioeconomic Status

During the past decade there has been an accumulation of evidence to suggest that father-absent families experience financial hardship and that the absence of the father jeopardizes a family's standard of living. A study of the effects of father absence by Wasserman (1972) indicated that husbandless mothers

were more likely to receive public assistance. In a more recent study, the National Association of Elementary School Principals (1980) found that one-parent children were consistently more likely than their two-parent peers to live in a low-income family. Currently, the Bureau of Census (1984) reports that 53.8% of the female-headed families with children under the age of 18 are poor and that the poverty rate for such families is 36.7%.

Thus, the moderating effects of socioeconomic status on the relationship between father absence and cognitive development are difficult to assess because a family that has been middle class may be redefined as disadvantaged or lower class if it becomes father-absent. How much of the variance in the effects of father absence can be attributed to income loss? To answer this question, the researcher must differentiate between the effects of father absence and the effects of depressed income. This problem has been approached in the research in two ways--through comparison of the magnitude of father-absence effects by socioeconomic levels and through statistical control of variance attributable to socioeconomic status.

Five of the 150 reviewed studies compared the magnitude of father-absence effects on cognitive development for different socioeconomic levels. The findings of two of these studies (Averitt, 1981; Birnbaum, 1966) suggest that father-absence effects do not differ by socioeconomic status of the family.

Averitt (1981) compared effects for middle and low socioeconomic status father-absent and father-present preschool children and found no significant differences in scores on the McCarthy Scales of Children's Abilities for father-absent and father-present children in either the low or middle socioeconomic status groups. Similarly, Birnbaum (1966) found no significant effects of father absence on California Achievement Test scores or school grades for high or middle socioeconomic status high school boys.

However, the other three studies comparing the magnitude of father-absence effects by socioeconomic levels found that effects differed by the socioeconomic status of the family. In a comparison of father-absence effects on Stanford-Binet Intelligence Scale scores for middle and low socioeconomic status 4-year-olds, Broman, Nichols, and Kennedy (1975) found more detrimental effects of father absence for middle-class children than for low socioeconomic status children. Conversely, Lessing, Zagorin, and Nelson (1970) reported more negative effects of father absence on intelligence test scores of low socioeconomic status high school students than for their middle-class counterparts. In another study comparing the intelligence test scores of father-absent and father-present high school students, Moffitt (1981) found that within the middle socioeconomic status group father-absent boys had significantly higher ($\rho < .01$) WISC scores while within the low socioeconomic status group there were no significant differences.

Five of the 150 reviewed studies of father-absence effects statistically controlled for the variance attributable to socioeconomic status. In three of these studies (Essen, 1979; Ferri, 1976; Svanum, Bringle, & McLaughlin, 1982), significant negative effects ($p < .05$) of father absence on achievement test scores were no longer significant after control for socioeconomic status. However, in a study by Smidchens and Thompson (1978), the significant negative effects ($p < .05$) of father absence on California Achievement Test scores remained after control for socioeconomic status. Similarly, Guidubaldi, Perry, and Cleminshaw (1984) found that significant negative effects ($p < .01$) of father absence on intelligence test scores and school grades of elementary-school children remained after control for socioeconomic status.

Thus, although a drop in income doubtless contributes to the detrimental effects of father absence on children's cognitive development, income differences alone have not accounted for all of the effects in some of the studies reviewed. The proportion of variance in effects of father absence that can be attributed to low socioeconomic status or the interaction between socioeconomic status and father absence remains to be determined.

Race of the Child

It is difficult to establish any interaction between race and the magnitude of father-absence effects because of the lack of comparability of socioeconomic status across different racial samples. There is a disproportionately large number of minority-

group father-absent samples that are low income. For example, Svanum, Bringle, and McLaughlin (1982) found that 82% of the black father-absent families were of low socioeconomic status compared with 52% of the white father-absent families. Herzog and Sudia (1973) pointed out that investigations of the influence of race on the cognitive development of father-absent children have been, for the most part, unsuccessful because of two conspicuously unresolved research problems: (1) differentiating between the effects of father absence and depressed income and (2) differentiating between the consequences of poverty and the consequences of race. Despite these difficulties, 17 of the 150 reviewed studies reported results comparing father-absence effects for different racial groups.

Eight of the 17 studies comparing father-absence effects for black and white samples found that effects differed for the two racial groups. Two of these studies (Deutsch, 1969; Deutsch & Brown, 1964) compared intelligence and achievement test scores of white and black elementary-school children from father-absent and father-present homes and found significant negative effects ($p < .05$) of father absence for the black group but not for the white group. Conversely, in three studies with high school students (Goldstein, 1983; Hunt & Hunt, 1975; Lloyd, 1972), father-absence had negative effects on the school grades and achievement test scores of white students but not black students. Similarly, Broman, Nichols, and Kennedy (1975) found that the

significant negative effects ($\rho < .01$) of father absence on Stanford-Binet Intelligence Scale scores were greater among white preschoolers than among black preschoolers.

However, eight of the reviewed studies comparing father-absence effects for black and white children found that father-absence effects did not differ for the two racial groups. In three of the studies (Bales, 1979; Peterson, DeBord, Peterson, & Livingston, 1966; Thompson & Smidchens, 1979) father absence was associated with lower school grades and achievement test scores for both the white and black samples. Similarly, two studies (Stetler, 1959; Willerman, Naylor, & Myrianthopoulos, 1970) comparing intelligence test scores of father-absent and father-present children found equally deleterious effects of father absence for the black and white children. Finally, three studies (Milne, Myers, Ellman, & Ginsberg, 1983; Myers, 1983; Svanum, Bringle, & McLaughlin, 1982) found no significant effects of father absence on the achievement test scores of either the black or white students.

Of the 150 studies reviewed, only one (Coleman, Campbell, Hobson, McPartland, Mood, Weinfield, & York, 1966) compared effects of father absence for other racial groups in addition to black and white categories. The Coleman Report (1966) investigated father-absence effects for eight racial classifications: Puerto-Rican, Mexican-American, Indian-American, Negro--South, Negro--North, White--South, White--North, and Oriental. The results of the study indicated that father absence or presence had very little

relation to achievement test scores for blacks or whites. However, father absence or presence had a stronger relation to the achievement test scores of other racial groups, especially the Mexican-American and Oriental groups.

Thus, there is suggestive evidence that race may have a moderating effect on the relationship between father absence and cognitive development. However, the mixed results of the reviewed research prevents the generalization of this evidence across studies. The results are further clouded by the difficulty in differentiating between "the consequences of poverty and the consequences of race."

Chapter Summary and Conclusions

Even though researchers who have studied the effects of father absence on children have presented an extensive body of data, inconclusive and often contradictory findings offer ambiguous evidence on which to base sound generalizations. Despite the ambiguity of the findings, however, this qualitative review of the father-absence research does provide sufficient basis for two firm conclusions:

1. Father absence per se does not necessarily lead to deficits in cognitive development. There is a firm basis for the rejection of widely assumed generalizations about the negative effects of father absence.

2. Any possible impact of the absence of the father on children's cognitive development may be mediated by a complex set of interacting variables. The potential interactive effects of the age, gender, and race of the child, the socioeconomic status of

the family, and the reason for, length, and onset of the absence make necessary the consideration of a variety of factors in the evaluation of the father-absent situation.

The contradictory findings and potential mediating variables extant in the father-absence research creates the necessity for a paradigmatic shift in the review of research investigating the relationship between father absence and cognitive development. Generalizations based on crude categorization of study outcomes into significant negative effects, no effects, or significant positive effects do not provide information about the magnitude of the differences or relationships. Furthermore, the comparison of studies on the one discrete variable of father absence/presence does not provide information about the potential interactive effects of mediating variables.

Review of the research indicates that the factors that mediate intellectual and achievement outcomes in children from father-absent families involve a complex interaction of individual differences and socio-cultural variables. Although much has been written about the research results showing the impact of father absence on children's cognitive development, little is known about the interaction between characteristics of the absence, study subjects, and study methodologies and the reported father-absence effects. This is an essential area of inquiry in understanding the research investigating the effects of father absence on children's cognitive development.

Table 1: Father Absence and Children's Cognitive Development

Study	Population	Matching Factors	Dependent Measures	Results
Allen (1970)	17 FA & 39 FP black low SES students in grades 1-8	SES, race	WISC CAT	FA students scored significantly lower ($\rho<.05$) than FP students on WISC. There were no significant differences on CAT.
Altus (1958)	25 FA & 25 FP male college students	Gender	ACE	The verbal score for the FA group was 6.28 points higher than for the FP group.
Annunziata (1981)	42 FA & 262 FP boys & girls in 5th-6th grades	SES, race	ITBS: Language	FP boys & girls scored significantly higher ($\rho<.05$) than FA boys & girls.
Atkinson & Ogston (1974)	26 FA(divorce), 4 FA(death), & 40 FP low SES white male 8-16 year olds	Gender, age, number of siblings, race, SES	GPA	No significant differences
Averitt (1981)	47 FP & 83 FA middle & low SES black & white 4-5 year olds	Gender	McCarthy	No significant differences
Bachman (1970)	317 FA(divorce), 500 FA(death), & 1997 FP male 10th graders	Grade in school, gender	Ammons IQ	FA(divorce) group scored 5 points lower than FP group. FA(death) group scored less than 2 points lower than FP group.

(table continued)

Table 1: (continued)

Study	Population	Matching Factors	Dependent Measures	Results
Bain, Boersma, & Chapman (1983)	28 FA & 28 FP white 3rd graders SES of FP group was 3 times higher than SES of FA group	Age, IQ, race, grade in school, family size, gender	WRAT	FA group scored significantly lower ($p<.05$) than FP group on WRAT reading only. FA girls scored significantly higher ($p<.05$) than FA boys on WRAT spelling & arithmetic.
Bales (1979)	4725 male & female black & white adolescents; "home stability factor" studied	SES, gender, race	GPA	There was a nonsignificant positive correlation between home stability and GPA for all groups.
Barton (1981)	54 FA, 9 MA, & 161 two-parent 5th-6th grade children	Gender	ITBS	One-parent boys had significantly lower ($p<.01$) achievement than two-parent boys. There were no significant differences for girls.
Belcher (1961)	92 "broken home" & 185 "intact home" 7-9th grade students	Grade, gender, age, IQ	CAT GPA	Students from "broken homes" had significantly lower ($p<.01$) CAT scores & school grades.
Belz & Geary (1984)	127 FA & 778 FP male & female high school seniors	Grade in school, gender	Scholastic Aptitude Test	FA students scored significantly lower ($p<.05$) than FP students on the quantitative scale.
Bergman (1981)	855 two-parent & 31 one-parent (divorced) male & female 13-year-olds (Sweden)	Gender, age at time of study	Swedish National Achievement Test	One-parent boys scored significantly lower ($p<.05$) than two-parent boys on mathematics achievement & spatial & inductive IQ.

Table 1: (continued)

Study	Population	Matching Factors	Dependent Measures	Results
Bernstein (1976)	14 FA & 103 FP male & female middle-class 5th graders	Grade in school, SES, IQ	ITBS	Among girls, FA significantly depressed ($p<.05$) math scores relative to verbal scores. There were no significant differences for boys.
Berry & Poncini (1982)	9 FP, 9 FA-early (before age 5), & 9 FA-late (after age 5) elementary school boys aged 9-12 years (Australia)	Age, gender, grade level, IQ	ACER Achievement	The FP group scored significantly higher ($p<.05$) than both the early & late FA groups on language comprehension, vocabulary, & mathematics achievement.
Birnbaum (1966)	90 FA & 90 FP high school boys	Gender, IQ, age	CAT GPA	No significant differences
Black, Hale, & Stevenson (1981)	85 FA(divorce) & 100 FP college undergraduates	Gender, age, race	SAT	No significant differences
Blanchard & Biller (1971)	44 low-middle SES white third-grade boys 11 FA-early (before age 5) 11 FA-late (after age 5) 11 FP: high availability 11 FP: low availability FA due to separation or divorce	Age, IQ, SES, gender, presence or absence of male siblings, grade level, race	SAT GPA	In every comparison, the high FP group scored significantly higher ($p<.05$) than the early & late FA groups. Compared to the low FP group, the high FP group scored significantly higher ($p<.05$) on GPA, spelling, language usage, language total, social sciences, science, & all mathematics subtests.

Table 1: (continued)

Study	Population	Matching Factors	Dependent Measures	Results
Bowman (1981)	72 FA & 72 FP male & female black & white low-middle SES high school students	Gender, race, SES	GPA	No significant differences
Boyd (1984)	326 divorced-family & 418 "intact-family" middle-class students in grades 8-12	None	CAT GPA	Divorced-family children had significantly lower ($p<.01$) CAT scores and school grades.
Broman, Nichols, & Kennedy (1975)	National sample of 7016 FA & 26094 FP white & black 4-year-olds from all SES levels	Race, gender, SES, age	SB IQ	IQ scores were significantly higher ($p<.01$) for FP blacks & whites. The effect increased with SES & was greater among whites than among blacks.
Brown (1980)	8556 elementary & secondary school students from 15 midwest schools One-parent & two-parent groups compared Subsequent analysis of NAESP (1980) study	None	GPA	There were disproportionate numbers of children from one-parent families in both the high achievement & low achievement groups at the elementary level. At the secondary level, there was a disproportionately high number of one-parent children in the low achievement group.
Buceta (1982)	24 FA & 24 FP 8-year-old boys & girls (Spain)	Age	GPA Raven	FA children had significantly lower ($p<.01$) language, mathematics, & total GPA than FP children.

Table 1: (continued)

Study	Population	Matching Factors	Dependent Measures	Results
Buchinal (1964)	123 FA(divorce) & 1230 FP 7-8th grade students	SES	GPA	No significant differences
Campbell (1932)	34 FA & 34 FP junior high school boys	Age, gender, "home conditions"	SB IQ GPA	IQ scores of students from FA & FP homes were nearly identical. The average GPA of the FA group was 3.7 points lower than the average GPA of the FP group.
Carlsmith (1964)	1180 male college freshmen & 137 male high school seniors FA because of WWII military service studied	Length of absence, age at onset, gender	Scholastic Aptitude Test	Length of FA and age at onset were related to the relative superiority of verbal to math aptitude. The effects were strongest for students whose fathers were absent at birth and/or were away for over 30 months.
Carter & Walsh (1980)	69 FA & 79 FP black low SES children in grades 3-8	Gender, race, SES	MAT GPA	No significant differences
Chapman (1977)	16 male & 16 female white college students in each of three family groups: FA, stepfather, & "intact"	Gender, race	Scholastic Aptitude Test	FP male students had significantly higher ($p<.01$) SAT total & verbal scores than FA male students. FA female students had significantly higher ($p<.05$) SAT verbal scores than FP female students.

(table continued)

Table 1: (continued)

Study	Population	Matching Factors	Dependent Measures	Results
Clarke (1961)	22 FA (death or divorce) & 11 FP 3rd-grade boys	Gender, IQ, race, grade level	CAT	No significant differences
Coleman, Campbell, Hobson, McPartland, Mood, Weinfield, & York (1966)	National probability sample of students in grades 6, 9, & 12 "Structural integrity of the home" studied	Parents' education & items in the home	"Standardized verbal & math achievement"	"Structural integrity of the home" had a relationship to achievement for black (r=.07), white (r=.10), Mexican-American (r=.18), Puerto-Rican (r=.16), Indian-American (r=.14), and Oriental (r=.28) students.
Collins, L. (1981)	180 students in grades 6-8 from "intact," step-father, & divorced single-parent families	Gender, race, SES	GPA	Teachers rated FA family group significantly higher ($\rho<.05$) than stepfather or FP groups.
Collins, M. (1969)	300 black children in grades 4, 6, & 8; at each grade level there were 25 boys & 25 girls from "intact homes" & 25 boys & 25 girls from "broken homes"	Gender, race, grade in school, SES	SRA IQ SRA GPA	"Intact family" children had significantly higher ($\rho<.01$) 6th grade arithmetic grades. "Intact family" children scored significantly higher ($\rho<.05$) on 4th grade IQ. There were no significant differences in achievement.
Condit (1960)	8th-grade students classified by family type: 262 one-parent-divorce, 98 one-parent-death, 1278 two-parent	Gender, IQ, SES, grade in school	GPA	No significant differences

Table 1: (continued)

Study	Population	Matching Factors	Dependent Measures	Results
Conyers (1977)	2000 ninth graders from "conventional" & "broken" homes	None	GPA	Students from "broken" homes had significantly lower ($\rho<.005$) grade point averages.
Corsica (1980)	32 FA & 44 FP middle SES boys & girls in grades 9-12	SES, age, grade, presence of older male siblings	Otis IQ GPA	FA students scored significantly lower ($\rho<.05$) on IQ & had significantly lower ($\rho<.05$) grades.
Cortes & Fleming (1968)	33 FA(divorce), 2 FA (death), & 35 FP male black low SES 4th graders	Gender, SES, race, grade in school	KA IQ SAT GPA	No significant differences
Cox (1975)	119 FP & 52 FA white low SES children in grades 3-5	SES, race	SRA	FP students scored significantly higher ($\rho<.05$) on language subtest.
Crescimbeni (1964, 1965)	92 FA(death or divorce) & 92 FP male & female students in grades 4-6	Age, IQ, gender, grade level, SES, school, teacher	MAT	At both one year & two years of separation, FA children scored significantly lower ($\rho<.05$).
Crossman & Adams (1980)	7 single-parent & 16 two-parent white middle SES 3-5 year olds	SES, race	WPPSI	Single-parent children scored significantly lower ($\rho<.05$) on similarity & vocabulary subscales.
Curtis & Nemzek (1938)	50 FA(death), 50 FA (divorce), & 100 FP high school students	IQ, age, gender, grade level, race	GPA	FP students had significantly higher ($\rho<.01$) school grades than FA students. FA(divorce) students had significantly higher ($\rho<.01$) school grades than FA(death) students.

