

THE RELATIONSHIP BETWEEN THREE FAMILY
CONFIGURATION GROUPS AND INTELLECTUAL PERFORMANCE
IN KINDERGARTEN CHILDREN

by

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ABSTRACT

The purpose of this study was to investigate the relationship between intellectual performance of kindergarten children and three family configuration patterns: only children, first- and second-born children in two-child families. Sixty male and female kindergarten children from a suburb of Victoria were the sample used for this study. The sample was represented equally with boys and girls. Ten children from each sex were selected for each family configuration group.

Intellectual performance was assessed through a short form of the McCarthy Scales of Children's Abilities Test. The test was administered individually to each subject, in sessions of approximately twenty minutes, by the researcher. The data were analyzed by a 3 x 2 analysis of variance to determine the differences in intellectual performance between the three family configuration patterns and two sexes. These variables were analyzed both separately and in combination.

The results indicated no significant differences between children in the three family configuration groups and intellectual performance. The performance of female subjects was significantly higher ($p=.006$) when compared to the performance of male subjects.

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DEDICATION

To my mother and father:
for your
never ending love and support.
Thank you.

CHAPTER I

INTRODUCTION

Statement of the Problem

There has been a considerable amount of research devoted to identifying variables which relate to intellectual performance of children. Several variables have been identified. This study will focus on the following: socio-economic status, birth order, family size and sex.

Socio-economic status has been found to be correlated to achievement. Researchers note that there are more children of high socio-economic status in high achievement situations and more children of low socio-economic status in low achievement situations (Hill & Giammateo, 1963; Marjoribanks & Walberg, 1975; Valendia, Grandon & Page, 1978).

Research involving birth order investigates the child's achievement and his birth position within the family. In a review of the literature, Bradley (1968) noted there was overwhelming evidence that male and female first-born and only children attended college in greater numbers than their later-born peers. Other researchers have noted the correlation between first-born children and high achievement (Adams & Phillips, 1972; Breland, 1973; Chittenden, Foan & Zweil, 1968; Glass, Neulinger & Brim, 1974; McGillicuddy-DeLisi & Sigel, 1979; Nisbet & Entwistle, 1967).

Family size research has presented conflicting results. There is evidence which indicates that children from smaller families

are higher achievers (Orshansky & Bretz, 1976; Touliatos, Lindhom & Rich, 1978). Only children are often seen to attain higher levels of achievement (Glass, et al., 1974; Laosa & Brophy, 1972). However, some studies have found only children to be less successful than children with younger siblings (Touliatos et al., 1978; Zajonc, 1976).

The sex of a child is often studied as a variable relating to academic achievement. The conclusions are contradictory. A higher level of achievement in males has been reported by several researchers (Fairweather & Butterworth, 1977; Graybill, 1975; Lawson, 1975). Higher academic performance has also been shown for females (Breland, 1974; Kaufman & Kaufman, 1973).

Based on past research findings, this study takes into consideration intellectual performance, socio-economic status, birth order, family size and subject's sex. While current research occasionally includes only children as a separate category, the more common practice of grouping onlies with first-borns often distorts research findings. Only children will be grouped separately from first and second-born children in this study. Research findings will undergo analysis for possible sex effects. Only middle socio-economic status subjects will be used to reduce the possibility of socio-economic status operating as a contributing variable to intellectual performance.

Purpose of the Study

It is the purpose of this investigation to study the relationship between (a) three family configuration patterns for groups of

kindergarten males and females who can be classified as:

- (1) only children
- (2) first-born children in two-child families
- (3) second-born children in two-child families

and (b) intellectual performance based on a short form of the McCarthy Scales of Children's Abilities (Kaufman, 1977).

The six subtests which will be used in this study are:

- (1) Puzzle Solving
- (2) Word Knowledge
- (3) Numerical Memory
- (4) Verbal Fluency
- (5) Counting and Sorting
- (6) Conceptual Grouping

This will involve segments of the Verbal, Quantitative, Perceptual-Performance, General Cognitive and Memory components of the McCarthy Scales of Children's Abilities Test. In addition, the sex of the subject, both within and isolated from the family configuration group, will be examined statistically to the intellectual performance measure. All subjects will be from middle socio-economic status families.

Definition of Terms Used in This Study

Birth order effect refers to the relationship between first-born children and high achievement with a sequential decline in achievement for later birth orders.

Family configuration groups include two components: the number of children in a family group and the child's birth order.

Intellectual performance will be based on the score assigned to an individual through intelligence and/or achievement testing. In the case of this study, scores from the McCarthy Scales of Children's Abilities Test will be used to indicate intellectual performance.

Significance of the Study

Research involving factors which may influence a child's intellectual performance are a prime concern to all educators. As the structure of families changes, educators must be aware of possible implications.

Statistics Canada (1976) has noted the following decrease in average family size:

<u>1961</u>	<u>1971</u>	<u>1976</u>
2.0	1.8	1.6

As these statistics do not include families without children, the number of one-child families has undoubtedly shown a proportional increase. In view of this trend, the comparison of only children to those with one sibling is, I feel, a timely topic.

The decrease in family size has important implications for educators. Lindert (1977) states that "family size results clearly imply that reductions in fertility would raise average achievement levels" (p.5). If the size of a child's family implies a significant relationship to intellectual functioning, then it is a factor of which all future researchers and educators should be aware.

While family sizes are decreasing, studies involving preferred family sizes have not shown the same pattern. In a survey of 2,414

American couples, Whelpton, Campbell and Patterson (1966) noted that the majority of parents favored two to four children while fewer than .4% stated an ideal of less than two children. A more recent study of 211 college students (Simon, 1976) found that the mean number of children preferred by male and female subjects was 3.09.

It is possible that the desire for larger families may be partially due to a lack of understanding of the social and intellectual implications for only children. Currently, studies involving only children present contradictory findings. Zajonc (1976) suggested that only children are less successful than first-borns and have the same disadvantage as last-borns. However, Faris (1940) felt that children isolated from their peers had more time to develop intellectually through books and greater contact with adults.

Some of the problems in the interpretation of research related to only children is the failure to treat only children as separate entities or to control for variables such as sex and socio-economic status. This study will take into consideration all these factors and, it is hoped, will add to a greater understanding of possible intellectual implications for only children.

This study will focus on beginning kindergarten children; an age when family influences are strong. Older children are more likely to be influenced by their peers, school and other variables.

Organization of the Study

This study is presented in five chapters. The first chapter

contains a statement of the problem, the purpose of the study, the definition of terms, the significance of the study and the organization of the study. The second chapter reviews the literature and research including studies involving primary children from various family configuration groups and their intellectual performance based on standardized intelligence and achievement tests. Chapter three outlines the procedures involved in the study and includes the hypotheses, pilot study, sample, testing instrument, study procedures and limitations. The fourth chapter is the results of analyses of the data. The final chapter is a summary, discussion of the results, implications and suggestions for further research.

