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The Effect Of Gender And Birth Order On Reading And
Mathematics Achievement Among
Third Grade Students

by
Laurie D. Rosenberg-Asch

A Thesis

Submitted in partial fulfillment of the requirements of the
Master of Science Degree in the Graduate Division
of Rowan University
July 3, 1997

Approved by

Date Approved

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ABSTRACT

Laurie D. Asch, *The Effect of Gender and Birth Order on Reading and Mathematics Achievement Among Third Grade Students*, 1997, Dr. Randall S. Robinson, Master of Science in Teaching, Rowan University.

The purpose of this study was to determine that there was no significant correlation between the effect of gender and birth order on reading and mathematics achievement among third grade students.

The sample in this study consisted of students in a third grade class, in a public elementary school in a suburban school district in southern New Jersey. The sample was comprised of forty randomly selected students from two third grade classes in the school. Twenty students were female, and twenty students were male.

Interim report cards were used as the instrument to determine achievement in reading and mathematics. The determination of birth order ranking was obtained by asking the students where they fit in order of their siblings.

A chi square table was used to analyze the data, and determine if there was a significant relationship between gender, birth order and achievement in reading and mathematics.

The results of this study indicated that there was no correlation between the effect of gender and birth order on reading and mathematics achievement among third grade students. Therefore, the null hypothesis cannot be rejected.

MINI-ABSTRACT

Laurie D. Asch, *The Effect of Gender and Birth Order on Reading and Mathematics Achievement Among Third Grade Students*, 1997, Dr. Randall S. Robinson, Master of Science in Teaching, Rowan University.

This study determined if there is a significant relationship between the effect of gender and birth order on reading and mathematics achievement among third grade students.

The results of this study indicated that there is no significant correlation between the effects of gender and birth order on reading and mathematics achievement.

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The late Norman J. Rosenberg, my father, and the late Raphael D. Asch, my father-in-law, who in times of despair smiled down upon me and gave me the courage to go on.

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Chapter I

SCOPE OF THE STUDY

Introduction

Most adults do not consider how birth order effects them academically. There are researchers who believe that birth order positioning, regardless of gender is irrelevant to academic success. There are other researchers who take gender into account when looking into birth order achievement relationships, and feel that influential factors do exist. Whether you agree with the research or not, birth order positioning may have an influence on a students academic success (Richardson, 1990).

Statement of the Problem

The factors that influence the academic performance of the youth of the nation are numerous and complex. There is ongoing research that indicates how economics may play a role in this. Those students who have a financial advantage are often given the tangible tools outside of school needed to excel in their academic career (Kessler, 1991).

The ever changing social structure of the nuclear family also effects academic achievement. Often times the emotional support needed to reinforce the educational process is absent. Problems with homework and projects required to be completed outside of school are left to be the sole responsibility of the students (Nuttall, 1976).

There are other factors that may influence educational success as well. The gender of students and where they are situated in terms of birth order positioning is one other such factor. The behavior of students may differ depending on their gender. Where a male or female student falls in terms of birth order ranking may be of significance. Research shows that separately, these factors may have an influence on academic success (Forer, 1976). However, is there a relationship between gender, birth order and achievement in reading and mathematics?

Hypothesis

There will be no correlation between the effects of gender and birth order on achievement in reading and mathematics among third grade students.

Definition of Terms

The following terms were used in this study:

Birth order- The birth order positioning of an individual in terms of their siblings, or lack of siblings.

Mathematics achievement- The average grade in mathematics as determined by the average grade between the first and second marking periods.

Reading achievement- The average grade in reading as determined by the average grade between the first and second marking periods.

Limitations

There were limitations which may have influenced the outcome of this study. They are listed:

1. The sample size was selected from a small suburban school in New Jersey, and is not representative of all third grade students.
2. There were only four third grade classes available to participate in this study, thereby limiting the number of subjects able to participate in this study.
3. There was limited control over the diversity of the subjects participating in the study, therefore the sample could not be generalized to the whole population.

The implications of these limitations are that the results of this study should not be applied to the whole population of suburban elementary third grade students.

Chapter II

Review of Related Literature

Introduction

The relationship between birth order and achievement is one that has been studied for many years. When gender is considered, the relationship seems to be unaffected. Much research has been done to establish if in fact there is a direct relation between achievement and birth order, and whether that relationship evolves due to societal influences. Although there are still biases as to how well males and females succeed academically, opinions are changing. The same can be said for opinions on the characteristics of individuals due to their birth order. With the size of the American family decreasing in number, and the number of years between siblings increasing, birth order effects are on the decline (Leman, 1985). Therefore, the purpose of this study was to determine that there is no correlation between the effects of gender and birth order on achievement in reading and mathematics among third grade students.