Table 1: (continued)

Study	Population	Matching Factors	Dependent Measures	Results
Derrick (1977)	30 FA(desertion), 29 FA (divorce), & 58 FP low SES 4-6 year olds	SES	SB IQ	No significant differences
Deutsch (1960)	400 black & white low SES students in grades 4-6 from one-parent & two-parent families	SES, race	SAT	Children from one-parent families scored significantly lower ($\rho<.05$) on SAT total, mathematics, & reading.
Deutsch & Brown (1964)	317 FP & 123 FA black & white 1st & 5th graders 53% of FA sample were low SES black 5th graders	Race	LT IQ	FP children scored significantly higher ($\rho<.05$) than FA children. Low SES black fifth-grade FA children scored significantly lower ($\rho<.01$) than their FP classmates.
Douglas, Ross, & Shipman (1968)	3626 male & female 15-year-olds (Great Britain) 133 FA death (sudden) 32 FA death (after illness) 118 FA employment	SES, size of family, housing, age	AH4 IQ Watts-Vernon Reading Test Vernon Graded Mathematics Test	FA death (after illness) children had significantly lower ($\rho<.05$) IQ & achievement test scores than FP children. There were no significant differences for FA death (sudden) children. Authors of study question results because of small FA death (after illness) sample.

(table continued)

Table 1: (continued)

Study	Population	Matching Factors	Dependent Measures	Results
Edgar & Headlam (1982)	72 one-parent & 72 two-parent 7th graders (Australia)	Age, gender, SES, race, grade level	ACER Achievement GPA	The two-parent family group scored significantly higher ($\rho<.05$) on the math whole numbers subtest only. Teachers rated the two-parent family children significantly higher ($\rho<.01$) on math ability & reading.
Eidson, Zimmerman, & Bernstein (1977)	200 white middle SES infants tested at 8 months & one year old 50 infants in each of 4 family living arrangements: single mother living alone, single mother living in communal living group, unwed couple, wed mother & father	Age, race, SES	Bayley	No significant differences
Engemoen (1966)	31 "broken home" & 237 "intact home" middle SES first-grade children	Age, SES, IQ	MRT MAT	No significant differences
Epps (1969)	848 FA(divorce), 424 FA (death), & 1554 FP black & white low & middle SES students in grades 9-12 from 4 southern & 4 northern high schools	Gender, area (northern or southern)	GPA	Only in the northern female comparisons did the FA group have significantly lower ($\rho<.05$) grade point averages than the FP group. There were no significant differences between FA & FP groups for the southern male, southern female, or northern male comparisons.

Table 1: (continued)

Study	Population	Matching Factors	Dependent Measures	Results
Essen (1979)	8823 children tested at age 16 (Great Britain) Two-parent families vs. one-parent families grouped by reason for absence & age at onset	SES, age	NFER Achievement Watts-Vernon Reading Test	One-parent family children scored significantly lower ($p<.05$) than two-parent children on both tests. However, after controlling for SES, there were no significant differences. There were no significant differences for reason for absence or age at onset.
Evans & Neel (1980)	National sample of 18,254 elementary & secondary school students from one-parent & two-parent families Subsequent analysis of data from NAESP (1980) study	None	GPA	One-parent children had significantly lower ($p<.05$) school grades than two-parent children at both the secondary & elementary levels.
Farley (1977)	273 one-parent & 913 two-parent 8-9th grade students	None	Ohio Survey Tests GPA	One-parent students had significantly lower ($p<.001$) verbal, math, & total aptitude scores. One-parent students had significantly lower ($p<.001$) math, reading, & English achievement. One-parent students had significantly lower ($p<.01$) math, English, history, & science grades.

(table continued)

Table 1: (continued)

Study	Population	Matching Factors	Dependent Measures	Results
Feldman & Feldman (1975)	203 FA & 220 FP black & white junior high school students	School attended	LT IQ GPA	There were no significant differences in IQ scores. FA group had a significantly lower ($p<.05$) mean GPA than FP group.
Ferri (1976)	11,385 children tested at age 11 (Great Britain) 353 FA divorce 227 FA death	SES	NFER Achievement	FA-divorce children scored significantly lower ($p<.01$) than FP children in math achievement. There were no significant differences between FA-death & FP groups.
Fink (1980)	120 FA & FP low SES girls in grades 10-12	SES, gender	Otis IQ ITBS Reading	No significant differences
Fowler & Richards (1979)	60 FA & 60 FP black low SES 2nd graders	SES, gender, race, grade level	SRA	FA students had significantly lower ($p<.05$) achievement scores than FP students.
Funkenstein (1963)	40 male Harvard medical school applicants chosen for extreme Q-V differences on ACE 18 FA: father away for over 1 year during WWII 22 FP: father not away from home during WWII	Gender	ACE	14 of the 18 FA students had relative low quantitative scores while only 6 of the 16 FP students had relatively low quantitative scores.

(table continued)

Table 1: (continued)

Study	Population	Matching Factors	Dependent Measures	Results
Gale (1974)	21 FA & 99 FP male junior college students	Gender, grade level	GPA	FA/FP was not significantly related to GPA.
Gatlin & Brown (1975)	31 FA & 52 FP black low SES elementary school students	Race, SES	Slossen IQ CAT GPA	FA students had significantly lower ($p<.01$) language arts grades than FP students. There were no significant differences in math grades, IQ, or achievement scores.
Gerard & Miller (1976)	89 FA & 887 FP children in grades 5-6	None	SCAT MRT SAT	FA children scored lower than FP children on all measures. (significance levels not reported)
Gerasch (1983)	100 FA(divorce/separation) & FP white middle SES girls in 8th or 12th grade	Gender, SES, race	GPA	FA students had significantly lower ($p<.01$) school grades than FP students.
Ginsberg & Russell (1981)	61 single-parent & 83 two-parent preschool & kindergarten boys & girls	None	Arithmetic achievement tasks	Single-parent children scored significantly lower ($p<.05$) on 10 of the 17 subtests.
Goldstein (1982, 1983)	National probability sample of 12-17 year olds 502 FA (divorce/separation) 249 FA (death) 5471 FP	Race, gender, SES	WISC-R WRAT	FA white students scored significantly lower ($p<.01$) than FP white students on WRAT math only. There were no significant differences for black students.

Table 1: (continued)

Study	Population	Matching Factors	Dependent Measures	Results
Gray (1980)	32 FA(divorce), 32 FP, & 32 stepfather white boys in grades 4-6	Race, gender, SES	GPA	Boys in FA group & stepfather group had significantly lower ($\rho<.01$) grades than FP boys.
Greenberg & Davidson (1971)	79 FA & 81 FP black low SES fifth graders	SES, race, IQ, grade level	MAT	No significant differences
Gregory (1965)	254 college students; 41 who had lost one or both parents because of divorce & 86 who had lost one or both parents because of death	Gender	Scholastic Aptitude Test	SAT verbal scores higher than math scores were found unduly frequently among male students whose parents had been divorced or who had lost either parent before age 10. SAT math scores higher than verbal scores were found no more frequently than expected among any category of female students who had lost one or both parents.
Guidubaldi & Perry (1984)	26 single-parent (divorce) & 89 two-parent family lower-middle SES kindergarten children	SES, grade level	PPVT WRAT MRT Teacher ratings	Single-parent status was related significantly to lower WRAT reading ($\rho<.01$), WRAT math ($\rho<.01$), MRT auditory ($\rho<.05$), MRT visual ($\rho<.05$), MRT total ($\rho<.05$), & teacher ratings ($\rho<.01$). There were no significant relationships between single-parent status and PPVT scores.

(table continued)

Table 1: (continued)

Study	Population	Matching Factors	Dependent Measures	Results
Guidubaldi, Perry, & Cleminshaw (1984)	National sample of children in grades 1, 3, & 5 341 from divorced single-parent families 358 from "intact families"	SES	WISC-R WRAT Teacher ratings	Divorce-family children scored significantly lower on WISC-R ($p=.02$), WRAT reading ($p=.003$), WRAT spelling ($p=.008$). Divorce-family children also had significantly lower grades in reading & math ($p=.004$) & teacher ratings of achievement ($p<.001$). After controlling for SES, only the WISC-R scores & teacher ratings remained significantly lower ($p<.01$).
Hammond (1979)	83 "intact family" & 82 divorced family middle class children in grades 3-6	Grade level, teacher, SES, race, gender	GPA	No significant differences
Herzog (1974)	58 FA & 41 FP boys ages 6½-15½ years (Barbados) FA categorized by length of absence Early FA: birth-2 years Late FA: 3-5 years Complete FA: birth-5 years	Length of absence, race, gender	Chicago IQ Gates Reading Test Vernon Graded Mathematics Test	Boys with late or complete FA had significantly higher ($p=.02$) scores on the mathematics test than the FP boys. Boys with early FA had significantly higher scores on IQ ($p=.07$) and the mathematics test than the FP boys.
Hess, Shipman, Brophy, & Bear (1968	41 FA & 40 FP low SES black preschool children	Mother's age, IQ, & education; SES, race, age	SB IQ	No significant differences

(table continued)

Table 1: (continued)

Study	Population	Matching Factors	Dependent Measures	Results
Hess, Shipman, Brophy, Bear, & Adelberger (1969)	35 FP & 39 FA black low SES children tested in grades 1 & 2 Follow-up phase of 1968 study	Mother's age, IQ, & education; SES, race, age	SB IQ MRT GPA	FA students had significantly lower ($\rho<.05$) grades in 1st-grade writing & 2nd-grade spelling, speaking, arithmetic, & science.
Hetherington, Cox, & Cox (1978)	48 FA(divorce) & 48 FP white middle SES preschool children	Gender, race, SES, length of absence, age	WPPSI	There were no significant differences at 2 months or one year following divorce, but at 2 years, FA children scored significantly lower ($\rho<.05$) on performance IQ.
Hillenbrand (1970, 1976)	73 male & 53 female temporary FA (military service) 6th graders	All fathers in military, grade level, SES	KA IQ	For girls, early FA was significantly related ($\rho<.05$) to lower quantitative scores. For first-born boys, length of FA was significantly related ($\rho<.01$) to increased quantitative scores.
Hornstein (1980)	50 FA & FP black low SES fifth graders	IQ, SES, race, grade level	Otis IQ ITBS	FA/FP was not significantly related to IQ or ITBS scores.
Hunt & Hunt (1975)	83 FA & 255 FP black & white junior & senior high school boys	Gender, race	GPA	For the white sample, FA was significantly related ($\rho<.01$) to school grades. The direction of the relationship indicates that FA students had higher school grades. For the black sample, there was no relationship between FA/FP & school grades.

Table 1: (continued)

Study	Population	Matching Factors	Dependent Measures	Results
Hunt & Hunt (1977)	108 FA & 250 FP black & white junior & senior high school girls	Gender, race	GPA	For the white sample, FA was significantly related ($\rho<.01$) to school grades. The direction of the relationship indicates that FA students had lower school grades. For the black sample, there was no relationship between FA/FP & grades.
Ilardi (1966)	224 FP & 189 FA male & female black low SES 4-year-olds	Age, race, SES, gender	SB IQ	IQ of the FA group was significantly lower ($\rho<.001$) than the IQ of the FP group. The deficit was greater for girls than for boys.
Jaffe (1965)	8th grade black boys & girls divided into disadvantaged group (FA & AFDC) & non-disadvantaged group (employed FP)	Gender, race, grade level	SB IQ ITBS	Non-disadvantaged group scored significantly higher ($\rho<.05$) on IQ & ITBS.
Jantz & Sciara (1975)	300 FA & 773 FP black 4th-grade students	Gender, race, grade level	MAT: Arithmetic	FP students had significantly higher ($\rho<.01$) scores than FA students. FP girls had significantly higher ($\rho<.05$) scores than FP boys, FA boys, or FA girls.
Jenkins (1958)	22 "legitimate" & 21 "illegitimate" FA children in grades 4-12	Race, SES, grade level	SB IQ GPA	No significant differences

Table 1: (continued)

Study	Population	Matching Factors	Dependent Measures	Results
Jones (1975)	30 FP & 30 FA male college students FA classified by age at onset (late--over 11 years; early--less than 11 years old)	SES, race, age, GPA, number of siblings	Henmon-Nelson	Late FA students had significantly higher ($\rho<.05$) verbal & math scores than FP or early FA students.
Keller (1969)	538 "mentally able" (IQ above 120) 5th & 6th grade children	SES, IQ	GPA	The difference in achievement of mentally able 5th & 6th graders was about the same with respect to whether they were from one-parent or two-parent homes.
Kelly, North, & Zingle (1965)	112 FA(death or desertion) & 131 FP 7th & 8th graders (Canada)	SES, gender	Edmonton Reading Test	No significant differences
Kitano (1963)	214 two-parent & 85 one-parent low SES students in kindergarten-5th grade	SES	GPA	No significant differences
Kohn (1977)	616 "broken-home" & 616 "intact-home" children tested in grades K-3	None	MRT MAT	Family intactness was significantly correlated ($\rho<.01$) with MAT math. The direction of the relationship indicates that "broken-home" children had lower scores than "intact-home" children.

(table continued)

Table 1: (continued)

Study	Population	Matching Factors	Dependent Measures	Results
Kohn & Rosman (1974)	287 kindergarten children from "intact homes" or "broken homes"	None	SB IQ	There were no significant correlations between family intactness and SB IQ.
Landy, Rosenberg, Sutton-Smith, (1969)	100 female working-class college sophomores 20 FA (divorce or death) 20 FP 60 partially FA (employment)	SES, gender	ACE: Quantitative	Quantitative scores were lower, the longer & the earlier the onset of the FA. The total FA group scored significantly lower ($p<.01$) than the FP group.
Lee (1974)	40 FA(military service) & 30 FP elementary-school boys	Gender, race	CTMM IQ	No significant differences
Lessing, Zagorin, & Nelson (1970)	138 FA(divorce) & 295 FP male & female guidance clinic clients tested at ages 9-16	SES, gender	WISC	FA children had significantly lower ($p<.05$) scores on Block Design, Object Assembly, & Performance IQ. Among children of working-class SES, FA group scored significantly lower ($p<.01$) than FP group on Information, Similarities, Vocabulary, Verbal, and Full Scale IQ. Among middle-class SES children, FA group scored significantly higher ($p<.05$) on Comprehension & Vocabulary IQ than the FP group.

Table 1: (continued)

Study	Population	Matching Factors	Dependent Measures	Results
Lloyd (1972)	415 one-parent & 3112 two-parent black & white 6th graders	Race, gender, IQ, grade level	CAT: Reading	Among white males only, a significantly higher ($\rho<.05$) percentage of underachievers had one parent.
McNeal (1973)	486 boys & girls in grades 8 & 9 28 MA & 215 FA classified by reason for absence	IQ, age, gender, school attended, grade level	CTBS/ITBS GPA	FA/MA students had significantly lower ($\rho<.001$) GPAs. There were no significant differences on CTBS/ITBS. FA/MA girls had significantly higher ($\rho<.05$) GPAs than FA/MA boys. FA/MA (death) students had significantly higher ($\rho<.05$) ITBS/CTBS scores than FA/MA (divorce) students.
Maxwell (1961)	292 psychiatric clinic referrals ages 8-13 FA before or after age 5 due to divorce or death	Age at onset of father absence	WISC	FA before age 5 was not related to WISC scores. FA after age 5 was significantly negatively associated with Comprehension ($\rho<.01$), Picture Completion ($\rho<.05$), and Coding ($\rho<.05$).
Milne, Myers, Ellman, & Ginsberg (1983)	Stratified national sample of children in grades 1-6 1923 living with one parent (usually the mother); 9996 living with both parents	Race	CTBS	No significant differences

Table 1: (continued)

Study	Population	Matching Factors	Dependent Measures	Results
Miner (1968)	633 high school students from one-parent & two-parent homes	None	CTMM IQ ITBS GPA	One-parent status was significantly correlated ($\rho<.05$) with achievement & IQ test scores and school grades. The direction of the relationship indicates that children from one-parent homes obtained lower scores & grades than children from two-parent homes.
Moffitt (1981)	26 FA & 34 FP boys ages 10-20 years (Denmark)	Gender, SES, race	WISC (Danish translation)	Within the high SES sample, FA boys scored significantly higher ($\rho<.01$) than FP boys. Within the low SES sample, there were no significant differences.
Mofidi (1980)	22 FA & 8 MA divorced-family & 40 non-divorced family 3-5 year olds	Gender	Carrow Language Inventory	Children from non-divorced families scored significantly higher ($\rho<.05$) than children from divorced families.
Mueller (1975)	314 FA & FP black & white 3rd graders Title I vs. non-Title I	Grade level	MAT: Word Analysis	Among Title I students, FA was significantly related ($\rho<.05$) to MAT Word Analysis scores. Direction of the relationship indicates that FA had negative effect on MAT scores. Among the non-Title I students, FA had no relationship to MAT scores.
Myers (1983)	515 FA & 2308 FP white & black high school students	None	SAT, ITBS, or CAT	No significant differences

Table 1: (continued)

Study	Population	Matching Factors	Dependent Measures	Results
National Association of Elementary School Principals (1980)	National sample of 18,254 elementary & secondary school students from one-parent & two-parent families	None	GPA	One-parent children had lower school achievement than two-parent children (no significance levels reported).
Nelsen & Maccoby (1966)	675 FP & 217 FA(death) male & female college freshmen	Gender	Scholastic Aptitude Test	FA students had higher verbal scores than FP students. FA students had lower quantitative scores than FP students (no significance levels reported).
Nielson (1971)	100 FA & 200 stepfather male war orphans, ages 16-23	Gender	Otis IQ	No significant differences
Nye (1957)	780 high school students in three family-structure categories: 158 "broken homes" 510 "happy unbroken" 112 "unhappy unbroken"	SES, age	GPA	No significant differences in school adjustment as measured by % of students in each group having school grades of D/F.
O'Shields (1977)	51 FA & 243 FP college students	None	Scholastic Aptitude Test	FA was not significantly related to aptitude test scores.