CHAPTER II

REVIEW OF THE LITERATURE

For over a century, researchers have studied a number of variables and their relationship to achievement. One area that has received a significant amount of attention is that of sibling structure variables: number of children in a family, birth order, sex, sex of sibling, age and spacing between siblings. This review will focus on birth order and family size variables and their relationship to achievement as measured by standardized intelligence and achievement tests.

The majority of the studies involve only elementary aged children. Major studies in this area involving older individuals will also be cited. The review will be organized under the following headings: intellectual measures in relation to birth order and family size, achievement measures in relation to birth order and family size, related variables and the conclusion.

INTELLECTUAL MEASURES

Birth Order

There have been numerous studies investigating the relationship between birth order and intellectual performance. Several studies have noted higher intellectual performance for first-born children (Adams & Phillips, 1972; Belmont & Marolla, 1973; Laosa & Brophy, 1972; Marjoribanks & Walberg, 1975; Nuttall, Nuttall, Polit & Hunter, 1976; Olnek & Bills, 1977; Zajonc, 1976).

A study involving a large sample took place in the Netherlands (Belmont & Marolla, 1973). The data set was nearly 400,000 men, as almost the entire 19-year-old male population of that country was required to take the Raven Progressive Matrices Test to determine suitability for military service. Results indicated that within each family size category, first-borns scored higher than later-borns. For each family size, earlier-borns scored better than those in the adjacent birth order position in the next largest family. This gradient was found in 86% of the relevant comparisons and was highly significant ($p < 1 \times 10^{-13}$). The same pattern was also present across all social classes.

There appeared to be few studies involving the relationship of birth order and intellectual performance in young children. The only study located which involved kindergarten children and this relationship was done by Laosa and Brophy (1972). They tested 47 boys and 46 girls using the Thurstone Primary Mental Abilities Test. Results indicated that although first-born girls scored higher than other family groupings on the perceptual speed subtest, the results were not significant. Later-born girls scored significantly higher ($p < .013$) on the numerical subtest than first-born girls and first and later-born boys. This suggests that the birth order relationship may be sex specific. However, only children were grouped with first-borns for this analysis, and thus the results are not specific.

In a two year study involving fourth and fifth grade children, Adams and Phillips (1972) compared test results for two groups:

first-born and only children with children in all other birth order positions. Testing of intellectual ability involved the verbal and non-verbal components of the California Test of Mental Maturity. First-born students performed significantly higher ($p < .05$) than other birth orders on both test components. Again, the grouping procedures used in this study lead to unclear results as there was no differentiation between only and first-borns or between birth order positions other than first-borns.

Another study involving older elementary aged children was done by Marjoribanks and Walberg (1975). One hundred and eighty-five 11-year old boys from southern Ontario were given the Science Research Associates Primary Mental Abilities Test. Results indicated that ordinal position was significantly and negatively related at the .01 level to the verbal and number ability scores. However, this relationship did not exist for the reasoning and spatial portions of the test. These findings, along with those of Laosa and Brophy (1972) reported earlier, suggest that only certain components of intellectual abilities may be related to birth order.

Both males and females were included in a study involving IQ, measured by the California Test of Mental Maturity, and birth order (Cicirelli, 1976). The 603 subjects were 11 and 12-years-old and the correlation between birth order and IQ was $-.04$ ($p < .05$). The weakness of this relationship may be due, in part, to the homogeneous sampling involved as all subjects were students in a campus school.

Zajonc (1976) reviewed four studies which used large populations

and correlated intellectual measures with birth order and family size. The studies involved: 100,000 6-14-year-olds from France; 70,000 11-year-olds from Scotland, 800,000 high school graduates from the United States and 400,000 19-year-olds from the Netherlands. Intellectual measures included an IQ test by Gille, the Stanford-Binet, the National Merit Scholarship Examination and the Raven Progressive Matrices Test. Test scores were converted into standard deviation units for comparative purposes.

Zajonc concluded that first-born children scored higher on intelligence tests than later-born children when birth order intervals were short (averaging 44-45 months). However, with longer intervals (over 60 months), there were no such declines. Zajonc stated that, in general, long intervals between siblings enhanced intellectual growth.

Not all sibling structure studies noted a significant relationship between birth order and intellectual performance. Dandes and Dow (1969) administered the Lorge-Thorndike Intelligence Test to 134 males and females in Grades 1-7. They reported no indication that intellectual differences existed between first and later-borns.

Other studies noted a reverse birth order relationship. In a study involving 360 children early in their first year of school, the second-borns scored higher on the SRA Primary Mental Abilities Test than the first-borns (Koch, 1954). In addition, second-borns with a male sibling had higher test scores than those with a female sibling. There were no reported levels of significance.

In an attempt to understand better the effects of birth order by controlling for differences in family environment, sixth grade scores on the Otis-Lennon Mental Abilities Test were analyzed for 274 pairs of brothers (Olnek & Bills, 1977). This study was called the Kalamazoo Brothers Sample as it took place in the Kalamazoo School District. Regression analysis indicated that earlier birth order within a family was associated with only a .40 test advantage and was not significant. Test scores declined in birth orders second through fifth, however, they rose again for sixth and seventh-borns, declining again for the eighth-borns. The only significant differences were between second-third-borns and fourth-fifth-borns, however, the significance level was not reported.

Family Size

While research results related to birth order are inconsistent, the relationship between smaller families and higher intellectual performance has been consistently reported (Zajonc, Markus & Markus, 1979). In the study by Belmont and Marolla (1973) involving nearly 400,000 19-year-old men, results relating to family size demonstrated that as family size increased there was a decrease in test performance. This pattern was highly significant ($p < 1 \times 10^{-15}$).

In a study involving elementary aged children, 603 11 and 12-year-olds were tested by the California Test of Mental Maturity (Cicirelli, 1976). Cicirelli noted that as family size increased from two to seven children, the mean IQ declined. The correlation between family size and IQ was $-.11$ ($p < .01$).

The Kalamazoo Brothers Sample found that men from larger families (more than five children) tended to have lower test scores, less education, lower occupational status and lower earnings (Olnek & Bills, 1977). This effect was not reduced when birth order was controlled.

Svanum and Bringle (1980) tested 7060 children aged 6 to 11 with the vocabulary and block design subtests of the Wechsler Intelligence Scales for Children (WISC) as part of the Health Examination Survey. The results indicated that family size was a significant ($p < .10$) independent predictor of intellectual development accounting for 3% of the variance.

Further support for the inverse relationship of family size and IQ was found in a study of 3428 children between the ages of 6 and 11 (Steelman & Mercy, 1980) who were tested on the vocabulary and block design subtests of the WISC. In the below poverty group (less than \$4,000 annual family income), family size had a much stronger negative relationship with IQ ($-.23$) than the above poverty group ($-.13$).