First Born Children

There is research that indicates first born children, especially males, excel academically. This reflects in the increased number of first born male children who

achieve university degrees, and excel in science, medicine and college teaching. In part this may be due to social attitudes which in the past have discouraged women from overachieving. However, these attitudes are constantly changing and girls are steadily excelling in all areas relative to academics (Forer, 1976).

Since first born children are the focus of their immediate families attentions, they are often taken more seriously than future siblings. This manifests in these children an increased feeling of importance and self confidence. In later years these qualities evolve into leadership abilities. Being the first born in a family is also considered a favored birth position by society, especially if you are male. However, attitudes about first born females are changing as women become more prominent figures economically, politically and academically. Studies show that first born children are over represented among those individuals mentioned in such noted journals as Who's Who in America and American Men and Women in Science. The gender factor does not seem to be an overwhelming influence on achievement on first born children (Leman, 1984).

There has been research that supports the fact that first born children, regardless of gender, are advanced in the areas of language and reading. This seems to occur because first born children have the advantage of being the center of their parents attention (Richardson, 1990). Excellence in mathematics seems to apply to first born children as well. There are some studies that indicate first born children, especially male, excel in mathematics, and gravitate towards occupations that are mathematically based. Research has shown that occupations which require skill in mathematics, such as medicine and engineering, are dominated by first born children (Adler, 1972).

Parental involvement must be taken into consideration when looking at academic achievement and birth order positioning. Parents of first born children have an increased opportunity to focus one on one with their children, and spend more time doing so. Reading aloud and emphasis on basic mathematical skills are emphasized more during the early academic stage of development in first born children since parents have more time and only one child to focus this attention on. Importance must also be given to the fact that family structure is changing. The number of years between siblings is increasing, and the so called characteristics of first born children are being found in children who are lower in rank in terms of birth order (Richardson, 1990).

Middle Children

Middle children are generally the lowest achievers academically, and gender appears to be irrelevant. Some of this may be due to the decreased pressure from parents to succeed (Richardson, 1990).

There have been studies which reveal that middle children are under represented in colleges and universities. Some of this may be attributed to a reduced emphasis of academic achievement relayed to middle children from their parents. However this is not always the case. Middle children often feel less pressure from parents, and this in turn gives them the opportunity to excel at their own pace. Research has shown that middle children do quite well in the area of language and reading, despite the fact that parent

involvement is not as prevalent as with first born children. Some of this may be due to the fact that middle born children are eager to communicate with others, especially their peers (Forer, 1976).

Middle children are under represented in careers that require excellence in mathematical skill. Once again, studies indicate that this may in part be due to a decrease in parental involvement during developmental stages. However, middle children do excel in areas of creativity, such as writing, music and art (Forer, 1976).

Middle children are more often than not more relaxed and less anxious than any other birth order position, and seem to have a good social and academic balance. There are some who feel that middle children who are female are better at human relationships as opposed to academic relationships. Family and marriage are of greater importance than academic success. However, with the economic structure of our country changing, and women becoming more influential in the work force, this fact is changing (Leman, 1985).

Youngest Children

Youngest children are in the most preferred spot in terms of birth order. They tend to achieve on a level that is lower than first born children, but higher than middle children. Youngest children have the advantage of having less expected of them since they are the babies of the family, and have older siblings as mentors (Forer, 1976).

Youngest children, regardless of their gender, seem to fair better in creative content areas in their academic career. Reading and writing are content areas that

youngest children excel at since they can use their imagination to the fullest extent.

Research has indicated that these academic subject areas are not as structured and give youngest children an opportunity to express their creative nature. In part, this may be due to a decrease in parental pressure to achieve academically, and a willingness on the part of the child to explore more creative content areas (Richardson, 1990).

Mathematics is not a strong academic area for youngest children. Research has indicated that this may be due to the fact that subjects that involve mathematical skill often require less social contact than those subject areas that are more creative. Youngest children thrive in academic situations where social interaction is predominant. As with reading and writing, gender does not seem to be an influential factor in mathematical achievement among last born children (Forer, 1976).

Older siblings have a definite influence on youngest children. Since older brothers and or sisters often mentor their younger siblings, youngest children can, at times, take on higher birth order characteristics. In part this may be due to the need youngest children feel to be accepted by their older siblings (Leman, 1985).

Youngest children seem to be people oriented, and this does, in fact, reflect in their academic performance. Although they may not always excel academically, youngest children are usually liked by their teachers, as well as their peers, and often choose professions that include increased social interaction. Whether or not the youngest child is male or female has little influence on their academic success (Travis, 1995).