(table continued)

Table 1: (continued)

Study	Population	Matching Factors	Dependent Measures	Results
Oshman (1975)	79 FP & 283 FA male & female college students FA categorized by reason for absence: military service, death, divorce	SES, gender, presence of older male siblings	SAT	Among the female students, the FA (military service) group had significantly higher ($p<.05$) verbal & total scores than all the other groups including the FP group. Among the male students, the FA (death) group had significantly lower ($p<.05$) quantitative & total scores than all the other groups.
Pedersen, Rubenstein, & Yarrow (1973, 1976)	27 FA & 28 FP male & female black infants ages 5-6 months	SES, gender, race age	Bayley	For female infants, there were no significant differences. For male infants, FA group scored significantly lower ($p<.05$) on 3 of the 16 subtests.
Perry & Pfhul (1963)	136 FA & 267 FP students in grades 9-12	SES, age	GPA	School grades were not significantly related to FA/FP.
Peterson, DeBord, & Livingston (1966)	20 FA & 74 FP black & white low SES 11-year-old boys	Gender, SES, age, race	Achievement score = Otis IQ + MAT	Father presence was positively correlated with achievement & IQ (for whites, $r=.23$; for blacks, $r=.32$). No significance levels were reported.
Pleas (1976	60 FA & 60 FP white high school students	Gender, grade level, race	GPA	No significant differences

Table 1: (continued)

Study	Population	Matching Factors	Dependent Measures	Results
Pringle, Butler, & Davie (1966)	National sample of 6-year-old children (Great Britain) 289 from "atypical" families & 6607 from "normal" families	Age, gender	Southgate Reading Achievement	There was a significant ($\rho<.01$) association between family situation & reading scores. More boys & girls in the "normal" family group had high reading scores than those in the "atypical" family group. Conversely, more boys & girls in the "atypical" group had low reading scores than in the "normal" group.
Rees & Palmer (1970)	40 "intact-home" & 40 "broken-home" boys & girls from 5 longitudinal studies tested at ages 6 & 12	Gender, decade of birth, birth order, SES, study from which data came	SB IQ	Means of "intact-family" children were higher than means for "broken-home" children (no significance levels reported).
Risen (1939)	146 FA, 68 MA, & 235 two-parent students in grades 7-9	Gender, grade level, IQ	% of students on honor roll for each group	There was no association between parental status & honor roll grades.
Rosenthal & Hansen (1980)	22 MA, 82 FA, & 455 two-parent children in grades 7-9	None	GPA	Children living in two-parent homes had significantly higher ($\rho<.05$) GPAs than FA & MA children.
Ryker, Rogers, & Beaujard (1971)	92 FA low SES black "school-age" children Classified by age at onset & reason for absence	NA	GPA	Children who became FA at 6 years & older had significantly lower ($\rho<.01$) school grades than children who became FA at 5 years & younger. There were no significant differences for reason for absence.

Table 1: (continued)

Study	Population	Matching Factors	Dependent Measures	Results
Santrock (1972)	57 FP & 286 FA white low SES junior high school boys & girls FA classified by age at onset & reason	SES, race, gender	3rd & 6th grade Otis IQ & SAT	FA children scored significantly lower ($\rho<.001$) than FP children on 3rd grade SAT & 6th grade SAT. FA because of divorce had significantly larger ($\rho<.05$) effects than FA due to death.
Santrock & Wohlford (1970)	15 FP & 30 FA white low SES 5th graders FA classified by age at onset & reason	Age, grade, IQ, school, SES, race, gender	SAT GPA	There were no significant differences between FA & FP groups. Comparisons by age at onset showed that FA boys who experienced FA at 3-5 years had significantly higher ($\rho<.05$) GPAs than boys who had FA onset at 0-2 or 6-9 years.
Saslow (1982)	7 FA & 7 FP white middle SES 3-year-old boys	Gender, race, SES, age, IQ, lack of siblings	McCarthy GPA	FA boys scored significantly higher ($\rho<.02$) on the Memory scale only. There were no significant differences in school grades.
Savage & Newhouse (1978)	121 FA boys & girls ages 5-15	NA	WRAT	Age at onset was significantly related to arithmetic ($\rho<.05$) & reading ($\rho<.01$) scores. Length of absence was significantly related to arithmetic ($\rho<.05$) only.
Sciara (1975)	300 FA & 773 FP black low SES 4th graders	Gender, IQ, SES, race, grade level	MAT	FP children had significantly higher ($\rho<.01$) reading & mathematics scores than FA children.

Table 1: (continued)

Study	Population	Matching Factors	Dependent Measures	Results
Sciara (1977)	108 FA & 158 FP black & white low SES first graders	SES, grade level	Gates-McGinitie Reading Test	FA children scored significantly lower than FP childen on the vocabulary ($\rho<.003$) & comprehension ($\rho<.01$) subtests.
Sciara & Jantz (1974)	773 FP & 300 FA black low SES 4th graders	Gender, SES, race, grade level	MAT: Reading	FA students scored significantly lower ($\rho<.001$) than FP students.
Scott (1979)	50 FA(divorce), 50 stepfather, & 50 two-parent 5th graders	SES, grade level	SAT GPA	No significant differences
Seraydarian (1983)	38 one-parent (divorce), 15 one-parent (death), 170 two-parent middle SES 12th graders	SES, grade level	ITBS GPA	For boys, there were no significant differences. For girls, FA girls had significantly lower ($\rho<.01$) English grades & significantly higher ($\rho<.01$) social sciences grades.
Shelton (1968)	81 two-parent, 10 MA, & 71 FA students in grades 7-9 MA/FA classified by age at onset	Gender	Otis IQ SAT GPA	No significant differences in IQ for boys or girls. One-parent boys had significantly lower ($\rho<.01$) GPAs & SAT scores than two-parent boys. There were no significant differences in GPAs or SAT scores between one-parent & two-parent girls.

Table 1: (continued)

Study	Population	Matching Factors	Dependent Measures	Results
Shilling & Lynch (1985	2610 FA & 550 MA 8th-grade students	Grade level	Educational Quality Assessment	No significant differences
Simmons (1981)	165 FA & 149 FP black low SES 8th graders	Grade level, race, SES	STEA SRA GPA	FA students scored significantly lower ($\rho<.05$) on STEA only.
Smidchens & Thompson (1978)	99 one-parent & 331 two-parent black & white 5th graders	SES, race, grade level, gender, parental education	CAT	One-parent students scored significantly lower ($\rho<.05$) on CAT. After controlling for SES, these differences remained significant.
Smilansky (1982)	203 FP & 203 FA(death) children in grades 1-6 (Israel)	Race, SES	Milta IQ Language grade Teacher ratings	FA children scored significantly lower on all measures: IQ ($\rho<.01$), language grade ($\rho<.05$), & teacher ratings ($\rho<.05$).
Solari (1976)	926 elementary-school boys & girls Two-parent vs. one-parent families studied	Gender, grade level	SAT ITBS	Students from two-parent families scored significantly higher ($\rho<.05$) in reading achievement at grades 5 & 6 and in math at grade 5. Two-parent boys scored significantly higher ($\rho<.01$) than one-parent boys in grade 2 math only. Two-parent girls scored significantly higher ($\rho<.05$) than one-parent girls in 6th grade reading, 1st grade math, & 6th grade math.

Table 1: (continued)

Study	Population	Matching Factors	Dependent Measures	Results
Solomon, Hirsch, Scheinfield, & Jackson (1972)	149 black low SES 5th graders 66 living with both parents 21 living with mother & stepfather 25 living with mother only 20 living with grandparents	Race, SES, grade level	Achievement score from factor analysis of IQ, GPA, achievement test	No significant differences
Southworth (1984)	21 one-parent & 21 two-parent children in grades 1, 4, 5, & 6	Age, gender, IQ, SES	Educational Research Bureau Comprehensive Test	One-parent family children scored significantly lower ($p<.05$) on math & reading achievement.
Stetler (1959)	199 one-parent & 385 two-parent white & black senior high school students	None	Otis IQ GPA	Students living with both parents had higher GPAs & IQ scores. (significance levels not reported)
Sutherland (1930)	Sample 1: 121 FA & 116 FP children ages 12-14 (Scotland)	Age, school, number of siblings	Northumberland IQ	FP children scored higher on IQ. (significance levels not reported)
	Sample 2: 724 FA & 581 FP children ages 11-13 (Scotland)	SES	Moray House IQ	FP children scored higher on IQ. (no significance levels reported)
Sutton-Smith, Rosenberg, & Landy (1968)	295 FA & 760 FP lower-middle SES male & female college students	SES, gender, age	ACE	FA boys had significantly lower ($p<.001$) quantitative, language, & total scores than the FP boys. FA girls had significantly lower ($p<.001$) quantitative scores than the FP girls.

Table 1: (continued)

Study	Population	Matching Factors	Dependent Measures	Results
Svanum, Bringle, & McLaughlin (1982)	National sample of 6-11 year old black & white boys & girls; 616 FA & 5493 FP	Age, gender, race, SES	WISC-R WRAT	Unadjusted for SES: For the white sample, FA children scored significantly lower ($\rho<.01$) on all measures. For the black sample, FA children scored significantly lower on WRAT reading ($\rho<.01$) & mathematics ($\rho<.05$). Adjusted for SES: For the white sample, FA children scored significantly lower ($\rho<.01$) on WISC Vocabulary only. For the black sample, FA children scored significantly lower ($\rho<.05$) on WISC Block Design only.
Thomas (1969)	35 FA(death) & 57 FP college-age sons of military fathers	Gender	Otis IQ GPA	No significant differences
Thompson (1978)	105 FA & FP low SES white & black boys & girls in grades 3-5	IQ, SES	WRAT: Arithmetic	FA students scored significantly lower ($\rho<.05$) than FP students.
Thompson & Smidchens (1979)	89 one-parent (divorce) & 345 two-parent white & black 5th graders	SES, gender, grade level, parental education	CAT: Reading	One-parent students scored significantly lower ($\rho<.001$) than two-parent students.
Veasey (1974)	11 FA & 14 FP male Job Corps volunteers ages 16-21 years	SES, gender, race	SAT: Reading	FA students scored higher than FP students (no significance levels reported).

Table 1: (continued)

Study	Population	Matching Factors	Dependent Measures	Results
Voza (1984)	12 FA & 12 FP children in grades 2-4	Gender, IQ, age, grade level	CAT: Reading	Grade 3: FA children scored significantly lower ($\rho<.05$) than FP children. Grades 2 & 4: There were no significant differences.
Vroegh (1972, 1973)	15 FA & 401 FP white middle SES boys & girls in grades 4 & 5	SES, race	SAT, MAT, or CAT	No significant differences
Wadsworth, Burnell, Taylor, & Butler (1985)	719 one-parent (664 FA & 55 MA) & 2482 two-parent 5-year-old children	Age at time of study	PPVT	One-parent children scored significantly lower ($\rho<.001$) than two-parent children.
Waldron (1983)	22 single-parent (divorce), 45 step-parent, & 40 two-parent children in grades 3-6	None	Stanford Diagnostic Reading Test	Children from single-parent families had significantly lower ($\rho<.05$) reading scores.
Wallerstein & Kelly (1980)	131 children ages 2-18 years from divorced-parent families enrolled in the Children of Divorce Project Data gathered at 5-6 months, one year, & five years following divorce	NA	Teacher evaluations of school performance	5-6 months: 1/3 of children were good/excellent students, 1/3 had average achievement, & 1/3 were doing poor/failing work. One year: 55% of children were achieving good/excellent grades, 25% declined in performance. 5 years: 3/5 of children were doing average work or better, 16% had extremely poor grades.

Table 1: (continued)

Study	Population	Matching Factors	Dependent Measures	Results
Wasserman (1969, 1972)	43 FA(divorce) & 48 FP black low SES 10-15 year old boys	Gender, SES, race	GPA	No significant differences
Webb (1970)	206 "broken home" & 206 "intact home" male & female 11-12th graders	Gender, age, grade level	GPA SCAT	There were no significant relationships between family status and GPA or SCAT scores.
Weitz & Wilkinson (1957)	51 FA(death or divorce) & 51 FP male college freshmen	Achievement test scores, gender	GPA	No significant differences
Willerman, Naylor, & Myrianthopoulos (1970)	88 4-year-old children; 29 living with unmarried mothers & 59 living with married mothers	Age, race, gender, mother's education	SB IQ	Children of unmarried mothers had lower IQ scores (no significance levels reported).
Wilson (1969)	194 FA & 552 FP male & female low SES black & white junior & senior high school students	SES	CTMM IQ SAT	No significant differences
Woo (1981)	57 FA, 18 MA, & 75 two-parent white middle SES college students	SES, race	GPA	No significant differences

(table continued)

Table 1: (continued)

Study	Population	Matching Factors	Dependent Measures	Results
Zakariya (1982)	National sample of elementary & secondary school students from one-parent & two-parent families Subsequent analysis of data from NAESP (1980) study	None	GPA	Two-parent children had higher school grades than one-parent children (no significance levels reported).
Zold (1975)	80 FA & 160 FP male & female adults	Age, gender, SES	Adolescent WISC or SB IQ, SAT, & GPA	FA sample had significantly higher ($p<.05$) school grades. There were no significant differences in other measures.

Notes. ACE = American College Entrance Examination, ACER Achievement = Australian Council of Education Research Achievement Test, Ammons IQ = Ammons Quick Test of Mental Ability, Bayley = Bayley Test of Infant Development, CAT = California Achievement Test, Chicago IQ = Chicago Non-Verbal Intelligence Test, CTBS = California Test of Basic Skills, CTMM = California Test of Mental Maturity, FA = father-absent, FP = father-present, GPA = grade point average, Henmon-Nelson = Henmon-Nelson Test of Mental Ability, ITBS = Iowa Test of Basic Skills, KA IQ = Kuhlmann-Anderson Intelligence Test, LT IQ = Lorge-Thorndike Intelligence Test, MAT = Metropolitan Achievement Test, McCarthy = McCarthy Scales of Children's Abilities, MRT = Metropolitan Readiness Test, NFER Achievement = National Foundation for Educational Research Achievement Tests, Otis IQ = Otis Quick-Scoring Mental Ability Test, PPVT = Peabody Picture Vocabulary Test, Raven = Raven Progressive Matrices, SAT = Stanford Achievement Test, SB IQ = Stanford-Binet Intelligence Test, SCAT = School and College Ability Test, SES = socioeconomic status, Slossen IQ = Slossen Intelligence Test, SRA IQ = Science Research Associates Test of Mental Ability, SRA = Science Research Associates Assessment Survey, STEA = Short Test of Educational Ability, WISC = Wechsler Intelligence Scale for Children, WISC-R = Wechsler Intelligence Scale for Children (Revised), WPPSI = Wechsler Preschool and Primary Scale of Intelligence, WRAT = Wide Range Achievement Test.

CHAPTER 3

METHOD

The problem addressed in the present study was the integration of the father-absence research to determine the effects of father absence on children's cognitive development. Included within this problem were the following questions:

1. Does the research indicate that father-absence effects differ as a function of different measures of cognitive development?

2. Does the research indicate that father-absence effects differ as a function of the characteristics of the absence (i.e., reason, duration, and age of the child at onset), the characteristics of the study subjects (i.e., gender, socioeconomic status, race, and age), or the characteristics of the study (i.e., date, source, sample size and geographic distribution, number of matched/controlled factors, and number of father-absence factors defined)?

3. What relationships exist between the reported father-absence effects and the substantive and methodological characteristics of the studies?

This study used the quantitative integrative review methodology of meta-analysis. The meta-analytic approach involved transforming the findings of individual studies to a common metric, coding various characteristics of the studies, and then using conventional statistical procedures to determine whether there was an overall effect, subsample effects, and relations among the characteristics

of the studies and the study findings. Thus, the meta-analysis included four procedural stages: (1) data collection; (2) sample selection; (3) description, classification, and coding of relevant research studies; and (4) statistical analysis.

Data Collection

The first procedural stage in the present meta-analysis consisted of the identification and collection of all relevant research literature. The studies accessed and collected were those which investigated the effects of father absence on children's cognitive development. Studies of "parent absence," "one-parent families," and "broken homes" were included since the missing parent was usually the father.

In order to draw conclusions about the entire realm of research investigating the effects of father absence on children's cognitive development, an attempt was made to access all relevant studies reported in the published and unpublished literature between 1925 and 1985. Toward this end, father-absence studies were sought in four places: computer document retrieval and abstracting resources, printed abstracts and indexes, previous reviews of the father-absence literature, and the bibliographies of studies once found.

Using the computer resource facilities of the University of the Pacific Library, two sets of computer searches (August, 1985 and December, 1985) were completed. The following on-line networks were accessed: Dissertation Abstracts, Educational Resources Information Center, Family Resources, Government Printing

Office Publications Reference, Psych-Alert, Psychological Abstracts, Resource Libraries Information Network, and Social Sciences Citation Index. The keywords used as both descriptors and free-text identifiers in the computer searches are listed in Appendix A.

Data collection also included hand searches of the following printed sources: Child Development Abstracts (1927 to date), Current Index to Journals in Education (1969 to date), Dissertation Abstracts (1951-present), Education Index (1929-present), Index to Social Sciences and Humanities Proceedings (1979 to date), Masters' Abstracts (1962 to date), Monthly Catalog of Government Publications (1940-date), Psychological Abstracts (1927-present), and Resources in Education (1966 to date). The keywords used as index terms were "broken homes," "children of divorced parents," "death," "divorce," "father absence," "parent absence," "one parent," and "single parent."

The completed literature search yielded 763 bibliographic entries. References appearing in all data sources except Dissertation Abstracts were obtained and examined in their entirety. The abstracts of dissertations were initially screened to determine potential relevance. All relevant dissertations were then obtained through interlibrary loan or University Microfilms and examined in their entirety. Ultimately, 167 relevant studies investigating the effects of father absence on children's cognitive development were identified and retrieved.