The SRA Primary Mental Abilities Test was used in a study of 185 11-year-old boys from 20 elementary schools in Ontario (Marjoribanks, Walberg & Borgen, 1975). In this study, children with more siblings tended to score lower on the verbal and numbers ability tests ($p < .01$).

Three separate literature reviews have reached identical conclusions about the relationship between family size and intellectual performance. Anastasi (1956) reviewed 110 studies and concluded

that there was a negative relationship between IQ and family size. In his review of four major studies involving large samples, Zajonc (1976) found that intellectual performance decreased with increases in family size. More recently, Cicirelli (1978) confirmed this relationship in a review of 48 studies.

Thus, the inverse relationship between family size and intellectual performance has been strongly supported. In addition, the curve which demonstrates this relationship shows a continuous increase of intellectual performance for subjects as family sizes decrease (Zajonc, 1976). Therefore, one might assume that the smallest family size, one child, would show the greatest level of intellectual performance. However, research has shown that only children often score below children with siblings (Zajonc, 1976).

In addition, there are several problems relating to research involving only children. Marjoribanks and Walberg (1975) noted that because of difficulty in the classification of only children (they are oldest and youngest in a family), some researchers have omitted them from their analyses. Other researchers have grouped only children with first-borns (Adams & Phillips, 1972; Laosa & Brophy, 1972) or grouped onlies with two and three child families to make a small family group (Solomon, Hirsch & Scheinfeld, 1972).

In the Belmont and Marolla (1973) study of 400,000 19-year-old men, only children were the single deviation from the pattern of the smaller the family size, the higher the intellectual performance ($p < 1 \times 10^{15}$). The authors suggested that only children may

have represented the atypical family, as families of this size were uncommon at that time. Thus, the results for only children were withdrawn from further analysis.

In a reanalysis of the Belmont and Marolla data, Marjoribanks and Walberg (1975) confirmed that the scores for only children were lower than they would have predicted. They hypothesized that the only children in this sample may have been defective from birth, influencing the parents not to have other children.

Only children scored below children from a two-child family in the study by Cicirelli (1976). These results were also demonstrated by Steelman and Mercy (1980) in their study of 6 to 11-year-olds. Only children scored slightly lower (mean IQ = 90.46) on the Wechsler subtests than first borns for all family sizes, except for those larger than six children (mean IQ = 86.76) for all poverty status subjects.

However, only children scored slightly higher (mean IQ = 108.05) than first-borns in all family sizes in the above poverty status group. It was suggested that only children in a high socioeconomic status family had the advantages of unshared resources and time.

There are further contradictions regarding the intellectual performance of the only child. Marjoribanks, et al. (1975) found that 11-year-old boys who were only children performed better on the SRA Primary Mental Abilities Test. The mean verbal ability scores for onlies were higher ($p < .01$) than for children with one sibling. Considering that the children in this group were all

from a low socio-economic status group, this finding is a direct contradiction to the results of Steelman and Mercy (1980).

Other investigators have suggested that differences in the only child's intellectual performance may be related to sex. Laosa and Brophy (1972) found that only girls performed higher than did only boys on the Thurstone Primary Mental Abilities Test. However, these results may be misleading due to their grouping of onlies with first-born children.

Svanum and Bringle (1980) have suggested that the incongruous nature of results for the only child may be age related. In a study involving children aged 6 - 11, the only child performed less well on the WISC and the Wide Range Achievement Test (WRAT) than children in family sizes of two or three. However, this pattern was not present in the younger children, aged 6-7 years.

ACHIEVEMENT MEASURES

While the majority of studies involving an ability measure and birth order or family size appear to involve measures of intellectual performance, a few studies have used achievement tests as a measure of children's abilities. The following studies involve achievement measures and birth order.

Birth Order

A two year study of 370 fourth grade students involved, in part, two sections of the Metropolitan Achievement Test (Adams & Phillips, 1972). Results indicated that first-borns scored significantly higher ($p < .05$) than later-borns.

The Reading, Language and Mathematic sections of the California Achievement Tests, the averages of academic grades and two intelligence tests (Lorge-Thorndike, Kuhlman-Anderson) were combined in a study by Solomon, Hirsch, Scheinfeld and Jackson (1972). A significant birth order x family size relationship was noted ($p < .01$), yet there was no significant difference by birth order within large (six or more children) families.

The California Achievement Test was also used in a study by Toulaitos, Lindholm and Rich (1978). Six hundred thirty seven children in Grades 3 - 6 were involved. Considering ordinal position, middle children scored lower than all other birth orders. First-born, last-born and only children had similar scores. The probability levels for the findings related to the three subtests were .05 for Language, .01 for Reading and .05 for Mathematics.

Support for the birth order relationship was found in a sample of 300 eighth graders in suburban Chicago (Oberlander, Jenkin & Houlihan, 1970). An analysis of their scores on the Science Research Associates High School Placement Test indicated a significant main effect for birth order ($p < .01$) and a significant birth order x family size interaction ($p < .01$). In addition, the birth order effect was found to be greatest in larger families. It was found that the earlier a child's birth place within the family, the more successful he was on the test measure. This effect was not as evident between students in smaller families.

Family Size

The relationship between family size and achievement appears

to operate in much the same manner as the relationship between family size and intelligence. Smaller families are consistently correlated with higher performance on both types of measures.

Support for this relationship can be found in a study by Svanum and Bringle (1980). The study involved 7060 6 - 11-year-olds who participated in the Health Examination Survey. As part of the survey, all subjects were given the Arithmetic and Reading subtests of the WRAT. Results indicated that family size was a significant independent predictor of 2% of the variance in educational achievement.

The California Achievement Test was the measure given to 637 white children in Grade 3 - 6 in a study by Touliatos, Lindholm and Rich (1978). Children with smaller families scored higher than those from larger families. The results were significant at the .05 level. However, singletons scored lower than children with one or two siblings, equal to those with three or four siblings and above those with five or six children in one family.

A study involving black fifth grade children in a lower socio-economic status neighborhood in Chicago noted similar results: higher scores for smaller families (Solomon, et al., 1972). One hundred forty-nine subjects were grouped into three categories according to family size: small (1 - 3 children), medium (4 - 5 children) and large (6 or more children). Test measures included academic letter grades, the Reading, Language and Mathematic subtests of the California Achievement Test, the Lorge-Thorndike and the Kuhlman-Anderson Intelligence Tests. Achievement was based on

a loading of all the indices indicated. The means for the three groups were: small (39.58), medium (38.21) and large (37.16). The difference between large and small families was significant at the .05 level.

However, a study involving 98 black and 127 white first graders in rural North Carolina found no significance in the relationship between test scores on the Metropolitan Achievement Test and family size (Ashbury, 1973). Ashbury noted that the results may be confounded due to the sampling. Only the bottom two levels in a five level socio-economic status grouping were represented in this study.