Only Children

There are studies that indicate only children, whether male or female, are on the

same academic level as first born children. Only children tend to be conscientious, well organized and scholarly. The reason for this is that only children receive a great amount of adult attention. This is not always true of children with siblings (Leman, 1985).

Only children usually excel in their academic careers since parents instill high expectations. Since only children are more exposed to conversation and interaction with adults, their reading and verbal ability are highly developed. In terms of their career in higher education, only children will generally focus on academic content areas that will lead them to become lawyers, writers and scholars (Richardson, 1990).

As with first born children, only children are proficient in mathematics and academic areas that require mathematical skill. These areas utilize a high degree of abstract and analytical thought, an area in which only children excel (Forer, 1976).

School is also a place where only children can be recognized among their peers, unlike at home. This fact can however, be applicable to children in any birth order position. First born, as well as youngest children find recognition from others favorable and reinforcing. Middle children in particular can thrive academically with the attention the social aspect of school can offer (Travis, 1995).

Only children, especially males, have a tendency to be overachievers. They push to be successful in all academic content areas, and often score the highest of all birth order positions on tests of scholastic ability (Richardson, 1990). However, with views of women in society and education changing, the scholastic ability test scores for women are on the rise. Female only children are definitely achievement oriented and competitive, and this is being reflected in their increased academic performance (Forer, 1976).

As with all birth order positions, gender seems to be on the decline in terms of its importance on achievement with only children. Whether the only child is male or female, they have similar birth order characteristics. Only children tend to excel academically in the educational careers. This seems to be a result of the high expectations placed on them by their parents, as well as the individual attention only children receive (Richardson, 1990).

Twins

The effect of birth order on twins is somewhat different than on other siblings due to their unique bond. As with only children, twins often take on the characteristics of both older children and younger children in terms of birth order positioning. Twins have the attention of their parents, but not the pressure to excel academically that oldest children feel. Intelligence test scores indicate that twins score the lowest of all birth order positions, regardless of gender (Richardson, 1990).

Twins develop language, verbal and reading abilities at a slower pace than any other birth order position. In part this may be due to the fact that parents do not pressure them in the same manner as other birth order positions, since being twins is an accomplishment in and of itself. Similar research has indicated the same for achievement in mathematics. Since twins, have one another to rely on, it is often the case that they are less willing to learn from others. This includes learning from parents, siblings or teachers. In either the case of reading or mathematics achievement, gender does not seem to be an influential factor (Forer, 1976).

Summary

The research indicates that although a correlation between birth order positioning and academic achievement may exist, it is changing due to the change in family structure. With family size decreasing, and the number of years between siblings increasing, the individual characteristics of each birth order position in terms of achievement is diminishing. The effect of gender on both birth order positioning and academic achievement is also a fact that is becoming less and less influential (Zajonc, 1975).

Chapter III

DESIGN OF THE STUDY

Introduction

The importance of academic achievement in reading and mathematics is a subject that is very complex. There are many factors which may or may not influence the educational success of a student in these content areas. Birth order is one such factor which researchers have considered. When looking at birth order and achievement, the gender of students is also a factor taken into account (Forer, 1976). The purpose of this study was to determine that there is no correlation between birth order, gender and achievement in reading and mathematics in an elementary third grade class.

Sample

The sample in this study consisted of students in a third grade class, in a public elementary school in a suburban school district in southern New Jersey. The sample group was comprised of forty randomly selected students from two third grade classes in the school. There were twenty female students and twenty male students that participated in this study. The subjects were between the ages of eight and ten years of age. As per township census data, the socio-economic level of the students in this study was considered to be middle income.

Instrument

Interim report cards were used as the instrument to determine achievement in reading and mathematics. The report cards defined achievement level of the students over a three month period. Within this three month period there were grades given for reading and mathematics. These grades were used to determine final grades on the interim report cards. The determination of birth order ranking was obtained by asking the students where they fit in order of their siblings.

Procedure

The data was collected from interim report cards after the first and third marking periods in the school year. The mean grade was calculated for each birth order position. Calculations were done for male students and female students independently in the subject areas of reading and mathematics. This data was analyzed by utilizing a chi square design. The chi square design was selected because the data was nominal.

Since comparison was made between what achievement levels were observed and what achievement levels were expected, a chi square design was appropriate. The significance of the chi square results was determined by consulting a chi square table. The p level of significance was .05 for the purpose of this study.