Sample Selection

Data collection yielded 167 studies investigating the effects of father absence on children's cognitive development. For final inclusion in the meta-analysis, each study had to meet the following criteria:

1. The study focused directly on father absence or included such a focus as part of a broader inquiry. Studies of "parent absence," "one-parent families," and "broken homes" were included since the missing parent was usually the father.

2. The study investigated the effects of father absence on cognitive development as assessed by scores on intelligence, academic aptitude, or academic achievement tests or school grades.

3. The study employed group comparisons or correlations for both father-absent and father-present samples.

4. The study reported descriptive statistics or used statistical analyses which yielded data that could be converted to effect sizes or effect size estimates.

Preliminary examination of the 167 accessed studies revealed that 20 of the studies were duplicate reports. Of the remaining 147 studies, 10 studies did not meet the inclusion criteria and were excluded from the meta-analysis for the following reasons:

1. Three studies (Bernstein, 1976; Funkenstein, 1963; Gregory, 1965) provided Scholastic Aptitude Test quantitative-verbal difference scores only. These data could not be converted to effect sizes or effect size estimates.

2. Four studies (Hillenbrand, 1970; Ryker, Rogers, & Beaujard, 1971; Savage & Newhouse, 1978; Wallerstein & Kelly, 1980) employed group comparisons or correlations for father-absent samples only.

3. Three studies (Carter & Walsh, 1980; Miner, 1968; Nye, 1957) yielded insufficient data from which to compute effect sizes or effect size estimates.

The final sample of studies included in the meta-analysis consisted of 137 separate research investigations. This sample comprised approximately 93% of the entire set of accessed studies investigating the effects of father absence on children's cognitive development.

Description, Classification, and Coding of Studies

Once all studies were identified and collected, the characteristics of the studies and their findings were described, classified, and coded. This procedural stage consisted of two steps: (1) completion of a Father Absence/Children's Cognitive Development Summary Sheet for each study and (2) completion of a Father Absence/Children's Cognitive Development Coding Sheet for each study. Facsimilies of the summary and coding sheets appear in Appendices B and C.

In this meta-analysis, the characteristics of the studies were classified and coded so that study findings could be analyzed and compared by study properties. The characteristics of the studies were roughly classified as either substantive features (i.e., characteristics specific to the problem studied) or methodological features (i.e., general characteristics of the study).

The following substantive and methodological features of the father-absence studies were classified and coded:

Substantive Features

1. Reason for absence: Some researchers (Bachman, 1970; Crescimbeni, 1965; Santrock, 1972) have hypothesized that father-absence effects differ as a function of the reason for the absence. To analyze whether effects differed by type of father absence, each study in the meta-analysis was coded according to the reason for the absence--employment/military service, death, divorce/separation/desertion, combined, or not reported.

2. Outcome type: The specific outcome was coded and grouped into 1 of 4 outcome types--intelligence test, academic aptitude test, academic achievement test, or school grades.

3. Age at onset: A number of studies (Blanchard & Biller, 1971; Savage & Newhouse, 1978; Shelton, 1968) have found that the age of the child at onset has a moderating influence on father-absence effects. To determine the relationship between age at onset and father-absence effects, each study in the meta-analysis was coded into 1 of 5 age at onset categories--early (0-6 years), middle (7-12 years), late (over 12 years), combined, or not reported.

4. Length of absence: Each study was coded according to the length of the father absence--less than two years, two years or more, combined, or not reported.

5. Gender: Some researchers (Barton, 1981; Collins, 1969;

Fowler & Richards, 1979) have hypothesized that father-absence effects differ as a function of the gender of the child. To analyze whether father-absence effects differed by gender, each study was coded according to the gender of the study subjects--male, female, or combined male and female.

6. Race: Each study was coded according to the race of the study subjects--black, white, other, combined, or not reported.

7. Socioeconomic status: To analyze whether father-absence effects differed as a function of the socioeconomic status of the study subjects, each study was coded according to the following socioeconomic status categories: high, middle, low, combined, or not reported.

8. Age: The age of the study subjects at the time of the study were classified and coded into 1 of 6 age categories--preschool, elementary, junior high, high school, college, or combined.

Methodological Features

1. Date: The date was recorded as stated on the manuscript or report. For studies that were published or presented more than once, the earliest date was recorded. Each study was coded according to the following categories: before 1965, 1965-1969, 1970-1974, 1975-1979, 1980 to date.

2. Source: The study was coded according to the source in which it appeared--journal, book, thesis/dissertation, or unpublished. If more than one source was used, such as a dissertation

later published in a journal, the study was designated in the most accessible source.

3. Sample *n*: The sample number of each study was grouped and coded into 1 of 8 sample size categories--25 or less, 26-50, 51-100, 101-200, 201-500, 501-1000, 1001-5000, or over 5000.

4. Geographic distribution: Each study was coded according to the geographic distribution of the study sample--neighborhood/school, city, school district, college/university, state, or nation.

5. Matched/controlled factors: Qualitative reviews of the father-absence research (Herzog & Sudia, 1973; Shinn, 1978) have cited a priori matching of father-absent and father-present samples as an indicator of methodological quality. The matching of father-absent and father-present samples on pertinent variables insures that the two groups are initially comparable and that differences between them on the outcome measures are attributable either to chance or to the father-absence/presence factor and no other source of influence. Maximum methodological quality is reached when the following six variables are matched or controlled across father-absent and father-present samples: gender, socioeconomic status, race, IQ, age, and grade in school. The number of matched or controlled factors in each study was recorded and coded.

6. Father-absence factors: Qualitative reviewers of father-absence research (Herzog & Sudia, 1973; Shinn, 1978) have also judged methodological quality on the basis of completeness of the definition of father absence used in the study. Maximum

methodological quality is reached when the reason, length, and age of the child at the onset of the absence are specified or controlled. The number of father-absence factors defined in each study was recorded and coded.

The task of completing a coding sheet for each study presented a range of difficulty depending on the clarity of the research report and the experimenter's adherence to standard research practices. The list of coding conventions previously outlined was used to strictly guide the classification and coding of the studies included in the meta-analysis. Periodic checks of the coding procedures were made by Dr. B. R. Hopkins, University of the Pacific, School of Education.

Statistical Analysis

Once all studies were collected and the characteristics of the studies were classified and coded, the findings of the studies were transformed to a common metric and then analyzed using conventional statistical procedures. The analysis of data was approached as multivariate data analysis in which the studies were the units on which measurements were taken and the study characteristics and findings were the many variables.

The statistical analysis consisted of five procedural levels. First, effect sizes for each study and study characteristic were calculated. Second, an overall average effect size was computed. Third, through frequency tables and graphs, the distributions of mean effect sizes by treatment (father absence versus father

presence) and study characteristics were described. Fourth, analysis of variance procedures were used to determine statistically significant differences between mean effect sizes. Finally, through multiple regression analysis and analysis of variance, relationships between mean effect sizes and study characteristics were analyzed. These five levels of the statistical analysis, specific procedures, and purposes are outlined in Table 2.

Calculation of Effect Sizes

Meta-analysis provides for the statistical integration of empirical studies of a common phenomenon. For this integration to be feasible, all the study findings must be expressed in some common metric. Glass (1976, 1981) suggests that when most of the studies are investigations with a control group, as in the father-absence research, the standard measure of the findings should be a standard score difference expressed as an "effect size." Therefore, in this meta-analysis, when descriptive statistics were available, effect sizes were computed by dividing the mean difference of the experimental (father-absent) and control (father-present) groups by the standard deviation of the control group: $\Delta = \bar{X}_E - \bar{X}_C / s_C$ (Glass, McGaw, & Smith, 1981, p. 107).

The meaning of Δ is readily comprehended and, assuming normal distribution, can be translated into representations of overlapping distributions of scores and comparable percentiles. For example, suppose that a study of the effects of father absence on achievement test scores reveals a Δ of -.86. One knows immediately that the

Table 2

Statistical Analysis: Procedures and Purposes

Statistical Procedure	Purpose
I. Calculation of effect sizes for each study 1. Computed from means and standard deviations 2. Converted from t ratios, F ratios, and ρ levels 3. Converted from χ^2 and correlations	--to establish a common metric by which individual study findings were compared and aggregated
II. Calculation of the overall average effect size	--to determine the overall (i.e., summed across all studies) impact of father absence on cognitive development
III. Frequency distributions and tables	--to describe the distributions of mean effect sizes by treatment (father absence versus father presence) and by study characteristics
IV. Analysis of Variance	--to determine statistically significant differences in mean effect sizes between the treatment (father absence versus father presence) and the categories of each variable (study characteristics)
V. Multiple Regression Analysis and Analysis of Variance	--to determine the relationship between each variable and mean effect size --to determine the proportion of mean effect size variance that is attributable to each variable --to determine those variables that add significantly to the variance in mean effect sizes, in which combination and to what extent

average father-absent subject's score is .86 standard deviations below that of the average father-present subject. Thus, assuming distribution normality, the average father-present subject exceeds 80% of the father-absent subjects on the achievement test.

A number of studies included in the meta-analysis did not report means and standard deviations for father-absent and father-present groups. In some cases, estimates of effect sizes were recovered from parametric test statistics via conversion formulas outlined by Glass, McGaw, and Smith (1981). When only information about probability levels was provided, it was still possible to obtain reasonable estimates of effect sizes. Finally, effect size estimates for some studies were obtained through conversion of χ^2 statistics and correlations via formulas reported by Glass, McGaw, and Smith (1981) and Rosenthal (1984).

Calculation of effect sizes from significance tests. If the result of a comparison of father-absent and father-present groups was reported as a t statistic, a corresponding effect size estimate was obtained directly from the following formula:

$$\hat{\Delta} = t\sqrt{(1/n_E)+(1/n_C)}$$ (Glass, McGaw, & Smith, 1981, p. 126)

When the result of a comparison of father-absent and father-present groups (J = 2) was reported as an F statistic, a corresponding effect size estimate was obtained directly from the following formula:

$$\hat{\Delta} = \sqrt{F\{(1/n_E)+(1/n_C)\}}$$ (Glass, McGaw, & Smith, 1981, p. 127)

However, when more than one father-absence condition was compared with a father-present group ($J > 2$), effect size estimates could be derived from overall F statistics for each of the father-absence conditions only when the group means were provided. Assuming homogeneous variance for all groups, the appropriate estimate of s_C^2 was MS_w which, when MS (between) was calculated from the group means was obtained from $MS_w = MS_b/F$.

In some studies, although a significance test was calculated, it was reported only that the calculation was based on n cases and its level of significance reached ρ. These ρ values were transformed to effect size estimates by looking up the corresponding t or F statistic in the appropriate tables and proceeding via the formulas previously cited.

Studies that reported results as "nonsignificant" without reporting the associated t, F, or ρ values were treated as having uncovered exactly null results. That is, for the calculation of the effect size, a probability of .50 (in the one-tailed instance) was assumed. It is reasonable to expect that this procedure yielded a conservative effect size estimate.

Calculation of effect sizes from correlation coefficients. Some studies correlated father absence/presence with measures of cognitive development and reported results as Pearson correlations. When this occurred, correlation coefficients were converted to effect size estimates via the following formula:

$$\hat{\Delta} = \frac{2r}{\sqrt{1 - r^2}} \qquad \text{(Rosenthal, 1984, p. 26)}$$

Calculation of effect sizes from chi-square statistics. When the results of a test of association between father absence/presence and measures of cognitive development were reported as χ^2 statistics, estimates of correlation coefficients were obtained from the following formula:

$$r \cong \left(\frac{\chi^2}{\chi^2 + n}\right)^{\frac{1}{2}}$$ (Glass, McGaw, & Smith, 1981, p. 150)

The resulting correlations were then converted to effect size estimates via the formula previously cited.

Following the calculation of effect sizes, the resulting statistics and the coded study characteristics were entered and recorded through the computer facilities at the University of the Pacific. Subsequent computation of the overall average effect size and analyses of variance and multiple regression analysis were performed using procedures outlined in the Statistical Package for the Social Sciences--SPSS (Nie, Hull, Jenkins, Steinbrenner, & Bent, 1975) and the SPSSX Users Guide (1986).

Computation of the Overall Average Effect Size

One decision that had to be made when computing effect sizes and the overall average effect size involved determining the number of hypothesis-relevant effect sizes obtained from each study. These multiple effect sizes occurred because (1) different samples of subjects were used in the study and their data were analyzed separately, (2) the effects of different types of father absence were compared, and (3) multiple outcome measures were employed in the study and each measure was analyzed separately. However, if

multiple results are derived from the same study, the data are rendered non-independent and reduces the reliability of subsequent analyses of variance and regression equations. In addition, the results of the studies are not represented equally in the overall average effect size because a study contributes to the overall findings in relation to the number of effect sizes contained in it. A facile solution to these problems would be to average all findings within a study up to the level of the study and proceed with the meta-analysis with "studies" as the unit of analysis. But in the present meta-analysis, this procedure would have obscured many important questions that could only be addressed at the "within-study" level of analysis.

As a compromise approach to identifying and combining effect sizes, a shifting unit of analysis was used in this meta-analysis. Specifically, each effect size at the variable level was coded as if it were an independent event. Thus, a single study that contained four effect sizes had four separate coding sheets filled out for it. Each coding sheet was slightly different, depending on the aspects of the samples, the characteristics of the father absence, or the outcome measures used to distinguish the effect size. However, when the overall average effect size was computed, within-study effect sizes were averaged first so that each study contributed equally to the general findings. For example, if a study contained effect sizes for male and female samples separately, the study contributed only one effect size to the overall effect size--the average of the

male and female groups--but two effect sizes to the analysis of the impact of gender--one for the female group and one for the male group. This strategy allowed studies to retain their maximum information value while keeping to a minimum any violation of the assumption of independence in the analyses of variance and regression equations.

Analysis of Variance

Following the calculation of effect sizes for each study and the computation of the overall average effect size, the SPSSX subprogram BREAKDOWN was used to compute average effect sizes for each variable category. For example, the effect sizes within each variable category of reason for father absence (i.e., employment/military service, death, divorce/separation/desertion, combined, and not reported) were averaged across all studies. This procedure was repeated for every category in each coded substantive and methodological study characteristic.

Tests of significant differences in mean effect sizes between categories of each variable (i.e., study characteristic) were then performed using the SPSSX subprogram ANOVA. Thus, the entire analysis of variance procedure consisted of 14 separate one-way analyses of variance, that is, one analysis of variance for each of the following study characteristics: outcome type, reason for absence, age at onset, length of absence, gender, socioeconomic status, age at time of study, study date, study source, sample size, geographic distribution, matched/controlled factors, and father-absence factors.

The ANOVA subprogram also yielded *eta* statistics for each study characteristic. *Eta* is a measure of association used when the independent variable is nominal and the dependent variable is ratio or interval. With a minimum value of 0 and a maximum value of 1, *eta* has a direct intuitive interpretation as the association between the dependent and independent variables and is comparable to the Pearson *r*. When *eta* is squared, it becomes an indicator of the proportion of variance in the dependent variable that is explained (or accounted for) by the independent variable. Thus, from this level of the ANOVA subprogram, correlations and regression multiple *R*'s were obtained for each study characteristic and the mean effect sizes.

Multiple Regression Analysis

The final statistical procedure of the meta-analysis consisted of a multiple regression using the SPSSX subprogram REGRESSION. Multiple regression analysis is a general statistical technique through which one can analyze the relationships between dependent or criterion variables and a set of independent or predictor variables. In the present analysis, the effect sizes found in the separate studies were the criterion variables and the characteristics of the studies were the predictor variables.

For the present meta-analysis, multiple regression was viewed as a descriptive tool through which the linear relationships between criterion and predictor variables were summarized and decomposed. Thus, the multiple regression analysis was used for

three primary purposes: (1) to determine the relationships between each level of each study characteristic and mean effect sizes; (2) to determine the proportion of mean effect size variance that is attributable to each level of each study characteristic; and (3) to determine those study characteristics that add significantly to the variance in mean effect sizes, in which combination and to what extent.

In general, multiple regression requires that variables are measured on an interval or ratio scale. However, through the use of "dummy categories," the nominal variables used in this meta-analysis could be incorporated into the regression. A set of dummy variables was created by treating each category of nominal variable as a separate variable and assigning a score of 0 or 1 for all cases depending on the absence or presence of each of the categories. For example, the nominal variable of socioeconomic status with categories of high, middle, low, combined, and not reported was conceived as five separate dichotomous variables. Each effect size in the meta-analysis was then assigned a score of 0 or 1 on all five of these variables. Thus, since the dummy variables created from the nominal variables had metric values of 0 and 1, they could be treated as interval variables and inserted into the regression. This conversion to dummy variables was repeated for each predictor variable in the multiple regression through the use of a combination of SPSSX COMPUTE and IF statements.

Chapter Summary

The primary problem addressed in the present study was the integration of the father-absence research to determine the effects of father absence on children's cognitive development. The study used the quantitative integrative review methodology of meta-analysis consisting of four procedural levels. First, all relevant research studies investigating the effects of father absence on children's cognitive development were accessed and collected. Second, a final sample of studies that met the inclusion criteria for the meta-analysis was selected. Third, the study findings and characteristics were described, classified, and coded. Finally, the study findings were integrated and analyzed using conventional descriptive statistics, analysis of variance, and multiple regression. The results of the meta-analysis are presented in Chapter 4.

CHAPTER 4

RESULTS

The primary purpose of this study was the integration of the father-absence research to determine the effects of father absence on children's cognitive development as assessed by scores on standardized intelligence, aptitude, and achievement tests and school grades. In addition, this study investigated the relationships between the reported father-absence effects and characteristics of the absence (i.e., reason, duration, and age of the child at onset), characteristics of the study subjects (i.e., gender, socioeconomic status, race, and age), and characteristics of the study (i.e., date. source, sample size and geographic distribution, number of matched/ controlled factors, and number of father-absence factors defined).