RELATED VARIABLES

While birth order and family size variables generally appear to relate to achievement measures, there are other related variables which warrant consideration. These include: socio-economic status, sex, intellectual environment, family density, parental attention, need achievement and behavioral maturity. While these variables will be discussed below, they are not the only other variables which may be related.

Although the negative relationship between family size and intellectual ability appears to be well established, there is evidence to suggest that it is also linked to socio-economic status. Cicirelli (1978) noted that as socio-economic status increased the correlation between family size and IQ diminished. He concluded that family size need not limit intellectual performance if the family socio-economic status was high enough to give adequate nutrition to the children.

In her extensive review of research prior to 1956, Anastasi (1956) found that the negative relationship between intelligence and family size disappeared or became positive when subjects of a high socio-economic status were considered. Other studies have noted only a minimal relationship between family size and intellectual performance in high socio-economic families (Belmont & Marolla, 1973; Marjoribanks, Walberg and Borgen, 1975; Olnek & Bills, 1977; Steelman & Mercy, 1980; Zajonc, 1976).

There is some evidence which suggests that the negative relationship between family size and intellectual performance is sex specific. A number of studies which have noted this relationship involved male subjects exclusively (Belmont & Marolla, 1973; Marjoribanks, Walberg & Borgen, 1975; Olnek & Bills, 1977).

A study involving both males and females of mixed ages found that family size was a significant factor for males only (Nuttall, Nuttall, Polit & Hunter, 1976). In smaller families of two children, grades of males were higher compared with those in larger families. A combination of academic achievement and IQ scores were used in this study. This sex specific relationship was also found by Laosa and Brophy (1972).

Zajonc and Markus (1975) have developed a theory which calculates the "intellectual environment", based on family size and the length of intervals between the birth of successive siblings. In this equation, the intellectual level of each family member is averaged to find the level of the intellectual environment. Of course, as the children mature or the family size expands, the intellectual

environment changes. Older children seemed to create a high intellectual environment, while a newborn or younger child appeared to lower the intellectual environment. In addition, a larger interval between births seemed to create a higher intellectual environment. This equation can be related to evidence which suggested that there was a greater birth order effect when the intervals between children's births were longer (Zajonc, 1976).

Waldrop and Bell (1965) have developed a combination variable which is a complex mathematical formula to determine the Family Size and Density Index. This index involved the total number of children in a family, the time space between each child and the average time span between births. Their study noted child initiated contact with the teacher, in a research nursery school, correlated with the Family Size and Density Index at $-.53$. Future studies involving intellectual achievement and family size may find this index most useful.

A further variable related to the higher achievement of children from small families is the amount of parental attention available (Marjoribanks & Walberg, 1975). However, the number of children in a family would not be the only factor involved in the amount of parental attention available, nor would it explain the apparent lower performance of the only child who, by this theory, would have the greatest amount of parental attention.

Other related variables to have received consideration are need achievement and behavioral maturity. Falbo et al. (1977) measured need achievement by administering the Edward's Personal Preference

Scale to 1098 undergraduate students. Family size was found to be negatively related ($p < .10$) to achievement motivation.

A Behavioral Maturity Scale in which teacher's rated pupils' task oriented behaviors (persistence, desire for mastery and interest in reading) was administered to 686 boys and 580 girls in Grade 1 (Skovholt, Moore & Willman, 1973). Although the study did not control for family size, there was evidence that ordinal position effects appeared early in a child's academic career. Results of this study were that only males scored significantly higher than middle males ($p < .05$) and last born males ($p < .05$). There were no significant differences among the females. However, only females scored significantly higher than middle males ($p < .001$) and last-born males ($p < .01$). First-born females scored significantly higher than middle-born males ($p < .001$) and last-born males ($p < .001$). While only male and females scored higher than those children with siblings, the results did not reach significance.

Cicirelli (1978) suggested a further reason that the only child frequently scored lower on achievement measures. He thought that one child families may have been atypical since "they contain a larger than usual representation of broken homes and mothers and/or children with medical problems" (p.368).

However, only children are becoming less atypical. As mentioned in Chapter I, Statistics Canada (1976) showed a steady decline in the number of children per family and a corresponding increase in one child families.

While there are several variables related to family configuration research which require consideration, there are also factors which make across study comparisons of this nature difficult. These difficulties include differences in ages, measures and populations (Cicirelli, 1976). This review has attempted to consider both related variables and comparison difficulties.

Summary

In their review of the literature, Zajonc, Markus and Markus (1979) stated that the relationship between family size and intellectual functioning is consistently reported. However, birth order effects within family sizes remain inconsistent. The review presented in this chapter seems to confirm the statements of Zajonc et al. for both intellectual and achievement measures.

Zajonc, et al. (1979) have hypothesized that the resolution to the birth order puzzle may lie in the problems due to the changes in family patterns. Singletons and last borns were the only groups not affected by the addition of siblings and thus a change in the family configuration pattern.

The same authors maintained that birth order inconsistencies may be explained by the comparison of different age samples. Although Zajonc, et al. (1979) were able to locate only two studies conducted with children under three, first-borns showed superior performance at this age. In the three to ten year age group, they found that second-borns more often had higher test scores relative to first-borns. The study by Koch (1954), described earlier, was an example of this relationship.

Between ages 11 - 13 years, mixed findings were reported and thus this period was labelled the "cross over years." In children over 14 years of age, first-borns consistently excelled over second-borns.

This age specific birth order effect was also noted by Steelman and Mercy (1980). They concluded that where there was no birth order effect, the children were elementary aged and studies where the effect was significant, older teenagers or adults were the sample. The inconsistent birth order findings may, in part, be due to an age specific birth order effect.

In conclusion while the relationship between an intellectual or achievement measure and family size appears in the literature quite consistently, birth order effects are inconsistent. Studies involving the only child are limited, often difficult to interpret due to sampling techniques and have produced conflicting results.

Only children are entering schools in increasing numbers. Their background appears to be related to intellectual or achievement measures in a unique way. Studies involving birth order and only children using kindergarten children are extremely limited. Further research in these areas is necessary to assist in the understanding of the intellectual development of today's children.

CHAPTER III

STUDY DESIGN AND PROCEDURES

Introduction

The study involved a comparison of the intellectual performance of only, first- and second-born kindergarten children. This chapter will include: the pilot study, the sample, testing instruments, hypotheses, procedure, limitations of the study and a summary.

Pilot Study

A pilot study was undertaken at Hans Helgesen Elementary School, School District #62 (Sooke), during March 1982. The pilot study provided the researcher with test administration experience, timing guidelines and an awareness of any potential problem areas. Also, the pilot provided scoring practice.

After parents' permission were obtained, a short form of the McCarthy Scales of Children's Abilities Test (Taylor, Slocumb & O'Neill, 1979) was administered to six kindergarten children. In order to include the possible range of children's abilities and children's reactions to the test, two children were chosen from each ability level: high, medium and low. These children were selected by the experienced classroom teacher.