Chapter IV

ANALYSIS OF FINDINGS

Introduction

This study was designed to determine if there is a relationship between birth order, gender and achievement in reading and mathematics. The study was conducted in an elementary school in suburban southern New Jersey. Forty students were randomly selected from four third grade classrooms. Twenty students were female and twenty students were male.

It was hypothesized that birth order and gender do not effect achievement in reading and mathematics among third grade elementary school students.

Analysis of Female Reading and Mathematics Achievement Within Birth Order Position

There were twenty female students considered in this study. Of the twenty students, five were first born children, six were middle children, three were only children and six were youngest children.

The mean reading grade for each female student according to birth order was calculated and determined to be 82.50 for first born females, 83.33 for middle female children, 85.00 for only children and 85.00 for youngest born children. The median grade was determined to be 85.00 as was the mode. The standard deviation was calculated to be

1.83. The observed chi square cell was calculated by the number of students meeting both the grade and birth order criteria. The expected chi square cell was calculated by determining the number of total students within the grade criteria, multiplied by the number of students within the birth order criteria. The resulting quotient was then divided by the total number of female students in the study (see table 1).

table 1
Chi Square Reading Achievement Table for Female Students
Within Birth Order Position

| Position \ Grades | 0 (Only) | 1 (Oldest) | 2 (Middle) | 3 (Youngest) |
|-------------------------|----------------|----------------|----------------|-----------------|
| 1 (85-100) | 3 / 2.55 | 4 / 4.25 | 4 / 5.10 | 6 / 5.10 |
| 2 (75-84) | - | 1 / 4.25 | 2 / 5.10 | - |
| 3 (65-74) | - | - | - | - |
| 4 (64 below) | - | - | - | - |

Chi square is calculated by the multiplication and division of the summary of each chi square cell. For this study the chi square for reading achievement within birth order position is 4.859804. Degrees of freedom were then calculated by the multiplication of the number of rows minus one and the number of columns minus one, and determined to be 9. With a level of significance of .05, and 9 degrees of freedom, the p level, as located

on a Distribution of Chi Square Table, is 16.919. Since a chi square of 4.859804 is less than the p level of 16.919, the null hypothesis cannot be rejected.

The observed and expected chi square cells for achievement in mathematics within birth order position, were calculated by determining the number of total students within the grade and birth order criteria. The resulting quotient from the chi square cell calculation was divided by the total number of female students in the study (see table 2).

table 2
Chi Square Mathematics Achievement Table for
Female Students Within Birth Order Position

| Position \ Grades | 0 (Only) | 1 (Oldest) | 2 (Middle) | 3 (Youngest) |
|-------------------------|----------------|----------------|----------------|-----------------|
| 1 (85-100) | 3 / 2.40 | 4 / 4.00 | 3 / 4.80 | 6 / 4.80 |
| 2 (75-84) | - | 1 / 4.00 | 3 / 4.80 | - |
| 3 (65-74) | - | - | - | - |
| 4 (64-below) | - | - | - | - |

The chi square for mathematics achievement within birth order position for female students in this study is 4.05. With a significance level of .05, and 9 degrees of freedom, the p level is 16.919. Since a chi square of 4.05 is less than the p level of 16.919, the null hypothesis cannot be rejected.

**Analysis of Male Reading and Mathematics Achievement
Within Birth Order Position**

There were twenty male students considered in this study. Of the twenty students six were first born children, two were middle children, two were only children and ten were youngest children.

The mean reading grade for each male student according to birth order was calculated and determined to be 85.00 for first born males, 85.00 for middle male children, 80.00 for male only children and 83.50 for youngest born. The median and mode grade calculations are both 85.00, and the standard deviation is 3.93.

The observed and expected chi square cells for reading achievement and birth order among male students was calculated by determining the number of total students within the grade and birth order criteria. The resulting quotient from the chi square cell calculation was divided by the total number of male students in the study (see table 3).

**table 3
Chi Square Reading Achievement Table for Male
Students Within Birth Order Position**

| Position \ Grades | 0 (Only) | 1 (Oldest) | 2 (Middle) | 3 (Youngest) |
|-------------------------|---------------|----------------|----------------|-----------------|
| 1 (85-100) | 1 / 1.5 | 5 / 4.50 | 2 / 1.50 | 7 / 7.50 |
| 2 (75-84) | 1 / 1.5 | 1 / 4.50 | - | 3 / 7.50 |
| 3 (65-74) | - | - | - | - |
| 4 (64-below) | - | - | - | - |

The chi square for reading achievement among male students within birth order position is 6.0111. With a significance level of .05, and nine degrees of freedom, the p level was 16.919. Since the chi square of 6.0111 is less than the p level of 16.919, the null hypothesis cannot be rejected.