This study used the quantitative integrative review methodology of meta-analysis consisting of four procedural levels. First, all relevant research studies investigating the effects of father absence on children's cognitive development were accessed and collected. Second, a final sample of studies that met the inclusion criteria for the meta-analysis was selected. Third, the study findings and characteristics were described, classified, and coded. Finally, the study findings were transformed to a common metric and integrated and analyzed using conventional descriptive statistics, analysis of variance, and multiple regression. In this chapter, the results of the statistical analyses are reported and the data necessary for interpretation of the findings are presented.

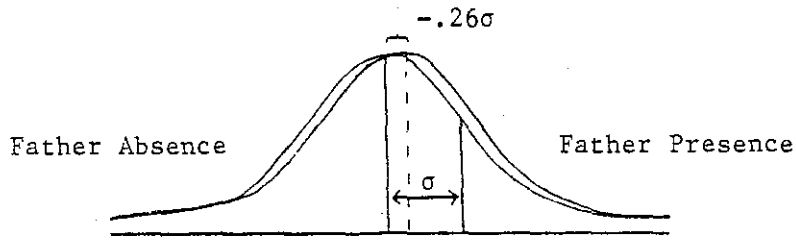
Data From All Studies

An extensive literature search yielded 167 studies investigating the effects of father absence on children's cognitive development. Preliminary examination of the 167 accessed studies revealed that 20 of the studies were duplicate reports. Of the remaining 147 studies, 10 studies were excluded from the meta-analysis because the studies did not include father-present control groups, did not present quantifiable data, or did not yield statistical data from which to compute effect sizes. The final sample of 137 separate research investigations included in the meta-analysis comprised approximately 93% of the entire set of studies investigating the effects of father absence on children's cognitive development. This sample represents 9,955,118 father-absent and father-present subjects from preschool to college age and from a variety of racial and socioeconomic status groups in Australia, Canada, England, and the United States.

The 137 studies included in the meta-analysis yielded 273 effect sizes with some studies yielding effects for more than one type of outcome for different types of father absence and different sample subjects. The number of effect sizes per study ranged from 1 to 8: 57 studies yielded one effect size, 58 studies yielded 2 effect sizes, 8 studies yielded 3 effect sizes, 7 studies yielded 4 effect sizes, 4 studies yielded 7 effect sizes, and 3 studies yielded 8 effect sizes. The studies included in the meta-analysis, within-study effect sizes, the average effect size for each study, and the statistics used to compute each effect size are listed in Appendix D.

Figure 1 contains the findings at the highest level of aggregation. The two curves depict the average father-absent and father-present groups across the 137 studies and the 273 effect sizes. For ease of representation, the figure is drawn in the form of two normal distributions. It does not represent a distribution of individual scores within studies, but rather a distribution of effect sizes as reported in the 137 studies analyzed.

Figure 1



Average Effect Size: -.26σ

Standard Deviation of Effect Size: .37σ

(Data based on 137 studies; 273 effect sizes)

The average study showed a .26 standard deviation superiority of the father-present group over the father-absent group. Thus, the average father-present subject had higher intelligence, aptitude, and achievement test scores and/or school grades than approximately 59% of the father-absent subjects.

Findings Pertinent to Study Hypotheses

This section repeats the 15 study hypotheses first introduced in Chapter 1 and then presents all findings pertinent to each hypothesis.

Hypothesis 1: For the five categories of reason for father absence, there is no difference in mean effect sizes.

The 273 effect sizes were classified into five categories of reason for father absence--employment/military service, death, divorce/separation/desertion, combined, and not reported. The mean effect sizes for each category were computed and then a test of significant differences in mean effect sizes between the five categories of reason for father absence was performed using a one-way analysis of variance. Mean effect sizes for reason for absence categories and the *F*-ratio and corresponding ρ-level are presented in Table 3.

Seventy-four effect sizes averaged -.31 of a standard deviation for father absence due to divorce, separation, or desertion. Thus, the average father-present child scored higher on measures of cognitive development than approximately 62% of the children who experienced father absence because of marital disruption. The mean effect sizes for the combined reason category was comparable, -.29 of a standard deviation. Thirty-four studies averaged -.21 standard deviation for the father absence due to death category. The mean effect size for employment/military service was the smallest of the five reason for absence categories, .08 of a standard deviation.

Table 3

Father-Absence Effects Compared by Reason for Absence

Reason for absence	No. of effect sizes	Mean effect size	Standard error of mean effect size
Employment/military service	4	.08	.16
Death	34	-.21	.05
Divorce/separation/desertion	74	-.31	.04
Combined	77	-.29	.05
Not reported	84	-.22	.04
Entire population	273	-.26	.02

ANOVA Table

Source of variation	df	MS	*F*	ρ
Between	4	.248	1.81	.127
Within	268	.137		

Analysis of variance revealed that the mean effect sizes for the five categories of reason for absence were not significantly different (F = 1.81, df = 4/268, ρ = .13). These results support Hypothesis 1 and suggest that the reported father-absence effects did not differ as a function of the reason for the absence.

Hypothesis 2: For the four categories of outcome measure of cognitive development, there is no difference in mean effect sizes.

The 273 effect sizes were classified into four categories of outcome measure--intelligence test, academic aptitude test, academic achievement test, and school grades. Mean effect sizes for each category were computed and then a test of significant differences in mean effect sizes between the four categories of outcome measure was performed using a one-way analysis of variance. Mean effect sizes for the four types of outcome measure and the F-ratio and corresponding ρ-level are presented in Table 4.

One-hundred and nine effect sizes averaged -.30 of a standard deviation for father absence on the academic achievement test outcome measure. Thus, the average father-present child scored higher than approximately 60% of the father-absent children on academic achievement tests. The mean effect size for the school grades outcome category was nearly the same, -.29 of a standard deviation. Nineteen effect sizes averaged -.21 standard deviation for the aptitude test outcome category. The mean effect size for the intelligence test outcome category was the smallest of the four outcome measure categories, -.19 of a standard deviation.

Table 4

Father-Absence Effects on Four Types of Outcome Measure

Outcome measure	No. of effect sizes	Mean effect size	Standard error of mean effect size
Intelligence test	76	-.19	.04
Academic aptitude test	19	-.21	.09
Academic achievement test	109	-.30	.03
School grades	69	-.29	.05
Entire population	273	-.26	.02

ANOVA Table

Source of variation	df	MS	*F*	p
Between	3	.188	1.36	.256
Within	269	.138		

Analysis of variance revealed that the mean effect sizes for the four categories of outcome measure were not significantly different (F = 1.36, df = 3/269, p = .26). These results support Hypothesis 2 and suggest that the reported father-absence effects did not significantly differ as a function of the outcome measure of cognitive development.

Hypothesis 3: For the five categories of age at onset of the father absence, there is no difference in mean effect sizes.

The 273 effect sizes were classified into five age-at-onset categories--early (0-6 years), middle (7-12 years), late (over 12 years), combined, and not reported. Mean effect sizes were computed for each category and then a test of significant differences in mean effect sizes between the five categories of age at onset was performed using a one-way analysis of variance. Mean effect sizes for the age-at-onset categories and the F-ratio and corresponding p-level are presented in Table 5.

The majority of the effect sizes (234 of 273) fell into the "combined" or "not reported" categories. Of the remaining 39 effect sizes, only 2 were associated with middle (7-12 years) age at onset and none were associated with late (over 12 years) age at onset. Thus, only tentative comparisons between the age at onset categories could be made.

Analysis of variance revealed that the mean effect sizes for the five categories of age at onset of the father absence were significantly different (F = 2.91, df = 4/268, p = .04). A subsequent range test showed that the mean effect size for the middle age at

Table 5

Father-Absence Effects Compared by Age of Child at Onset of Absence

Onset age	No. of effect sizes	Mean effect size	Standard error of mean effect size
Early (0-6 years)	37	-.27	.07
Middle (7-12 years)	2	-1.02	.11
Late (over 12 years)	0	--	--
Combined	73	-.26	.05
Not reported	161	-.25	.03
Entire population	273	-.26	.02

ANOVA Table

Source of variation	df	MS	*F*	ρ
Between	3	.345	2.91	.035
Within	269	.136		

onset category was significantly larger ($\rho < .05$) than the mean effect sizes for the other categories. These results suggest that the reported father-absence effects were greater for children experiencing the onset of father absence between 7 and 12 years of age than for children experiencing onset of father absence before age 7 or after age 12. However, because the middle age at onset category contained only 2 effect sizes, these conclusions are very tentative and must be viewed with caution.

Hypothesis 4: For the four categories of length of father absence, there is no difference in mean effect sizes.

The 273 effect sizes were classified into four length of father absence categories--less than 2 years, 2 years or more, combined, and not reported. Mean effect sizes were computed for each category and then a test of significant differences in mean effect sizes between the four categories of length of father absence was performed using a one-way analysis of variance. Mean effect sizes for the length of absence categories and the *F*-ratio and corresponding ρ-level are presented in Table 6.

Unfortunately, the majority of the effect sizes (211 of 273) fell in the "not reported" category indicating that the majority of the accessed studies did not report the length of the father absence. Of the remaining 62 effect sizes, only 3 were associated with father absence of less than 2 years. Thus, meaningful comparisons could only be made between the "2 years or more" and "combined" categories. Analysis of variance revealed that the mean effect sizes for the length

Table 6

Father-Absence Effects Compared by Length of Absence

Length of absence	No. of effect sizes	Mean effect size	Standard error of mean effect size
Less than 2 years	3	-.39	.18
2 years or more	37	-.33	.07
Combined	22	-.39	.14
Not reported	211	-.23	.02
Entire population	273	-.26	.02

ANOVA Table

Source of variation	df	MS	*F*	ρ
Between	4	.202	1.47	.212
Within	268	.138		

of absence categories were not significantly different (F = 1.47, df = 3/269, ρ = .21). These results support Hypothesis 4 and suggest that the reported father-absence effects did not differ significantly as a function of length of the absence.

Hypothesis 5: For the three categories of gender of study subjects, there is no difference in mean effect sizes.

The 273 effect sizes were classified into three categories of gender of study subjects--male, female, and combined. Mean effect sizes for each category were computed and then a test of significant differences in mean effect sizes between the gender of study subject categories was performed using a one-way analysis of variance. Mean effect sizes for gender of study subject categories and the F-ratio and corresponding ρ-level are presented in Table 7.

Ninety effect sizes averaged -.25 of a standard deviation for father absence for male study subjects. Thus, among male children, the average father-present child scored higher on measures of cognitive development than approximately 58% of the father-absent children. The mean effect size for the female study subject category was -.19. Thus, among female children, the average father-present child scored higher than approximately 56% of the father-absent children.

Analysis of variance revealed that the mean effect sizes for the three categories of gender of study subjects were not significantly different (F = 1.64, df = 2/270, ρ = .20). These results support Hypothesis 5 and suggest that the reported father-absence effects did not differ significantly as a function of gender of study subjects.

Table 7

Father-Absence Effects Compared by Gender

Gender	No. of effect sizes	Mean effect size	Standard error of mean effect size
Male	90	-.25	.04
Female	58	-.19	.05
Combined	125	-.30	.03
Entire population	273	-.26	.02

ANOVA Table

Source of variation	df	MS	*F*	p
Between	2	.227	1.64	.195
Within	270	.138		

Table 8

Father-Absence Effects Compared by Socioeconomic Status

Socioeconomic status	No. of effect sizes	Mean effect size	Standard error of mean effect size
High	0	--	--
Middle	46	-.25	.06
Low	46	-.26	.04
Combined	121	-.22	.03
Not reported	60	-.34	.06
Entire population	273	-.26	.02

ANOVA Table

Source of variation	df	MS	*F*	ρ
Between	3	.195	1.42	.238
Within	269	.138		

Hypothesis 7: For the five categories of race of study subjects, there is no difference in mean effect sizes.

The 273 effect sizes were classified into five categories of race of study subjects--black, white, other, combined, and not reported. Mean effect sizes for each category were computed and then a test of significant differences in mean effect sizes between the race categories was performed using a one-way analysis of variance. Mean effect sizes for the race of study subject categories and the *F*-ratio and the corresponding ρ-level are presented in Table 9.

Sixty-five effect sizes averaged -.25 of a standard deviation for father absence for the black racial category. The mean effect size for the white racial category, also averaged across 65 effect sizes was identical, -.25 of a standard deviation. Thus, among both black and white children, the average father-present child scored higher on measures of cognitive development than approximately 58% of the father-absent children. With only one reported effect size for the "other" racial category, meaningful comparisons could not be made for other racial classifications.

Analysis of variance revealed that the mean effect sizes for the five categories of race of study subject were not significantly different (F = .14, df = 4/268, ρ = .97). These results support Hypothesis 7 and suggest that the reported father-absence effects did not differ significantly as a function of the race of the study subjects.

Table 9

Father-Absence Effects Compared by Race

Race	No. of effect sizes	Mean effect size	Standard error of mean effect size
Black	65	-.25	.04
White	65	-.25	.06
Other	1	-.39	.00
Combined	42	-.23	.04
Not reported	100	-.28	.04
Entire population	273	-.26	.02

ANOVA Table

Source of variation	df	MS	*F*	ρ
Between	4	.020	.14	.967
Within	268	.140		

Hypothesis 8: For the six categories of age of subjects at time of study, there is no difference in mean effect sizes.

The 273 effect sizes were classified into six categories of age of subjects at time of study--preschool, elementary, junior high, high school, college, and combined. Mean effect sizes for each category were computed and then a test of significant differences in mean effect sizes between the age of study subject categories was performed using a one-way analysis of variance. Mean effect sizes for the age categories and the F-ratio and the corresponding ρ-level are presented in Table 10.

Ninety-nine effect sizes averaged -.34 of a standard deviation for father absence for elementary school age study subjects. Thus, among elementary school age children, the average father-present child scored higher than approximately 63% of the father-absent children on measures of cognitive development. The mean effect size for the junior high school age category averaged across 43 effect sizes was comparable, -.33 of a standard deviation. The mean effect size for the preschool age category was less, -.27 of a standard deviation, while the mean effect sizes for the other three categories were the smallest, ranging from -.13 to -.15 of a standard deviation.

Analysis of variance revealed that the mean effect sizes for the six categories of age of study subjects were significantly different ($F = 3.52$, df = 5/267, $\rho = .004$). A subsequent multiple range test showed that the mean effect sizes for the elementary and junior high age categories were significantly larger ($\rho < .05$) than

Table 10

Father-Absence Effects Compared by Age at Time of Study

Age at time of study	No. of effect sizes	Mean effect size	Standard error of mean effect size
Preschool	27	-.27	.09
Elementary	99	-.34	.03
Junior high	43	-.33	.07
High school	55	-.15	.05
College	27	-.13	.07
Combined	22	-.14	.05
Entire population	273	-.26	.02

ANOVA Table

Source of variation	df	MS	*F*	p
Between	5	.467	3.52	.004
Within	267	.133		

the mean effect sizes for the other categories. These results support the rejection of Hypothesis 8 and suggest that the reported father-absence effects were greater in the studies with elementary and junior high school age subjects.

Hypothesis 9: For the five categories of study date, there is no difference in mean effect sizes.

The 273 effect sizes were classified into five categories of study date--before 1965, 1965-1969, 1970-1974, 1975-1979, 1980 to date. Mean effect sizes were computed for each category and then a test of significant differences in mean effect sizes between the five categories of study date was performed using a one-way analysis of variance. Mean effect sizes for the study date categories and the *F*-ratio and the corresponding ρ-level are presented in Table 11.

Twenty-seven effect sizes averaged -.35 of a standard deviation for father absence in the studies dated before 1965. The mean effect sizes for the 1965-1969 study date category was comparable, -.32 of a standard deviation. The mean effect sizes for the other three categories of study date were somewhat smaller, ranging from -.21 to -.24 of a standard deviation.

Analysis of variance revealed that the mean effect sizes for the five categories of study date were not significantly different (F = 1.11, df = 4/268, ρ = .35). These results support Hypothesis 9 and suggest that the reported father-absence effects did not differ significantly as a function of study date.

Table 11

Father-Absence Effects Compared by Study Date

Study date	No. of effect sizes	Mean effect size	Standard error of mean effect size
Before 1965	27	-.35	.10
1965-1969	51	-.32	.05
1970-1974	53	-.23	.05
1975-1979	61	-.21	.04
1980-date	81	-.24	.04
Entire population	273	-.26	.02

ANOVA Table

Source of variation	df	MS	*F*	ρ
Between	4	.154	1.11	.351
Within	268	.139		

Hypothesis 10: For the four categories of source of the study, there is no difference in mean effect sizes.

The 273 effect sizes were classified into four categories of source of the study--journal, book, thesis/dissertation, and unpublished. Mean effect sizes for each category were computed and then a test of significant differences in mean effect sizes between the study source categories was performed using a one-way analysis of variance. Mean effect sizes for the study source categories and the F-ratio and the corresponding ρ-level are presented in Table 12.

The mean effect size for studies appearing as theses or dissertations was the smallest, -.24 of a standard deviation. The mean effect sizes for the three other categories of study source were identical, -.27 of a standard deviation. As expected, analysis of variance showed that the mean effect sizes for the four categories of study source were not significantly different (F = .13, df = 3/269, ρ = .94). These results support Hypothesis 10 and suggest that the reported father-absence effects did not significantly differ as a function of study source.

Hypothesis 11: There is no difference in mean effect sizes by the sample size of each study.

The 273 effect sizes were classified into eight categories of sample size--25 or less, 26-50, 51-100, 101-200, 201-500, 501-1000, 1001-5000, and over 5000. Mean effect sizes for each category were computed and then a test of significant differences in mean

Table 12

Father-Absence Effects Compared by Study Source

Study source	No. of effect sizes	Mean effect size	Standard error of mean effect size
Journal	114	-.27	.04
Book	28	-.27	.05
Thesis/dissertation	99	-.24	.04
Unpublished	32	-.27	.04
Entire population	273	-.26	.02

ANOVA Table

Source of variation	df	MS	*F*	p
Between	3	.018	.13	.944
Within	269	.140		

effect sizes between the sample size categories was performed using a one-way analysis of variance. Mean effect sizes for the sample size categories and the *F*-ratio and corresponding ρ-level are presented in Table 13.