The pilot test results were not analyzed statistically. It was noted that a broad range of scores was elicited and these corresponded to the teacher's perceived ability level for each child.

A different short form of the McCarthy Scales of Children's

Abilities (Kaufman, 1977) was located. The Kaufman short form involved three subtests which were not part of the Taylor, Slocumb, and O'Neill short form: Puzzle Solving, Word Knowledge and Conceptual Grouping. The three new subtests were also administered to the pilot sample.

The Sample

In April 1982, five schools in School District #62 (Sooke) were selected to participate in this study. The selection was based on the schools' location in a suburban core with the majority of the homes in the middle price range. House prices were based on listings found in Real Estate Victoria (1982).

Each school was visited by the researcher and the study explained to the principal and the kindergarten teacher. After the five schools were visited, it became apparent that it would be necessary to include more schools in order to obtain the number of children with the characteristics required.

All elementary schools in the Sooke District, with the exception of those in isolated areas, were invited to participate in May 1982. In June 1982, kindergarten teachers were addressed by the researcher at a meeting during which the study was explained and test materials were on display.

In September 1982, all participating schools received parent information letters and family background questionnaires. A copy of each of these forms is located in the Appendix. The parent information letters were sent home with the parents of potential

subjects. The letters provided information regarding the study and a permission form.

The family background questionnaires were filled out by the kindergarten teachers for families with only children or children with one sibling. The following information was obtained: the number of siblings and the number of adults in the home, estimated socio-economic status, and other relevant information such as preschool background (more than six months) and any medical problems. The estimated socio-economic status, based on parents' occupation, involved three levels. The following is a sample of the guidelines used to determine socio-economic status:

- 
- high - president - large corporation
 highly paid professional - doctor, lawyer
 - middle - middle manager
 middle paid professional - teacher
 skilled or semi-skilled worker - carpenter
 - low - on welfare
 unemployed - longer than six months.

The family background questionnaires and permission forms were then sent to the researcher.

A grid was prepared to determine the number of potential subjects in each family configuration group. As there were not enough children in the only child category (for both males and females), three additional schools in the Sooke area were contacted. With the inclusion of these schools, there were enough children to complete all family configuration groupings. Eleven elementary schools and eighteen kindergarten classes participated in this study.

From a total of 88 potential subjects, 60 were chosen for testing. At least 10 potential subjects were eliminated due to: low or high parent socio-economic status, only one parent in the home or extensive preschool background (more than one year).

Each group was also compared according to subjects' age. Every attempt was made to minimize the age spread between the six family configuration groupings. The maximum range in age between the first-born girls and the second-born boys was 2.8 months. Within each family configuration group, the boys' average age was less than the girls'.

Male and female average ages were also calculated for each family configuration group. The maximum range in the combined ages was between the first-borns and the second-borns with a spread of 1.2 months. The number of subjects and their average age for each family configuration group is shown in Table 1.

The final selection procedure involved making a second grid of potential subjects for each school and organizing a combination which would give a total of 10 subjects for each family configuration category with a minimal difference in age between groups. With the exception of one large elementary school, no more than six subjects from the same family configuration group were selected from one school. Children not selected were available as alternates. During the study, there were two absences and two alternates were used in their place.

After the sample had been established, the children were listed by school name rather than family configuration group until

Table 1
 Number of Subjects, Subjects' Average Age
 in Months and Family Configuration Groups
 by Sex

	Only Children	First-Born Children	Second-Born Children	Total
Girls - Number	10	10	10	30
- Average Age	64.1	65.2	63.8	64.4
Boys - Number	10	10	10	30
- Average Age	63.4	63.4	62.4	63.1
Total - Subject No.	20	20	20	60
Average Age in months	63.75	64.30	63.1	63.7

after the testing. This was to eliminate the possibility of experimenter bias.

Testing Instruments

The McCarthy Scales of Children's Abilities (MSCA) Test was designed to determine the intellectual ability of young children. It is appropriate for children aged 2.5 to 8.5 years (McCarthy, 1972). The MSCA Test involves 18 subtests which have been grouped into six scales: Verbal, Perceptual-Performance, Quantitative, General Cognitive, Memory and Motor.

The Eighth Mental Measurements Yearbook (1978) cites several reviewers who reacted positively to the MSCA. Jane Hunt stated that the MSCA Test "offers a general intelligence score comparable to those of the Binet and the WPPSI" (p.311). Everett E. Davis summarized the qualities of the MSCA Test by saying: "This is probably the best test that has been devised so far for testing the mental ability of young children" (p.314). A study by Phillips, Pasewark and Tindall (1978) found that the MSCA correlated .74 with the WPPSI Full Scale IQ and .71 with the Columbia Mental Maturity Scale.

There are several other positive psychometric features of the MSCA. There was no reported racial discrimination between the test results of black and white children (Kaufman & Kaufman, 1975). There was no significant difference between the mean General Cognitive Index scores obtained by boys and girls (Kaufman & Kaufman, 1973). In addition, the predictive validity of the MSCA Test on

first grade achievement were of the same overall magnitude as the Stanford-Binet and the WPPSI (Kaufman, 1973).

One disadvantage of the MSCA Test was the long administration time (1 to 1.5 hours) necessary for each individual subject. One solution to a lengthy test has been the development of a reliable short form (Kaufman, 1977). Reliable short forms for the WISC (Enburg, Rowley, & Stone, 1961; Kaufman, 1976) and the WPPSI (Kaufman, 1976) have already been developed. At least two short forms of the MSCA Test have been developed (Kaufman, 1977; Taylor, Slocumb, & O'Neill, 1979).

The short form devised by Taylor, Slocumb and O'Neill (1979) involved the following sub-tests: Counting and Sorting, Pictorial Memory, Number Questions, Verbal Fluency, Numerical Memory and Tapping Sequence. Only four of the six McCarthy Scales were included in this short form.

The Kaufman (1977) Short Form involved five of the six McCarthy Scales including: the Verbal, Perceptual-Performance, Quantitative, General Cognitive and Memory. The only scale that is not represented is the Motor Scale. The Kaufman short form involved the following sub-tests Word Knowledge I and II, Verbal Fluency, Numerical Memory I and II, Conceptual Grouping, Counting and Sorting and Puzzle Solving.

The Kaufman short form was selected for the final study for ease of administration and interpretation. In addition, the correlations between the Kaufman short form and the General Cognitive Score of the McCarthy Test for 5 and 5½ year olds were .92 and .93 respectively (Kaufman, 1977).