The observed and expected chi square cells for male mathematics achievement and birth order position were calculated by determining the number of total students within the grade and birth order criteria. The resulting quotient from the chi square cell calculations were divided by the total number of male students in the study (see table 4).

table 4
Chi Square Mathematics Achievement Table for Male Students
Within Birth Order Position

| Position \ Grades | 0 (Only) | 1 (Oldest) | 2 (Middle) | 3 (Youngest) |
|----------------------|---------------|----------------|----------------|-----------------|
| 1 (85-100) | 1 / 1.5 | 3 / 4.50 | 2 / 1.50 | 9 / 7.50 |
| 2 (75-84) | 1 / 1.5 | 3 / 4.50 | - | 1 / 7.50 |
| 3 (65-74) | - | - | - | - |
| 4 (64-below) | - | - | - | - |

The chi square for mathematics achievement among male student's within birth order position is 7.433. With a significance level of .05, and 9 degrees of freedom, the

p level was 16.919. Since a chi square of 7.433 is less than the p level of 16.919, the null hypothesis cannot be rejected.

Analysis Related To Hypothesis

The results of the chi square calculations for this study indicate that there is no correlation between the effects of gender and birth order on achievement in reading and mathematics among third grade students in a suburban elementary school in southern New Jersey.

Chapter V

SUMMARY, CONCLUSIONS AND RECOMMENDATION

Introduction

Views of the birth order position of male and female children, and how it effects academic achievement is often debated. Many say birth order has a definite impact on achievement, especially in the content areas of reading and mathematics. Others feel neither gender or birth order influence academic achievement. The purpose of this study was to determine that birth order and gender do not influence achievement in reading and mathematics.

Summary of the Problem

In our society there are many factors that influence the academic performance of children. The economic and financial status of the child's family can play an important role in the type of education received. The change in social structure of the nuclear family may also effect academic achievement. There are times when emotional support is absent and the importance of educational proficiency is not emphasized. It is also important to look at gender and birth order, and their effect on academic achievement, especially when it is related to verbal and analytical skills like reading and mathematics.

Summary of the Hypothesis

This study was designed to determine if gender and birth order effect reading and mathematics achievement in an elementary school in southern New Jersey. It was

hypothesized that there is no correlation between the effects of gender and birth order on achievement in reading and mathematics among third grade elementary students.

Summary of the Procedure

The data analyzed in this study was obtained from the first and second marking period report cards. The mean was calculated for each birth order position and for male and female grades in reading and mathematics. This data was then analyzed and compared for significance by utilizing chi square. The p level of significance for the purpose of this study was .05, and degrees of freedom were calculated to be 9.

Summary of Findings

The null hypothesis was not rejected because there was no level of significance determined between gender and birth order on academic achievement in reading and mathematics. It was found that the mean mathematics and reading grades were very close for both male and females regardless of birth order position. The chi square calculations were also very close for males and females, and for all birth order positions. The mean reading grade for female students, taking into account birth order position, was 84.25. The mean mathematics grade was 84.00. The mean reading grade for male students, taking into account birth order position, was 83.75. The mean mathematics grade for male students was 84.25. These calculations indicate only a slight variation in grade between male and female students of any birth order.

Conclusions

This study has indicated that there is no relation between birth order, gender and achievement in reading and mathematics among third grade elementary school students. It seems that the academic performance of female and male students is becoming equal. This may be due to the changing view of women in our society. It was not to long ago that women were not encouraged to pursue a higher education. Now, females as well as males, are encouraged to pursue any educational and vocational aspirations they may have. In terms of reading , there is an abundance of literature that appeals to both male and female students. This encourages students of either gender to engage in reading on a more frequent basis. As for mathematics, female students and male students are understanding the importance of mathematical skill to succeed. Female students are also seeing women pursue carecers that are mathematically based, like engineering, accounting, medicine and science.

The results of this study indicated that birth order did not have an effect on academic achievement in reading and mathematics. This may be a result of the decrease in family size and the increase in years between siblings. When this occurs the defining characteristics of each birth order position become less apparent.

Implications and Recommendations

The results of this study indicate that there is no significant correlation between the effect of birth order and gender on reading and mathematics achievement. However, this study was conducted in only one grade level in one elementary school in a suburban area

of southern New Jersey. It does not take into account upper or lower grade levels or urban schools. The study also does not take into consideration family size.

The implications of this study, in regard to education, indicate that academic achievement is not affected by either gender or birth order. However, I recommend that this study be conducted in various academic settings among various age and grade levels. This study also warrants further research in regard to the effect family size may have on academic achievement.

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