The mean effect size for studies with samples of 26-50 subjects was the largest, -.52 of a standard deviation. The mean effect sizes then progressively decreased in magnitude as the study sample sizes increased. Analysis of variance revealed that the mean effect sizes for the eight categories of study sample size were significantly different ($F = 2.85$, df = 7/265, $\rho = .007$). A multiple range test showed that the mean effect sizes for the 26-50 sample size category was significantly larger ($\rho < .05$) than the mean effect sizes for all other categories. In addition, the mean effect size for sample size category 1 (less than 25 subjects) was significantly smaller ($\rho < .05$) than the mean effect sizes for categories 2, 3, 4, and 5 (samples ranging from 26 to 500 subjects). These results support the rejection of Hypothesis 11 and suggest that the reported father-absence effects did differ as a function of study sample size.

Hypothesis 12: For the six categories of geographic distribution of the study sample, there is no difference in mean effect sizes.

The 273 effect sizes were classified into six categories of sample geographic distribution--school/neighborhood, city, school district, college/university, state, and nation. Mean effect sizes were computed for each category and then a test of significant differences in mean effects sizes between the sample geographic

Table 13

Father-Absence Effects Compared by Sample Size

Sample size	No. of effect sizes	Mean effect size	Standard error of mean effect size
25 or less	5	.13	.36
26-50	13	-.52	.13
51-100	49	-.35	.06
101-200	49	-.29	.06
201-500	76	-.24	.05
501-1000	18	-.19	.02
1001-5000	34	-.18	.02
Over 5000	29	-.17	.04
Entire population	273	-.26	.02

ANOVA Table

Source of variation	df	MS	*F*	ρ
Between	7	.377	2.85	.007
Within	265	.132		

distribution categories was performed using a one-way analysis of variance. Mean effect sizes for the geographic distribution categories and the *F*-ratio and corresponding ρ-level are presented in Table 14.

The mean effect size for studies of a sample distribution of neighborhood/school was the largest, -.43 of a standard deviation. The mean effect sizes then progressively decreased in magnitude as the study sample geographic distribution increased, except for category 6 (nation) where the effect size increased to -.22 of a standard deviation. Analysis of variance revealed that the mean effect sizes for the six categories of sample geographic distribution were significantly different ($F = 2.78$, df = 5/267, $\rho = .02$). A subsequent multiple range test showed that the effect size for the neighborhood/school distribution category was significantly larger ($\rho < .05$) than the mean effect sizes for categories 3, 4, and 5 (school district, college/university, state, nation). These results support the rejection of Hypothesis 12 and suggest that the reported father-absence effects did differ as a function of study sample geographic distribution.

Hypothesis 13: There is no difference in mean effect sizes by the number of matched/controlled factors in each study.

The 273 effect sizes were classified into seven categories depending on the number of factors matched or controlled in the study--0, 1, 2, 3, 4, 5, or 6. Mean effect sizes for each category were computed and then a test of significant differences in mean

Table 14

Father-Absence Effects Compared by Sample Geographic Distribution

Geographic distribution	No. of effect sizes	Mean effect size	Standard error of mean effect size
School/neighborhood	37	-.43	.07
City	89	-.29	.05
School district	59	-.21	.05
College/university	22	-.17	.08
State	17	-.12	.03
Nation	49	-.22	.04
Entire population	273	-.26	.02

ANOVA Table

Source of variation	df	MS	*F*	ρ
Between	5	.373	2.78	.018
Within	267	.134		

effect sizes between the matched/controlled factor categories was performed using a one-way analysis of variance. Mean effect sizes for each category and the *F*-ratio and corresponding ρ-level are presented in Table 15.

The mean effect sizes for studies that matched or controlled 5 or 6 factors were the largest, -.58 and -.72 of a standard deviation respectively. The mean effect sizes for the other categories of number of matched/controlled factors were smaller, ranging from -.31 to -.18 of a standard deviation. Analysis of variance revealed that the mean effect sizes for the seven categories of number of matched/controlled factors were significantly different (F = 2.71, df = 6/266, ρ = .01). A subsequent multiple range test showed that the mean effect sizes for studies that controlled/matched 5-6 factors were significantly greater (ρ < .05) than the mean effect sizes for studies that controlled/matched 0, 1, 2, 3, or 4 factors. These results support the rejection of Hypothesis 13 and suggest that the reported father-absence effects did differ as a function of the number of matched/controlled factors in each study.

Hypothesis 14: There is no difference in mean effect sizes by the number of father-absence factors defined in each study.

The 273 effect sizes were classified into four categories depending on the number of father-absence factors defined in the study--0, 1, 2, or 3. Mean effect sizes for each category were computed and then a test of significant differences in mean effect sizes between the father-absence factor categories was performed

Table 15

Father-Absence Effects Compared by Number of Matched/Controlled Factors

Matched/controlled factors	No. of effect sizes	Mean effect size	Standard error of mean effect size
0	27	-.23	.02
1	40	-.31	.06
2	63	-.18	.04
3	86	-.25	.04
4	44	-.25	.06
5	10	-.58	.13
6	3	-.72	.22
Entire population	273	-.26	.02

ANOVA Table

Source of variation	df	MS	*F*	p
Between	6	.363	2.71	.014
Within	266	.136		

using a one-way analysis of variance. Mean effect sizes for each category and the *F*-ratio and corresponding ρ-level are presented in Table 16.

The mean effect size for studies that defined two father-absence factors was the largest, -.35 of a standard deviation. The mean effect sizes for the other categories of number of defined father-absence factors were smaller, ranging from -.29 to -.19 of a standard deviation, and did not vary in any discernible pattern. Analysis of variance revealed that the mean effect sizes were not significantly different (F = 1.99, df = 3/269, ρ = .12). These results support Hypothesis 14 and suggest that the reported father-absence effects did not significantly differ as a function of the number of father-absence factors defined in each study.

Hypothesis 15: There is no relationship between the composite set of predictors and the study effect sizes.

The composite set of predictors included the 14 study characteristics listed in Table 17. Through analysis of variance, *eta* correlations were obtained for each of the 14 study characteristics and the effect sizes produced by the studies. Pearson correlation coefficients were also computed for nine variables expressed as interval level data (i.e., onset age, length of absence, socioeconomic status of study subjects, age of the subjects at time of the study, date of the study, sample size, sample geographic distribution, number of matched/controlled factors, and number of defined father-absence factors).

Table 16

Father-Absence Effects Compared by Number of Defined Father-Absence Factors

Father-absence factors	No. of effect sizes	Mean effect size	Standard error of mean effect size
0	67	-.26	.04
1	93	-.19	.03
2	40	-.35	.08
3	73	-.29	.04
Entire population	273	-.26	.02

ANOVA Table

Source of variation	df	MS	*F*	ρ
Between	3	.274	1.99	.116
Within	268	.138		

Table 17 lists the *eta* and Pearson correlations for the 14 study characteristics and study effect sizes. The correlations are generally low, although five reached statistical significance--age at onset of the father absence, age at time of study, sample size, sample geographic distribution, and number of matched/controlled factors. The largest correlation is with sample size showing a significant association ($\eta = .26$, $\rho < .01$; $r = .21$, $\rho < .01$) between sample size and the study effect sizes. As the size of the study sample increased, the effect size produced by the study decreased. Study effect sizes also diminished as the geographic distribution of the sample increased ($\eta = .22$, $\rho < .05$; $r = .16$, $\rho < .01$) and as the number of matched/controlled factors in the study decreased ($\eta = .24$, $\rho < .01$; $r = -.12$, $\rho < .05$). The final significant correlation shows an association between the age of the study subjects and the study effect size ($\eta = .25$, $\rho < .01$; $r = .20$; $\rho < .01$). As the age of the study subjects increased from elementary school to college age, the study effect sizes decreased.

Following the calculation of correlation coefficients, a step-wise multiple regression analysis was performed in order to determine the independent variables (i.e., study characteristics) that predicted the study effect sizes, in which combination and to what extent. The results of the multiple regression analysis appear in Table 18. Seven variables contributed significantly ($\rho < .05$) to the prediction of effect size--geographic distribution (neighborhood/school), onset age (middle: 7-12 years old), sample

Table 17

Correlations of Study Characteristics with Effect Size

Study characteristic	Correlation with effect size η	r
Reason for absence	.16	--
Outcome measure	.12	--
Onset age	.18*	.04
Length of absence	.15	.11
Gender of study subjects	.11	--
Socioeconomic status of subjects	.12	.04
Race of study subjects	.05	--
Age at time of study	.25**	.20**
Date of study	.13	.10
Source of study	.04	--
Sample size	.26**	.21**
Geographic distribution	.22*	.16**
Matched/controlled factors	.24**	-.12*
Father-absence factors	.15	-.07

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

size (25 or less), age at time of study (high school), number of matched/controlled factors (five), number of defined father-absence factors (two), and age at time of study (college). These results support the rejection of Hypothesis 15 and suggest that there is a relationship between the composite set of predictors and the study effect sizes.

The regression equation, utilizing the unstandardized regression coefficient for each of the seven significant variables, permits a prediction of the effect size. The regression equation for this sample of 137 father-absence studies is as follows:

$$\hat{\Delta} = -.245 - .249X_1 - .775X_2 + .450X_3 + .150X_4 - .475X_5 - .148X_6 + .144X_7$$

Where:

$\hat{\Delta}$ = the predicted effect size

-.245 = the additive constant

X_1 = geographic distribution: neighborhood/school

X_2 = onset age: middle (7-12 years)

X_3 = sample size: 25 or less

X_4 = age at time of study: high school

X_5 = number of matched/controlled factors: 5

X_6 = number of father-absence factors defined: 2

X_7 = age at time of study: college

Table 18

Step-Wise Multiple Regression

	Independent variables	*B*	*R*	R^2
STEP 1	Geographic distribution: neighborhood/school	-.193	.178	.031
	Additive constant	-.233		
STEP 2	Geographic distribution: neighborhood/school	-.120	.254	.065
	Onset age: middle (7-12 years old)	-.794		
	Additive constant	-.226		
STEP 3	Geographic distribution: neighborhood/school	-.218	.302	.091
	Onset age: middle (7-12 years old)	-.788		
	Sample size: 25 or less	.453		
	Additive constant	-.232		
STEP 4	Geographic distribution: neighborhood/school	-.231	.341	.117
	Onset age: middle (7-12 years old)	-.759		
	Sample size: 25 or less	.487		
	Age at time of study: high school	.149		
	Additive constant	-.261		
STEP 5	Geographic distribution: neighborhood/school	-.237	.366	.134
	Onset age: middle (7-12 years old)	-.766		
	Sample size: 25 or less	.482		
	Age at time of study: high school	.142		
	Matched/controlled factors: 5	-.466		
	Additive constant	-.253		

(continued)

Table 18 (continued)

Step-Wise Multiple Regression

	Independent variables	*B*	*R*	R^2
STEP 6	Geographic distribution: neighborhood/school	-.260	.389	.151
	Onset age: middle (7-12 years old)	-.793		
	Sample size: 25 or less	.464		
	Age at time of study: high school	.133		
	Matched/controlled factors: 5	-.493		
	Father-absence factors defined: 2	-.143		
	Additive constant	-.227		
STEP 7	Geographic distribution: neighborhood/school	-.249	.405	.164
	Onset age: middle (7-12 years old)	-.775		
	Sample size: 25 or less	.450		
	Age at time of study: high school	.150		
	Matched/controlled factors: 5	-.475		
	Father-absence factors defined: 2	-.148		
	Age at time of study: college	.144		
	Additive constant	-.245		

Corrected Multiple *R* .377

Corrected *R* square .142

σ_e .322

The proportion of the variance in the study effect sizes attributable to the composite set of seven significant variables is approximately .405. Thus, only about 16% of the variance in study effect sizes is accounted for by the composite set of predictors (i.e., study characteristics).

The multiple R and R square were corrected for sampling error bias via the following formula suggested by Glass and Hopkins (1984):

$$\hat{R}^2_{Y.12...m} = 1 - (1 - R^2_{Y.12...m})\left(\frac{n - 1}{n - m - 1}\right)$$

where $R^2_{Y.12...m}$ is the square of the multiple correlation from the regression equation based on n cases and m variables. In the present regression with n = 273, m = 7, and $R^2_{Y.1234567}$ = .164, the corrected multiple correlation estimated from the equation is .377. The corrected multiple R is slightly lower than the value obtained from the original regression, .405. Thus, after correction for bias, only about 14% of the variance in study effect sizes is accounted for by the composite set of predictors (i.e., study characteristics).

Summary of the Results

The purpose of this study was to integrate the reported results of the father-absence research to determine the effects of father absence on children's cognitive development. The study used the quantitative integrative review methodology of meta-analysis through which the findings from individual studies were integrated and relationships between the study findings and characteristics were explored. Through this procedure 137 studies yielding 273 effect sizes based on a sample of 9,955,118 subjects were statistically analyzed.

Analysis of the study findings at the highest level of aggregation yielded a mean effect size of -.26 of a standard deviation reflecting a .26 standard deviation superiority of the father-present group over the father-absent group. Thus, the average father-present subject had higher test scores and/or school grades than approximately 59% of the father-absent subjects.

Based upon the results of the statistical analyses, study hypotheses 3, 8, 11, 12, and 13, involving the comparison of mean effect sizes across levels of study characteristics, were rejected. Mean effect sizes were found to differ significantly as a function of age of the child at onset of the father absence, age of the subjects at time of study, sample size, sample geographic distribution, and number of matched/controlled factors in each study.

The statistical analysis also led to rejection of Hypothesis 15. Five significant correlations between study characteristics and study effect sizes were obtained. These significant correlations indicated: (1) larger effect sizes were associated with father-absence onset during 7-12 years of age; (2) larger effect sizes were identified with younger study subjects; (3) larger effect sizes were associated with smaller study sample sizes; (4) larger effect sizes were related to narrow geographic distributions of study samples; and (5) larger effect sizes were associated with a greater number of matched or controlled factors in the study.

The following seven study characteristics were found to significantly predict the study effect sizes: geographic distribution of the study sample (neighborhood/school), onset age (7-12 years of age), sample size (25 or less), age at time of study (high school), matched/controlled factors (5), father-absence factors defined (2), and age at time of study (college). However, only 14% of the total variance in the study effect sizes was accounted for by the composite set of predictors (i.e., study characteristics).

CHAPTER 5

CONCLUSIONS

Changing family patterns have resulted in an increasing focus on the effects of father absence on children's cognitive development. While the research has stressed the importance of fathering to children in two-parent families, the effects of father absence are still contested. The plethora of contradictory research findings has created the need for a systematic analysis of the literature in order to determine what is known and not known about the effects of father absence on children's cognitive development.

The problem addressed in the present study was the integration of the father-absence research to determine answers to the following questions:

1. Does the research indicate that father absence has an effect on children's cognitive development as assessed by scores on standardized intelligence, aptitude, and achievement tests and school grades?

2. Does the research indicate that father-absence effects differ as a function of characteristics of the absence, characteristics of the father-absent child, or characteristics of the study?

3. What relationships exist between the reported father-absence effects and the substantive and methodological features of the studies?

4. Which substantive and methodological features of the studies predict the reported father-absence effects, to what extent and in which combination?

The present study used the quantitative integrative review methodology of meta-analysis through which the findings from individual studies were integrated and relations between the study findings and characteristics were explored. The meta-analytic approach involved transforming the findings of individual studies to a common metric (i.e., effect size), describing and coding the characteristics of the studies, and then using analysis of variance and multiple regression analysis to determine whether there were overall effects, subsample effects, and relations among the characteristics of the studies and the study findings.

In order to draw conclusions about the entire realm of research investigating the effects of father absence on children's cognitive development, extensive computer and manual searches were used to access and collect all relevent studies reported in the published and unpublished literature between 1925 and 1985. As many information channels as possible were utilized to insure that no obvious, avoidable retrieval bias existed and that the sample of retrieved studies closely approximated the target population of father-absence research. An important validity issue in meta-analysis is described by Rosenthal (1984) as the "file drawer phenomenon" where only studies with significant results are reported in the literature and, thus, retrieved by the meta-analyst. Of the 137 studies included in the present meta-analysis, 48 reported "no significant effects." Thus, the literature examined appears to have included a representative sample of the entire realm of research investigating the effects of father absence on children's cognitive development.

The final sample of 137 separate research investigations included in the meta-analysis yielded 273 effect sizes with some studies yielding effect sizes for more than one type of outcome for different types of father absence and different sample subjects. This sample represents 9,955,118 father-absent and father-present subjects from preschool to college age and from a variety of racial and socioeconomic status groups in Australia, Canada, England, and the United States.

Once all studies were identified and collected, the characteristics of the studies and their findings were described, classified, and coded to so that study findings could be analyzed and compared by study properties. Following the coding of the characteristics of individual studies, the study findings were transformed to a common metric (i.e., effect size) and integrated and analyzed using conventional descriptive statistics, analysis of variance, and multiple regression.

Conclusions

The primary problem addressed in the present meta-analysis was the integration of the father-absence research to draw conclusions regarding the following subproblems: (1) overall effects of father absence on children's cognitive development; (2) subsample effects depending on characteristics of the father absence, study, or study sample; (3) relations among the reported father-absence effects and study characteristics; and (4) prediction of father-absence effects from study, father-absence, and study sample characteristics. In the following section, the findings and conclusions pertinent to each subproblem are presented.

Overall Effects

Aggregation of the findings from the 137 studies included in the present meta-analysis yielded an overall effect size of -.26 reflecting a .26 standard deviation superiority of the father-present group over the father-absent group. Thus, the overall average finding from the 137 reviewed studies indicates that father absence has a negative effect on children's cognitive development as assessed by standardized intelligence, aptitude, and achievement tests and school grades.