Hypotheses

The level of significance for the following hypotheses was set at .05. The hypotheses are as follows:

- H₁: There will be no significant differences among the means of children from one-child families and the first and second-born children from two-child families as measured by a short form of the McCarthy Scales of Children's Abilities.
- H₂: There will be no significant differences among the means of male and female children from one-child families and the first and second-born children from two-child families as measured by a short form of the McCarthy Scales of Children's Abilities.
- H₃: There will be no significant differences among the means of male and female children as measured by a short form of the McCarthy Scales of Children's Abilities.
- H₄: There will be no significant differences among the means of each sub-test of male and female children from one-child families and the first and second-born children from two-child families as measured by a short form of the McCarthy Scales of Children's Abilities.
- H₅: There will be no significant differences among the means of each sub-test of children from one-child families and the first and second-born children from two-child families as measured by a short form of the McCarthy Scales of Children's Abilities.
- H₆: There will be no significant difference among the means of

each sub-test of male and female children as measured by a short form of the McCarthy Scales of Children's Abilities.

Procedure

In September 1982, the subjects were selected, a schedule was prepared and the testing began. In each kindergarten classroom, the researcher began with a group activity to establish rapport with the students. Two action songs were used as the group activity.

The subjects were then individually requested to leave the room with the researcher to play some further games. In each school, the testing was done outside the classroom in a place as quiet and as free from interruption as possible.

The tests were done in the following order:

Puzzle Solving - a series of jigsaw puzzles from easy to complex.

Scores were based on the number of correct joins with some bonus points for speed. The puzzles involved a cat and a cow (two pieces each), a carrot (three pieces), a pear (three pieces), a bear (six rectangular pieces) and a parrot (six pieces of differing geometric shapes).

Word Knowledge - the identification of pictures and the definitions of words. The pictures the child was asked to identify were: an apple, a tree, a house, a woman and a cow. The words presented for definition were: towel, coat, tool, thread, factory, shrink, expert, month, concert and loyal.

An example of the questioning used would be: What is a towel? or Tell me what a towel is used for. For each word, two points were given for a good synonym or a complete response. One point was given for a vague or incomplete response.

Numerical Memory - the child was asked to repeat a sequence of numbers in a progressively longer series. An example of the questioning would be: Say 5-8. If the child's repetition was correct on the first trial, he scored two points. If he was not correct on the first trial, he was presented with a second set of numbers of the same length. Subjects who repeated the numbers in the second trial correctly were awarded one point. The examiner proceeded to a series of numbers longer by one digit which was presented in the same manner. Subjects who were unsuccessful on the second trial did not continue to the longer series of numbers.

The second part of this test involved the repetition of numbers in a backwards order. For example, the examiner would say 3-5 and the subject would be required to respond by saying 5-3. Scoring was handled in the same manner as the first part; with two points for a successful answer on the first trial and one point for success on the second trial.

Verbal Fluency - the child was asked to list items from a particular category in a 20 second time limit (e.g. Tell me all the things you can eat). One point was given for each item named up to a maximum of nine points for a single category. The three other categories used were: animals, things to wear and things you can ride on.

Counting and Sorting - ten blocks were used in number tasks such as counting and dividing. An example of counting task would be: Take two blocks. Take three more blocks. How many do you have? An example of a dividing task would involve four blocks and two rectangular pieces of cardboard. The child would be asked to put some blocks on each card and to be sure the same number of blocks were on each card. One point was given for each correct response.

Conceptual Grouping - multi-coloured plastic pieces in a variety of sizes and shapes were used in activities involving sizes, shapes and groupings. Examples of a task with a maximum score of one would be: Show me the little one. Show me the red one. Find the square one. In these tasks, only certain plastic pieces were used.

Examples of a task with a maximum of two points would be: Find all the square ones. Find all

the big yellow ones. Which two pieces go best with the ones on the card? For these tasks, a subject could score one point for a partially correct response.

Test administration time averaged approximately twenty minutes for each subject.

After the testing session, the subject was taken back to the classroom and another subject was withdrawn for testing. With the exception of one female student, all subjects participated willingly in all the activities. The one child who refused to leave the room for the testing was withdrawn from further study.

Limitations of this Study

The results of this study must be interpreted in view of the following limitations:

1. Conclusions from this study are not necessarily applicable to other groups of kindergarten children. The majority of the schools from which the subjects were drawn were suburban areas of Victoria and may or may not be comparable to similar suburban areas. However, it was necessary to include four schools from areas outside the suburban core. In addition, four subjects were from a school located on a Canadian Armed Forces Base.

2. Although an attempt to control for socio-economic status was made, the definition of middle class used in this study was broad. In addition, teachers were asked to use their judgment to assign the socio-economic status category based on their knowledge

of the family and the parents' occupations. In some cases, information regarding parents' occupations was not readily available.

3. It was not possible to control adequately for the amount of day care or preschool experience for each subject. Although some children were eliminated from the study due to a lengthy attendance (over one year) at a day care or preschool: (a) this information was not available to all classroom teachers; and (b) exclusion of all children with extensive day care or preschool experience would have severely limited the population. The British Columbia Kindergarten Needs Assessment surveyed the number of children who attended preschool prior to kindergarten. Over eighty percent of the responding teachers stated that fifty percent of their kindergarten class had attended preschool (Mayfield et al., 1981).

4. The initial group interaction time between subjects and the researcher in the kindergarten class was shorter than desired (between 5-15 minutes). This was necessary to accommodate the number of subjects required in the time available.

5. The results may only be relevant for kindergarten children beginning the school year with similar family configuration backgrounds to subjects in this study. After one year of school experience, the results may be different than those reported.

6. Although the short form of the McCarthy Scales of Children's Abilities Test has a correlation of .93 with the entire McCarthy Test for this age group, results may have been different if the entire test had been administered to each subject. Time limitations prevented the administration of the entire test to each individual.

7. A random selection of children may have been more desirable for this study. For reasons of a limited population and time, the sample was chosen in the manner described above.

8. While the majority of the children were tested in the morning, there were some children tested in the afternoon. This factor may have affected test performance for some children.

9. Although mean ages were calculated for each family configuration group and an attempt was made to equalize ages for all the groups, the males were younger than the females in each family grouping. Greater control over the ages of participating subjects would have been most desirable. This was not possible due to the limited number of children with the characteristics required in the School District used in this study.

10. For those subjects who had a sibling, the sex of that sibling was not considered. With the limited number of children available, it was not possible to control for this variable.

11. There are other differences in the subject's background that may have contributed to his intellectual performance on the McCarthy short form. It was not possible to control for variables other than those previously discussed.

Summary

Sixty kindergarten children were individually tested by a short form of the McCarthy Scales of Children's Abilities Test (Kaufman, 1977). Subjects were selected from three family configuration backgrounds: only children, and first- and second-born children

from two-child families. There were ten males and ten females in each group. The study compared the test results of males and females in each family configuration group.

CHAPTER IV

RESULTS OF ANALYSES OF DATA

Introduction

This study investigated the relationship between the intellectual performance and family configuration of only children and first- and second-born children in two-child families. The three family configuration groups and two sex classifications were the independent variables. Intellectual performance, based on a short form of the McCarthy Scales of Children's Abilities Test (Kaufman, 1977), was the dependent variable.