A difficult issue in meta-analysis is the substantive interpretation of the effect size. Once reviewers have generated an effect size, how are they to know if it is large or small, meaningful or trivial? Cohen (1977) suggests some general definitions for effect sizes based on the typical effect sizes encountered in the behavioral sciences as a whole. Cohen labelled an effect size small if $\Delta = .20$, medium if $\Delta = .50$, and large if $\Delta = .80$. Within this context, the major conclusion that can be reached from the present meta-analysis is that father absence has a "small" negative effect on children's cognitive development.

However, Glass, McGaw, and Smith (1981) reject Cohen's substantive interpretation of effect sizes: "There is no wisdom whatsoever in attempting to associate regions of the effect-size metric with descriptive adjectives such as small, moderate, large, and the like" (p. 104). According to Glass et al., effect size interpretation must take place within a context of decision and

comparative value involving the difficult problem of making practical judgments about practical significance. In the present meta-analysis, the father-absent and father-present samples were separated by approximately one-quarter of a standard deviation ($\Delta = -.26$), or the average father-present child scored higher on measures of cognitive development than 59% of the father-absent children. In terms of score differences on the Stanford-Binet Intelligence Scale, for example, the average father-present child scored less than 4 points higher than the average father-absent child, assuming a population standard deviation of 15. However, in terms of achievement test score differences, where the population standard deviation may range from 1.0 to 2.5 years depending on the grade level of the test, the average father-present child could score from 3-7 months higher than the average father-absent child. Thus, while the reported effects of father absence are negative, these effects have uncertain practical significance.

In a third approach to substantive interpretation, Cooper (1984) emphasizes the consideration of the role of study methodology in producing the overall effect size. In the present meta-analysis, the mean effect sizes based on studies with 5-6 matched or controlled factors across father-absent and father-present samples produced significantly larger effect sizes ($\Delta = -.65$) than less controlled studies ($\Delta = -.25$). This finding uncovers a possible explanation for the small effect size derived from the overall integration of father-absence studies. Only 13 of the 273 effect sizes were derived from well controlled studies making it reasonable to suggest that the overall average effect size obtained in

the present meta-analysis may have been larger if the sample of analyzed studies had included a greater number of well controlled studies.

The overall average finding from the 137 reviewed studies indicates that father absence had a "small" negative effect on children's cognitive development as assessed by standardized intelligence, aptitude, and achievement tests and school grades. However, will controlled studies (i.e., studies that matched/controlled 5-6 factors across father-absent and father-present samples) yielded "moderate" effect sizes.

Subsample Effects

In comparisons of mean effect sizes across levels of study characteristics, mean effect sizes were found to differ significantly as a function of only 5 of the 14 coded and analyzed study characteristics: (1) age of the child at onset of the absence; (2) age of the subjects at time of study; (3) sample size; (4) sample geographic distribution; and (5) number of matched/controlled factors in the study. These findings support the following conclusions:

1. Reported negative effects of father absence were significantly greater for children experiencing onset of father absence between 7 and 12 years of age than for children experiencing onset of father absence before age 7 or after age 12. However, over half (161 of 273) of the effect sizes were derived from studies that did not report age-at-onset data. Furthermore, no studies included subjects that experienced father-absence onset at over 12 years of age and only two studies included subjects that experienced father-absence onset between 7 and 12 years of age. Thus, the conclusion that more detrimental

effects are associated with father-absence onset between 7 and 12 years is tentative and must be viewed with caution.

2. Reported negative father-absence effects were signficantly greater for elementary and junior high school age subjects than for preschool, high school, or college age subjects. Thus, longitudinal studies including analysis of intra-individual changes in cognitive development at different age levels of children experiencing father absence would yield important data regarding father-absence effects.

3. The methodology employed in the father-absence study has a significant effect on the magnitude of the reported father-absence effects. Reported father-absence effects were significantly greater when study samples included 26-50 subjects, when study samples were drawn from one school or neighborhood, or when 5-6 sample factors were matched or controlled across father-absent and father-present groups.

4. The methodological quality of the study had a significant effect on the magnitude of the reported father-absence effects. One indication of methodological quality in the father-absence research is the within-study matching of father-absent and father-present samples on pertinent variables. Maximum methodological quality is reached when the following six variables are matched or controlled: gender, socioeconomic status, race, IQ, age, and grade in school. The reported negative father-absence effects were significantly greater in studies that controlled or matched 5-6 factors than in studies that matched or controlled 0-4 factors.

Failure to find a greater number of subsample effects among the 15 study characteristics investigated in the present meta-analysis may be due, in part, to the lack of information contained in the father-absence studies. For example, 86 of the 137 analyzed studies did not report the reason for the father absence and 104 of the studies did not report the length of the absence. Thus, the majority of studies contained inadequate information on which to base conclusions regarding possible subsample effects of two important father-absence variables--reason for and length of the absence.

Relations Among Study Characteristics and Findings

Five significant correlations between the study characteristics and study effect sizes were obtained. These significant correlations indicated: (1) larger effect sizes were associated with father absence during 7-12 years of age; (2) larger effect sizes were identified with younger study subjects; (3) larger effect sizes were associated with smaller study sample sizes; (4) larger effect sizes were related to narrow geographic distributions of study samples; and (5) larger effect sizes were associated with a greater number of matched or controlled factors in the study. These findings are consistent with and support the conclusions drawn from the investigation of subsample effects.

Prediction of Reported Father-Absence Effects

The following seven study characteristics were found to significantly predict the reported father-absence effects: geographic distribution of the study sample (neighborhood/school), onset age (7-12 years of age),

sample size (25 or less), age at time of study (high school), matched/controlled factors (5), father-absence factors defined (2), and age at time of study (college). However, only 14% of the total variance in the reported father-absence effects was accounted for by the composite set of predictors (i.e., study characteristics).

Failure to account for more of the variance in the reported father-absence effects may be due to the lack of information contained in the analyzed father-absence studies. In many cases, studies did not report data about the coded and analyzed methodological and substantive study characteristics. Furthermore, the body of father-absence research provided no relevant data regarding the following potentially important variables: availability of the father and/or father substitutes following the separation, family interaction characteristics before and after the father absence, standards of maternal care, family configuration, mobility, and availability of societal and familial support systems. These variables may add significantly to the prediction of father-absence effects and should be included in future studies investigating the effects of father absence on children's cognitive development.

Summary

The major conclusion reached from the present meta-analysis is that the effects of father absence on children's cognitive development are negative and small with uncertain practical significance. However, in well controlled studies (i.e., studies that matched/controlled 5-6 factors across father-absent and father-present samples) the

reported negative effects of father absence were moderate with some practical significance. Thus, methodological problems including inadequate reporting and failure to insure comparable father-absent and father-present samples preclude the formation of firm conclusions regarding subsample effects, relations among study characteristics and findings, and prediction of father-absence effects. The most significant information derived from the present meta-analysis consists of implications and guidelines for future research investigating the effects of father absence on children.

Implications for Future Research

The present meta-analytic review of the research indicates that investigations of the effects of father absence have been fragmentary and their results often conflicting and inconclusive. One reason for this, no doubt, lies in the difficulty of carrying out father-absence research. There is the problem of obtaining a large representative sample of father-absent children together with an equally representative sample of father-present children with whom they can be compared. Furthermore, only by collecting a great deal of data about father-absent families, about aspects of the child's development, and about the nature of the absence can a complete picture of the effects of father absence on cognitive development be compiled.

In addition to the difficulties inherent in the father-absence research, methodological problems have contributed to the fragmentary and conflicting results. Some of these methodological problems have

been discussed in qualitative reviews of the father-absence literature (Herzog & Sudia, 1973; Shinn, 1978). Primary among the methodological problems in the father-absence research is the definition of father absence. Generalizations about the effects of father absence often assume a dichotomy between "one-parent" and "two-parent" or "father-absent" and "father-present" with no regard for the reason, length, and onset of the absence, the degree of father availability following separation, or the existence of father substitutes.

Another methodological problem found in the father-absence research is the lack of consideration or control of variables that may have possible moderating effects on the relationship between father absence and cognitive development. No single factor is the cause of variance in intellectual or academic performance, rather a combination and interaction of factors yields the outcome. Focus on only one or two variables leads to overlooking factors that could make significant contributions to the results. In addition, failure to control for moderating variables may result in samples differing on so many pertinent variables that comparisons of father-absent and father-present groups yield no interpretable results.

A third methodological problem found in father-absence research is the failure to recognize and make explicit the underlying assumptions within the research so that the results can be evaluated in term of those foundations. One characteristic present in many studies of the effects of father absence is the designation of the father-absent family as an "incomplete family" and the accompanying

assumption that such a family is abnormal or less conducive to the child's optimum cognitive development than the two-parent family. Thus, the prevailing tendency has been to focus on the problems and weaknesses of the father-absent family without inquiry into the nature of or even the existence of positive effects.

Many of the studies investigating the effects of father absence have used inappropriate or incomplete statistical procedures to analyze data. Most studies assess statistical significance and place little, if any, emphasis on the magnitude of the effects obtained. Another common statistical error in father-absence research is the use of one statistical procedure when several can be applied to the data. Finally, father-absence studies have rarely used statistical procedures allowing for the consideration of the possible contributions of moderating variables and the interactions between variables and the magnitude of effects.

This brief consideration of the methodological problems present in the father-absence research indicates the need for a re-evaluation of hypothesis formation and research procedures. Isaac and Michaels (1975) state, "The most effective insurance against unwitting errors is sound and thorough planning which foresees problems and makes acceptable allowances where unavoidable difficulties exist" (p. 1). Such a task necessitates a paradigmatic shift in the father-absence research including redefinition of the perspective and context of the research problem and clarification of techniques for statistical analysis of the data.

Perspective

One aspect of problem formulation is the determination of the perspective of the study, the relationship of the dependent and independent variables of the research study as regarded from a particular point in time. Perspective in father-absence research involves the picturing of the component parts of the study in such a way as to show them as they refer to the total development of the child and the changing circumstances of the family.

A crucial element in the investigation of the effects of father absence on cognitive development is the need to study the development of the child over a long period of time. Low scores on one measure of cognitive development noted in a one-time study may represent a developmental delay and may not be an indicator of negative effects of father absence per se.

In addition, there is the need to study the father absence/presence factor over time. Father absence/presence is not a static circumstance but a dynamic, ongoing process. The period of stress which may precede the absence and the loss of the father/husband together with subsequent changes in the family's economic and social circumstances and the relationships between its remaining members may have effects on the child's cognitive development that can only be traced over time. Longitudinal studies such as the Children of Divorce Project (Wallerstein & Kelly, 1976 & 1980; Wallerstein, 1984) are exemplary of a desirable paradigmatic shift in the study of the effects of father absence on children.

Context

In order to establish the context of the research study, the researcher must define the whole situation, background, and environment of the studied phenomenon and place the dependent and independent variables within this entire picture. Only by collecting a great deal of data about the father-absent family, about aspects of the child's development, and about the nature of the absence can a complete picture of the effects of father absence on children's cognitive development be compiled.

The context of the study of father absence involves definition of the characteristics of the absence including the cause, length, age of the child at onset, and availability of the father and father substitutes following the absence. Family interaction characteristics and standards of maternal care before and after the absence also contribute to the context of father-absence research. In addition, setting the context necessitates consideration of the characteristics of the population studied including gender, race, socioeconomic status, mobility, age, and family configuration. Social norms and the availability of societal and familial support systems also contribute to the whole environment surrounding the investigation of the effects of father absence.

The complexity of the study of father-absence effects points to the need for a reformulation of research questions about father absence and its possible effects on cognitive development. Previous studies have been asking: How and how much are children harmed by

growing up in a father-absent home? Studies that would attempt to treat father absence as a cluster of variables that may affect cognitive development would define the entire context of father-absence and would be exemplary of a positive paradigmatic shift. Thus, the question in the study of the effects of father absence would become: Under what circumstances and in what ways does father absence from the home combine with other factors to produce identifiable effects relevant to the child's cognitive development? In line with this model, additional rewarding questions concerning father absence would explore both negative and positive elements. Such inquiries would attempt to discover what elements interact to produce what effects in both father-absent and father-present homes.

Statistical Analyses

Much of the research reviewed has been relatively simplistic with a limited range of methods used to analyze the data. Emphasis has been placed on the presentation of frequency counts or percentages (e.g., Webb, 1970; National Association of Elementary School Principals, 1980) that lead to overstatement of the importance of small differences between father-absent and father-present subjects. Some studies using correlation statistics (e.g., Pringle et al., 1966; Mueller, 1975; O'Shields, 1980) have been limited to the investigation of the relationship between only two variables--father absence and cognitive development. Many studies (e.g., Cortes & Fleming, 1968; Chapman, 1977; Smilansky, 1982) have used one-way tests of significant mean

differences that do not provide information about the magnitude of the father-absence effects and do not explore interactions between variables.

Review of the research suggests that if statistical analyses are to be complete, the magnitude of the differences between father-absent and father-present subjects needs to be assessed. Thus, an implication that arises from the present meta-analysis is that journals encourage authors to provide reports of effect size or sufficient information (means and standard deviations) so that effect sizes can be readily calculated. Unless measurement of effect size is addressed, the importance of the findings are to some extent masked (Cohen, 1977). Provision of effect sizes in study reports will give the reader the option of deciding whether a statistically significant difference is large enough to merit further attention, either in practice or in research.

The complexity of the study of father-absence effects and children's cognitive development points to the need for a multivariate approach to data analysis. Multivariate analyses can be used effectively to determine the influence of separate variables, thus providing alternative explanations for the findings. Multiple regression analysis could also be used to explain variations or control for the influence of confounding variables. As the use of multivariate analysis and multiple regression analysis become more common in father-absence research, it will become increasingly clear that single variables of statistical significance

do not necessarily predict a large proportion of the variance in children's cognitive development. Thus, it will be necessary to employ many variables and many statistical procedures to understand and explain the complexity of the relationship between father absence and cognitive development.

Summary

Even though researchers who have studied the effects of father absence on children have presented an extensive body of data, weak methodological techniques, loose and poorly controlled research procedures, and inappropriate and incomplete statistical analyses invalidate many conclusions and offer ambiguous evidence on which to base generalizations. The findings of the present meta-analysis suggest that father absence does have negative effects on children's cognitive development, although the magnitude and practical significance of the effects cannot be clearly established. As more studies with adequate methodological techniques and well controlled research procedures are completed, it will be possible to meta-analyze those studies in hopes of reaching more definitive conclusions regarding the magnitude and significance of reported father-absence effects, subsample effects, and relations between study characteristics and findings.

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Appendix A

Descriptors and Free-Text Identifiers Used in Computer Searches

Descriptors and Free-Text Identifiers

Used in Computer Searches

The following descriptors and free-text identifiers were used to retrieve bibliographic entries from on-line computer networks:

Broken Home crossed (intersected) with Academic Achievement, Academic Aptitude, Achievement, Cognitive Ability, Cognitive Development, Grades (Scholastic), Intellectual Development, Intelligence, Mathematics Achievement, Reading Achievement, Scholastic Aptitude, School Readiness

Death and Dying

Dying Father

Divorce crossed (intersected) with Academic Achievement, Academic Aptitude, Achievement, Cognitive Ability, Cognitive Development, Grades (Scholastic), Intellectual Development, Intelligence, Mathematics Achievement, Reading Achievement, Scholastic Aptitude, School Readiness

Father Absence

Father-Absent

Fatherless

Fathers

One Parent crossed (intersected) with Academic Achievement, Academic Aptitude, Achievement, Cognitive Ability, Cognitive Development, Grades (Scholastic), Intellectual Development, Intelligence, Mathematics Achievement, Reading Achievement, Scholastic Aptitude, School Readiness

Parental Absence

Paternal Absence

Single Parent crossed (intersected) with Academic Achievement, Academic Aptitude, Achievement, Cognitive Ability, Cognitive Development, Grades (Scholastic), Intellectual Development, Intelligence, Mathematics Achievement, Reading Achievement, Scholastic Aptitude, School Readiness

Widow

The following on-line computer networks were accessed: Dissertation Abstracts, Educational Resources Information Center, Family Resources, Government Printing Office Publications Reference, Psych-Alert, Psychological Abstracts, Resource Libraries Information Network, and Social Sciences Citation Index.

Appendix B

Father Absence/Children's Cognitive Development

Summary Sheet

Father Absence/Children's Cognitive Development Summary Sheet

IDENTIFICATION
Author(s): _____
Date: _____ Source: _____
Focus : _____

FATHER ABSENCE
Permanent: _____
Divorce/Separation/Desertion: _____
Death: _____
Temporary: _____
Length of Absence: _____
Age at Onset of Absence: _____

FATHER PRESENCE: _____

OUTCOME TYPE
Intelligence: _____
Academic Aptitude: _____
Academic Achievement: _____
School Grades: _____
Other: _____

SUBJECTS
Total n: _____
Gender: _____ males _____ females
Age at Time of Study: _____
SES: _____
Race: _____
Geographic Distribution: _____

MATCHED/CONTROLLED FACTORS: _____

STATISTICAL ANALYSIS
Type: _____
Results: _____

META-ANALYSIS
Yes: _____
No: _____ Limitations: _____

NOTES:

Appendix C

Father Absence/Children's Cognitive Development

Coding Sheet

Father Absence/Children's Cognitive Development Coding Sheet

IDENTIFICATION

Study # _____ ES # _____ Author(s) _____

SUBSTANTIVE FEATURES

Reason for Absence _____
1. Employment/military service
2. Death
3. Divorce/separation/desertion
4. Combined
9. Not reported

Outcome Type _____
1. Intelligence test
2. Academic aptitude test
3. Academic achievement test
4. School grades

Age at Onset _____
1. Early (0-6 years)
2. Middle (7-12 years)
3. Late (over 12 years)
4. Combined
9. Not reported

Length of Absence _____
1. Less than 2 years
2. 2 years or more
3. Combined
9. Not reported

Gender _____
1. Male
2. Female
3. Combined

Socioeconomic Status _____
1. High
2. Middle
3. Low
4. Combined
9. Not reported

Race _____
1. Black
2. White
3. Other
4. Combined
9. Not reported

Age at Time of the Study _____
1. Preschool
2. Elementary
3. Junior high
4. High school
5. College
6. Combined

METHODOLOGICAL FEATURES

Date _____
1. Before 1965
2. 1965-1969
3. 1970-1974
4. 1975-1979
5. 1980 to date

Source _____
1. Journal
2. Book
3. Thesis/dissertation
4. Unpublished

Sample Size _____
1. 25 or less
2. 26-50
3. 51-100
4. 101-200
5. 201-500
6. 501-1000
7. 1001-5000
8. Over 5000

Sample n _____

Geographic Distribution _____
1. Neighborhood/school
2. City
3. School district
4. College/university
5. State
6. Nation

Matched/Controlled Factors _____
___Gender
___Socioeconomic status
___Race
___IQ
___Age
___Grade in school

Father-Absence Factors _____
___Reason(s) for absence
___Age at onset
___Length of absence

EFFECT SIZE

Statistics Used _____
1. $\bar{X}$, s
2. F, t,
3. r, χ^2

Δ = _____

Appendix D

Studies Included in the Meta-Analysis

Studies Included in the Meta-Analysis

Study	Statistics Used	Within-Study $\Delta/\hat{\Delta}$	Study $\Delta/\hat{\Delta}$
Allen (1970)	$\bar{X}$, s $\bar{X}$, s	IQ: -.42 Achievement: +.03	-.20
Altus (1958)	$\bar{X}$, s	None	+.07
Annunziata (1981)	F F	Male: -.81 Female: -.28	-.56
Atkinson & Ogston (1974)	"No significant difference"	None	0.00
Averitt (1981)	$\bar{X}$, s $\bar{X}$, s	Male: -.52 Female: -.26	-.39
Bachman (1970)	$\bar{X}$, s $\bar{X}$, s	Death: -.14 Divorce: -.44	-.29
Bain et al. (1983)	$\bar{X}$, s $\bar{X}$, s	Male: -.65 Female: +.15	-.25
Bales (1979)	r r r r	Black male: -.06 Black female: -.02 White male: -.10 White female: -.08	-.06
Barton (1981)	t t	Male: -.59 Female: -.11	-.35
Belcher (1961)	$\bar{X}$, s $\bar{X}$, s	Achievement: -1.44 GPA: -2.13	-1.76
Belz & Geary	$\bar{X}$, s $\bar{X}$, s	Male: -.13 Female: -.19	-.16
Bergman (1981)	$\bar{X}$, s $\bar{X}$, s $\bar{X}$, s $\bar{X}$, s	Male IQ: -.24 Female IQ: -.17 Male achievement: -.38 Female achievement: -.25	-.26
Berry & Poncini (1981)	ρ	None	-.99
Birnbaum (1966)	$\bar{X}$, s $\bar{X}$, s	Achievement: -.10 GPA: -.14	-.12
Black (1981)	$\bar{X}$, s $\bar{X}$, s	Male: -.14 Female: -.03	-.08

Studies Included in the Meta-Analysis (continued)

Study	Statistics Used	Within-Study $\Delta/\hat{\Delta}$	Study $\Delta/\hat{\Delta}$
Blanchard & Biller (1971)	t t	Achievement: -1.07 GPA: -.77	-.92
Bowman (1981)	F	None	-.23
Boyd (1984)	$\bar{X}$, s $\bar{X}$, s	Achievement: -.29 GPA: -.23	-.26
Broman et al. (1975)	$\bar{X}$, s $\bar{X}$, s $\bar{X}$, s $\bar{X}$, s	Black male: -.25 Black female: -.09 White male: -.37 White female: -.07	-.20
Buceta (1982)	$\bar{X}$, s $\bar{X}$, s	IQ: -.35 GPA: -1.55	-.95
Buchinal (1964)	F	None	0.00
Campbell (1932)	$\bar{X}$, s $\bar{X}$, s	IQ: -.01 GPA: -.25	-.13
Carlsmith (1964)	$\bar{X}$, s	None	-.14
Chapman (1977)	$\bar{X}$, s $\bar{X}$, s	Male: -1.10 Female: +.46	-.32
Clarke (1961)	$\bar{X}$, s	None	+.28
Coleman et al. (1966)	r r r	Black: -.14 White: -.20 Other: -.39	-.26
Collins (1981)	t	None	+.61
Collins (1969)	$\bar{X}$, s $\bar{X}$, s $\bar{X}$, s $\bar{X}$, s $\bar{X}$, s $\bar{X}$, s	Male IQ: -.14 Female IQ: -.43 Male achievement: +.31 Female achievement: -.19 Male GPA: -.12 Female GPA: -.29	-.14
Condit (1960)	t t	Death: -.07 Divorce: -.14	-.10

Studies Included in the Meta-Analysis (continued)

Study	Statistics Used	Within-Study $\Delta/\hat{\Delta}$	Study $\Delta/\hat{\Delta}$
Conyers (1977)	ρ	None	-.34
Corsica (1980)	$\bar{X}$, s $\bar{X}$, s	IQ: -.44 GPA: -.69	-.56
Cortes & Fleming (1968)	$\bar{X}$, s t t	IQ: -.10 Achievement: -.25 GPA: -.30	-.22
Cox (1975)	F	None	-.27
Crescimbeni (1964)	t t	Death: -1.13 Divorce: -.91	-1.02
Crossman & Adams (1980)	$\bar{X}$, s	None	-.54
Curtis & Nemzek (1938)	$\bar{X}$, s $\bar{X}$, s	Death: -.41 Divorce: -1.09	-.75
Derrick (1977)	$\bar{X}$, s $\bar{X}$, s	IQ: -.17 Aptitude: -.03	-.10
Deutsch (1960)	r	None	-.95
Deutsch & Brown (1964)	$\bar{X}$, s	None	-.46
Douglas et al. (1968)	$\bar{X}$, s $\bar{X}$, s	IQ: -.10 Achievement: -.26	-.18
Edgar & Headlam (1982)	ρ ρ	Achievement: -.29 GPA: -.40	-.34
Eiduson et al. (1977)	$\bar{X}$, s	None	-.24
Engemoen (1966)	$\bar{X}$, s $\bar{X}$, s	IQ: -.29 Achievement: -.06	-.18
Epps (1969)	F F	Male: -.06 Female: -.53	-.30
Essen (1979)	$\bar{X}$, s	None	-.38

Studies Included in the Meta-Analysis (continued)

Study	Statistics Used	Within-Study $\Delta/\hat{\Delta}$	Study $\Delta/\hat{\Delta}$
Evans & Neel (1980)	F	None	-.06
Farley (1977)	$\bar{X}$, s	Aptitude: -.36	-.34
	$\bar{X}$, s	Achievement: -.34	
	$\bar{X}$, s	GPA: -.32	
Feldman & Feldman (1975)	$\bar{X}$, s	IQ: -.03	-.11
	F	GPA: -.19	
Ferri (1976)	$\bar{X}$, s	Male death: -.17	-.21
	$\bar{X}$, s	Female death: -.01	
	$\bar{X}$, s	Male divorce: -.33	
	$\bar{X}$, s	Female divorce: -.33	
Fink (1980)	$\bar{X}$, s	IQ: +.02	+.16
	$\bar{X}$, s	Achievement: +.30	
Fowler & Richards (1979)	$\bar{X}$, s	Male: -.49	-.69
	$\bar{X}$, s	Female: -.90	
Gale (1974)	χ^2	None	-.17
Gatlin & Brown (1975)	t	IQ: -.09	-.29
	t	Achievement: -.39	
	t	GPA: -.39	
Gerard & Miller (1976)	$\bar{X}$, s	None	-.35
Gerasch (1983)	$\bar{X}$, s	None	-.77
Ginsburg & Russell (1981)	F	None	-.30
Goldstein (1983)	$\bar{X}$, s	Black death IQ: -.22	-.21
	$\bar{X}$, s	White death IQ: -.20	
	$\bar{X}$, s	Black divorce IQ: +.07	
	$\bar{X}$, s	White divorce IQ: -.30	
	$\bar{X}$, s	Black death achievement: -.35	
	$\bar{X}$, s	White death achievement: -.20	
	$\bar{X}$, s	Black divorce achievement: +.04	
	$\bar{X}$, s	White divorce achievement: -.37	
Gray (1980)	$\bar{X}$, s	None	-.81

Studies Included in the Meta-Analysis (continued)

Study	Statistics Used	Within-Study $\Delta/\hat{\Delta}$	Study $\Delta/\hat{\Delta}$
Greenberg & Davidson (1971)	F	None	-.33
Guidubaldi & Perry (1984)	r r	Achievement: -.87 GPA: -.82	-.84
Guidubaldi et al. (1984)	F F F	IQ: -.18 Achievement: -.23 GPA: -.22	-.21
Hammond (1979)	t t	Male: -.27 Female: -.17	-.22
Herzog (1974)	χ^2 χ^2	IQ: +.42 Achievement: +.30	+.36
Hess et al. (1968)	$\bar{X}$, s	None	-.18
Hess et al. (1969)	$\bar{X}$, s $\bar{X}$, s ρ	IQ: -.16 Achievement: -.12 GPA: -.46	-.25
Hetherington et al. (1978)	$\bar{X}$, s	None	-.44
Hornstein (1980)	r r	IQ: -.41 Achievement: -.40	-.40
Hunt & Hunt (1975)	r r	Black: +.16 White: -.92	-.38
Hunt & Hunt (1977)	r r	Black: 0.00 White: +1.12	+.56
Ilardi (1966)	$\bar{X}$, s $\bar{X}$, s	Male: -.24 Female: -.58	-.41
Jaffe (1965)	$\bar{X}$, s $\bar{X}$, s	IQ: -.75 Achievement: -.94	-.84
Jantz & Sciara (1975)	F	None	-.24
Jenkins (1958)	$\bar{X}$, s ρ	IQ: -.44 GPA: -.31	-.38
Jones (1975)	t	None	+.22

Studies Included in the Meta-Analysis (continued)

Study	Statistics Used	Within-Study $\Delta/\hat{\Delta}$	Study $\Delta/\hat{\Delta}$
Keller (1968)	χ^2	None	-.17
Kelly et al. (1965)	F	None	-.08
Kitano (1963)	"no significant difference"	None	0.00
Kohn (1977)	r	None	-.19
Kohn & Rosman (1974)	r	None	-.20
Landy et al. (1969)	ρ	None	-.86
Lee (1974)	$\bar{X}$, s	None	+.07
Lessing et al. (1970)	$\bar{X}$, s $\bar{X}$, s	Male: -.20 Female: +.01	-.09
Lloyd (1972)	χ^2 χ^2 χ^2 χ^2	Black male: -.16 Black female: -.12 White male: -.15 White female: -.02	-.11
McNeal (1975)	F F F F F F F F	Male death achievement: +.18 Female death achievement: +.23 Male divorce achievement: -.04 Female divorce achievement: -.32 Male death GPA: -.27 Female death GPA: -.22 Male divorce GPA: -.43 Female divorce GPA: -.45	-.33
Maxwell (1961)	χ^2	None	-.24
Milne et al. (1983)	$\bar{X}$, s $\bar{X}$, s	Black: -.27 White: -.18	-.22
Moffitt (1981)	$\bar{X}$, s	None	+.27
Mofidi (1980)	$\bar{X}$, s $\bar{X}$, s	Male: -.30 Female: -1.23	-.76

Studies Included in the Meta-Analysis (continued)

Study	Statistics Used	Within-Study $\Delta/\hat{\Delta}$	Study $\Delta/\hat{\Delta}$
Mueller (1975)	r	None	-.47
Myers (1983)	$\bar{X}$, s $\bar{X}$, s	Black: -.10 White: -.08	-.09
Nelsen & Maccoby (1966)	$\bar{X}$, s $\bar{X}$, s	Male: -.08 Female: -.18	-.13
Nielson (1971)	$\bar{X}$, s	None	-.06
O'Shields (1980)	r	None	-.31
Oshman (1975)	$\bar{X}$, s $\bar{X}$, s $\bar{X}$, s $\bar{X}$, s $\bar{X}$, s $\bar{X}$, s	Male military service: -.16 Female military service: +.55 Male death: -.69 Female death: +.03 Male divorce: -.05 Female divorce: -.27	-.10
Pedersen et al. (1976)	$\bar{X}$, s $\bar{X}$, s	Male: -.75 Female: -.19	-.47
Perry & Pfuhl (1963)	χ^2	None	-.12
Peterson et al. (1966)	r r	Black: -.97 White: -.64	-.80
Pleas (1976)	F F	Male: -.38 Female: -.14	-.12
Pringle et al. (1966)	χ^2 χ^2	Male: -.11 Female: -.10	-.10
Rees & Palmer (1970)	$\bar{X}$, s $\bar{X}$, s	Male: -.24 Female: -.12	-.18
Risen (1939)	χ^2	None	0.00
Rosenthal & Hansen (1980)	t t	Death: -.11 Divorce: -.14	-.12

(continued)

Studies Included in the Meta-Analysis (continued)

Study	Statistics Used	Within-Study $\Delta/\hat{\Delta}$	Study $\Delta/\hat{\Delta}$
Santrock (1972)	$\bar{X}$, s	Male death IQ: +.04	-.34
	$\bar{X}$, s	Female death IQ: +.12	
	$\bar{X}$, s	Male divorce IQ: -.19	
	$\bar{X}$, s	Female divorce IQ: -.06	
	t	Male death achievement: -.80	
	t	Female death achievement: -.44	
	t	Male divorce achievement: -.52	
	t	Female divorce achievement: -.83	
Santrock & Wohlford (1970)	F	Achievement: -.32	-.32
	F	GPA: -.32	
Saslow (1975)	$\bar{X}$, s	IQ: +1.01	+.75
	t	GPA: +.50	
Sciara (1975)	F	None	-.26
Sciara (1977)	ρ	None	-.31
Sciara & Jantz (1974)	F	None	-.28
Scott (1974)	$\bar{X}$, s	None	+.05
Seraydarian (1982)	$\bar{X}$, s	Death IQ: -.14	-.10
	$\bar{X}$, s	Divorce IQ: -.05	
	$\bar{X}$, s	Death achievement: +.14	
	$\bar{X}$, s	Divorce achievement: -.08	
	$\bar{X}$, s	Death GPA: -.18	
	$\bar{X}$, s	Divorce GPA: -.31	
Shelton (1968)	$\bar{X}$, s	Male IQ: -.58	-.72
	$\bar{X}$, s	Female IQ: -.58	
	$\bar{X}$, s	Male achievement: -.87	
	$\bar{X}$, s	Female achievement: -.30	
	$\bar{X}$, s	Male GPA: -1.46	
	$\bar{X}$, s	Female GPA: -.55	
Shilling & Lynch (1985)	$\bar{X}$, s	None	+.07
Simmons (1981)	t	Aptitude: -.36	-.24
	t	Achievement: -.18	
	t	GPA: -.17	

Studies Included in the Meta-Analysis (continued)

Study	Statistics Used	Within-Study $\Delta/\hat{\Delta}$	Study $\Delta/\hat{\Delta}$
Smidchens & Thompson (1978)	$\bar{X}$, s $\bar{X}$, s	Male: -.42 Female: -.39	-.40
Smilansky (1982)	$\bar{X}$, s $\bar{X}$, s $\bar{X}$, s	IQ: -.37 Achievement: -.17 GPA: -.28	-.27
Solari (1976)	$\bar{X}$, s $\bar{X}$, s	Male: -.18 Female: -.22	-.20
Solomon et al. (1972)	ρ	None	-.19
Southworth (1984)	$\bar{X}$, s	None	-.54
Stetler (1959)	$\bar{X}$, s $\bar{X}$, s	Black: -.37 White: -.27	-.32
Sutherland (1930)	$\bar{X}$, s	None	-.29
Sutton-Smith et al. (1968)	t t	Male: -.38 Female: -.07	-.22
Svanum et al. (1982)	$\bar{X}$, s $\bar{X}$, s $\bar{X}$, s $\bar{X}$, s	Black IQ: -.01 White IQ: -.26 Black achievement: -.21 White achievement: -.33	-.20
Thomas (1969)	$\bar{X}$, s $\bar{X}$, s	IQ: +.10 GPA: -.15	-.02
Thompson (1978)	$\bar{X}$, s	None	-.31
Thompson & Smidchens (1979)	$\bar{X}$, s $\bar{X}$, s	Male: -.44 Female: -.47	-.45
Veasey (1974)	$\bar{X}$, s	None	+.56
Voza (1984)	$\bar{X}$, s	None	-.86
Vroegh (1972)	$\bar{X}$, s	None	-.07

Studies Included in the Meta-Analysis (continued)

Study	Statistics Used	Within-Study $\Delta/\hat{\Delta}$	Study $\Delta/\hat{\Delta}$
Wadsworth et al. (1985)	$\bar{X}$, s	None	-.36
Waldron (1983)	F F	Achievement: -.41 GPA: 0.00	-.20
Wasserman (1972)	$\bar{X}$, s	None	-.24
Webb (1970)	r r	Achievement: -.16 GPA: 0.00	-.08
Weitz & Wilkinson (1957)	F F	Death: -.16 Divorce: -.24	-.20
Willerman et al. (1970)	$\bar{X}$, s $\bar{X}$, s $\bar{X}$, s $\bar{X}$, s	Black male: -1.90 Black female: -1.17 White male: -.33 White female: -.19	-.90
Wilson (1969)	$\bar{X}$, s $\bar{X}$, s	IQ: 0.00 Achievement: -.08	-.04
Woo (1981)	F	None	-.13
Zold (1975)	$\bar{X}$, s $\bar{X}$, s	Male: +.26 Female: -.06	-.10

Note. Δ = effect size computed from experimental and control group means and standard deviation of control group, $\hat{\Delta}$ = estimated effect size computed from F, t, r, ρ, or χ^2.