The results of the study were analyzed using a 3 x 2 analysis of variance. The results of the analyses of variance are shown on Table 2. This chapter will include findings related to the hypotheses, results of the analyses of variance and a summary.

Findings Related to the Hypotheses

The analysis of variance on the McCarthy Scales of Children's Abilities Test scores between the three family configuration patterns showed no significant differences. This led to the acceptance of Hypothesis 1:

There will be no significant differences in intellectual performance among the means of children from one-child families and the first- and second-born children from two-child families as measured by a short form of the McCarthy Scales of Children's Abilities.

The results of the analysis of variance are presented in Table 2.

The analysis of variance on the McCarthy Scales of Children's Abilities Test scores between males and females in three family

Table 2
 Analysis of Variance on the MSCA Test
 Scores Between Male and Female Kindergarten Children
 from Three Family Configuration Patterns

Sub Tests of the McCarthy Scales of Children's Abilities Test	Sources of Variance					
	Sex		Family		Sex x Family	
	F1, 54	P	F2, 54	P	F2, 54	P
Puzzle Solving	2.31	.13	.56	.57	.59	.56
Word Knowledge	5.51	.02	.11	.90	1.57	.22
Numerical Memory	4.69	.03	.30	.74	4.08	.02
Verbal Fluency	3.85	.06	1.27	.29	.03	.97
Counting & Sorting	8.23	.01	1.19	.31	1.29	.28
Conceptual Grouping	3.63	.06	1.46	.24	.65	.53
Total for 6 tests	8.33	.006	.05	.95	1.34	.27

configuration patterns showed no significant differences. This led to the acceptance of Hypothesis 2:

There will be no significant differences in intellectual performance among the means of male and female children from one-child families and first- and second-born children from two-child families as measured by a short form of the McCarthy Scales of Children's Abilities.

The results of the analysis of variance are presented in Table 2.

The analysis of variance on the McCarthy Scales of Children's Abilities Test scores between males and females showed a significant ($p = .006$) difference. Hypothesis 3 was not accepted:

There will be no significant differences in intellectual performance among the means of male and female children as measured by a short form of the McCarthy Scales of Children's Abilities.

The results of the analysis of variance are presented on Table 2.

The analysis of variance on the McCarthy Scales of Children's Abilities Test scores between each sub-test for male and female children in three family configuration patterns showed no significant differences in five of the six sub-tests. The difference was significant only for Numerical Memory ($p = .02$). Hypothesis 4 was not accepted:

There will be no significant differences in intellectual performance among the means of each sub-test of male and female children from one-child families and the first- and second-born children from two-child families as measured by a short form of the McCarthy Scales of Children's Abilities.

The results of the analysis of variance are presented in Table 2.

The analysis of variance on the McCarthy Scales of Children's

Abilities Test scores between each sub-test and the three family configuration patterns showed no significant differences. This led to an acceptance of Hypothesis 5:

There will be no significant differences in intellectual performance among the means of each sub-test of children from one-child families and the first- and second-born children from two-child families as measured by a short form of the McCarthy Scales of Children's Abilities.

The results of the analysis of variance are presented in Table 2.

The results of the analysis of variance on the McCarthy Scales of Children's Abilities Test scores between each sub-test for male and female children in three family configuration patterns showed that the differences were not significant at the .05 level for Block Puzzle Solving and Conceptual Grouping. The differences were significant for Word Knowledge ($p = .02$), Numerical Memory ($p = .03$), Verbal Fluency ($p = .05$), Counting and Sorting ($p = .006$). Hypothesis 6 was not accepted:

There will be no significant difference in intellectual performance among the means of each sub-test of male and female children as measured by a short form of the McCarthy Scales of Children's Abilities.

The results of the analysis of variance are presented in Table 2.

Summary

The results of the statistical analyses of this study were:

1. There was no significant relationship between the family configuration groups described in this study and intellectual performance as measured by the MSCA Test.

2. The sex of the subject combined with his family configuration group was not significantly related to his intellectual performance.

3. There was a significant ($p = .006$) difference between the performance of male and female subjects. Female subjects scored higher than males on the total test.

4. The combination sex and family configuration analysis showed no significance, except on the sub-test Numerical Memory ($p = .02$).

5. There were no significant differences between family position in any of the sub-tests.

6. Significant differences between male and female performances on four of the six sub-tests were found. On four sub-tests (Word Knowledge, Numerical Memory, Verbal Fluency and Counting and Sorting), the females scored higher than the males.

CHAPTER V

SUMMARY AND CONCLUSIONS

This study investigated the relationship between intellectual performance and children who are: only children, first- or second-born children in two-child families. Using a 3 x 2 analysis of variance, six hypotheses were tested. The results indicated that intellectual performance was not significantly related to either family size or the child's position within the family. Intellectual performance related significantly ($p = .006$) to the subject's sex, with female subjects scoring higher than males. This chapter will discuss the results of the study and present implications and suggestions for further research.

DISCUSSION OF THE RESULTS

The relationship between intellectual performance and three variables was investigated. The variables were: family size, birth order and sex. The relationships between intellectual performance and each variable tested will be discussed below.

Family Size

Based on a number of large scale samples, there seems to be a relationship between children in smaller families, higher ability and achievement (Cicirelli, 1978). However, research results relating to the smallest family size, one child, have shown conflicting results. Only children have been found to show either higher (Glass, et al., 1974) or lower (Zajonc, 1976) intellectual performance than children with one or more siblings. The results of this study

indicated no significant difference in intellectual performance between kindergarten children who were only children and children in two-child families.

The majority of studies which indicated that only children differ significantly in intellectual performance, compared to children with siblings, involved older children. Thus, it is possible that this relationship may be age specific. This suggests that kindergarten children who are only children do not differ significantly from children with siblings. However, differences in intellectual performance may appear as the only child matures. The questions which require further investigation are: (a) When does the change in intellectual ability between only children and children with siblings occur? (b) What is the nature of the relationship? and (c) How can we use this knowledge to further the intellectual development of all children?

Birth Order

The relationship between first-born children and high achievement appeared to be well supported in the literature (Adams & Phillips, 1972; Breland, 1973; Chittenden, et al., 1968; Glass, et al., 1974; Nisbet & Entwistle, 1967). However, the majority of birth order studies involved older adolescents or adults rather than young children. The significance of birth order in relation to intellectual performance in kindergarten children was analyzed in this study.

Results indicated no significant difference in the MSCA short

form test results between children in different birth orders, except in one sub-test. There appeared to be a significant ($p = .02$) interaction between the sex and family configuration variables on the Numerical Memory sub-test. The finding that only certain segments of intellectual ability may be related to birth order was consistent with previous research (Laosa & Brophy, 1972; Marjoribanks & Walberg, 1975).

The interpretation of research relating to birth order became more complex when the implications of the last-born child were considered. In this study, the second-born child was also the last-born child. However, in families of three or more children, the second-born child would be a middle child.

Sutton-Smith and Rosenberg (1970) have suggested that rather than first-born children being superior, middle children are neglected relative to first-born and last-born children. They noted that this effect would not be present in two-children families because the oldest child may benefit from being the oldest and the youngest may benefit from being the baby. Further research involving birth order with young children in larger families is necessary to clarify this relationship.

Sex

A higher level of cognitive functioning in males has been reported by several researchers (Fairweather & Butterworth, 1977; Graybill, 1975; Lawson, 1975). However, the majority of the studies noting this relationship involved older adolescents and adults. This study also investigated the relationship between sex and the intellectual performance of kindergarten children.

The results of this study indicated that females performed significantly ($p = .006$) higher than males. This relationship was noted on total test scores and four of the six sub-test scores. Higher achievement for females in the early years of school has also been noted by Stone & Church (1973).

It appears that the sex effect is also age related (Zajonc, et al., 1979). The research done in the early school years showed females to be predominantly more successful than males and the later school years showed males to be higher achievers than females. In addition, there is some evidence to indicate that sex differences may widen as age increases with males scoring increasingly higher than females on tests of intellectual and academic achievement (Graybill, 1975).

Implications and Suggestions for Further Research

Further research investigating the relationship between family configuration groups and intellectual performance could consider the following suggestions:

1. The subjects in this study were all selected from one suburban area. Further research could also include children from city and rural settings.

2. The assignment of socio-economic status to families in this study was by the teachers' judgment with a limited knowledge of the family background. As socio-economic status has been found to be positively related to intellectual performance (Cicirelli, 1978; Zajonc, 1976), the use of a standardized instrument based

on a more extensive knowledge of the child's family background would be recommended.

3. Because the majority of kindergarten children in British Columbia may have experienced day care or pre-school prior to entering kindergarten (Mayfield et al., 1981), this factor must be carefully controlled for in future studies.

4. It is possible that the test results of some children may have been influenced due to their unfamiliarity with the researcher. A longer (one hour or more) interaction time between the subjects and the researcher prior to testing would be recommended.

5. The test results presented may only be applicable to beginning kindergarten children. Therefore, a longitudinal study would be recommended to determine the nature of these relationships as the subjects' ages increased.

6. The test instrument used in this study was a short form of the McCarthy Scales of Children's Abilities Test. It would be recommended that future researchers administer the entire test or one of the more reliable tests such as the WPPSI or Stanford-Binet.

7. It was not possible to select subjects randomly for the various family configuration groups in this study due to the requirements for each group and the limited population. It is suggested that a larger population be used in future studies to allow for a more random selection of subjects to groups.

8. It is possible that test results may have been influenced by the time of day during which the testing took place. It is

recommended that a future study test all subjects at the same time of day (i.e. morning or afternoon) or randomly test one-half of the subjects of each group in each of the time periods.

9. Due to the limited sample, it was not possible to control adequately for age between the groups. It would be recommended that future studies match all groups by age.

10. Future researchers could include a larger number of subjects.

11. Koch (1954) and Schoonover (1959) have found that children with a brother score higher than children with sisters on tests of intellectual and school achievement. Future studies could consider sibling gender when compiling groups of children with siblings.

12. It is possible that the test used in this study may not have been appropriate. The test may not have been sensitive enough to detect possible areas of difference between the three family groupings. Future researchers might choose a different testing instrument.

13. The results of this study may have been influenced by other factors such as parents' age or education. These are two variables which future researchers might try to control.

Conclusions

Research relating to family configuration patterns and intellectual achievement has produced mixed results. There seems to be a relationship between children from smaller families and higher achievement (Cicirelli, 1978). However, research relating to the smallest family size, the only child, suggest he or she may perform

either higher (Glass, et al., 1974) or lower (Zajonc, 1976) in intellectual achievement than children with siblings. As the number of only children has increased, future research is needed to help educators understand the special factors related to their situation.

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APPENDIX

FOR TEACHERS' USE ONLY

QUESTIONNAIRE

Child's Name _____ School _____

JUST CIRCLE THE APPROPRIATE CATEGORY FOR EACH SECTION.

1. Family Structure This child is an only child
 the oldest child in a two child family
 the youngest child in a two child family

If the child is in any other category (3 or more children in the family)
 the form need not be completed.

2. Sex male
 female

3. Number of parents
 (living in home) one two don't know

4. Socio-Economic Status high middle low

(This is based on parents' occupation. Use your judgment and only circle
 high or low if extreme)

Examples for socio-economic status category:

high - president - large corporation, highly paid professional (doctor, lawyer)
 middle - middle manager, middle paid professional (teacher), skilled
 or semi-skilled worker (carpenter)
 low - on welfare, unemployed (longer than 6 months)

5. If you know that there are more than two adults living in the home or
 the child has experienced formal daycare for more than six months,
 please note below:

Please return in District mail bag by Friday, September 17 with signed
 permission letters.

Thank you so much for your assistance.

Dear Parents:

I have almost completed my Master's degree through the University of Victoria and am now working on my thesis requirement. For my study, I will be administering a short form of the McCarthy Scales of Children's Abilities Test to sixty kindergarten children in School District #62 (Sooke). The test activities will be done individually and will take approximately fifteen minutes.

Your child may have an opportunity to participate in this project. Please be assured that:

- a) all results will be kept confidential. However, if you wish to be informed of the results, please make a note on the form below.
- b) individual test scores will not be analyzed in any way. I am only interested in group results.

The project has the approval of the Sooke School District and the University of Victoria.

I would appreciate your signing the permission form below and returning it to school as soon as possible. If you have any further questions, please do not hesitate to contact me at home (658-1317, evenings) or at school (478-3431, after 2:30).

Thank you for your co-operation.

Sincerely,

(Miss) Debbie Wolfe,
Curriculum Co-ordinator
Hans Helgesen Elementary

PLEASE RETURN THIS FORM BY THURSDAY, SEPTEMBER 15th.

_____ (Child's Name) of _____ (School)

has my permission to be involved in this project as outlined. I understand that not all children who are able to participate will be tested due to the limited number of tests required.

(Parent Signature)

VITA

Surname: WOLFE Given Names: Deborah Lynn

Place of Birth: Chilliwack, B.C. Date of Birth: Dec. 26, 1952

Educational Institutions Attended, with Dates of Entering and Leaving:

UNIVERSITY OF BRITISH COLUMBIA 1970 to 1975

UNIVERSITY OF VICTORIA 1979 to 1982

_____ to

Degrees, Diplomas, Etc., Awarded, with Dates and Names of Institutions:

B.Ed. (Elementary) 1975 University of British Columbia

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Title of Thesis/Dissertation

An Examination of the Relationship Between Three Family

Configuration Patterns and Intellectual Performance of

Kindergarten Children

Author


Signature

Deborah Lynn Wolfe

Name

December 1, 1982

Date