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A COMPARISON OF SIBLING POSITION AND ACADEMIC ACHIEVEMENT IN THE ELEMENTARY SCHOOL

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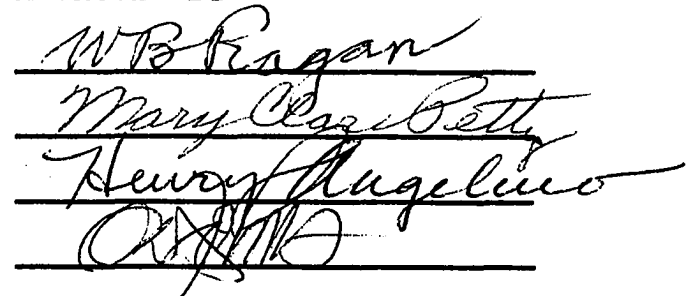

DISSERTATION COMMITTEE

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A COMPARISON OF SIBLING POSITION AND ACADEMIC ACHIEVEMENT IN THE ELEMENTARY SCHOOL

CHAPTER I

The study of sibling position within a family has a long history of research and study. "The importance of the individual's position in the family on the basis of birth has been recognized by students of behavior. In part, this importance grows out of differences in the parents' attitudes toward children on this basis, but much of it grows out of its effect upon relationships between the children themselves."[1]

Hurlock states that traditional beliefs about the "best position" in the family have been reinforced by fairy tales in which the oldest child is usually represented as uncertain, mistrustful, shrewd, stingy, or wealthy, and the youngest as secure, open, confiding, stupid, naive, spontaneous, fond of animals, soft, good-natured, generous, humane, or poor.[2]

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[1] James H. Bossard and Eleanor Boll, The Sociology of Child Development (New York: Harper and Brothers Publishers, 1960), p. 100.

[2] Elizabeth B. Hurlock, Child Development (New York: McGraw-Hill Book Company, 1964), p. 672.

According to Bossard and Boll the oldest child is expected to jump farther, climb higher, draw better houses, spell more words, etc., than other children of the family; and he dare not, if he is to retain his prestige, be outclassed in these things by children of comparable age and status in other families. The oldest child is generally "on the spot" as is the leader of any group, to perform a little better and to act a little more circumspectly than his younger followers.[1]

Hurlock has described the position of the middle child:

> The middle child in a family of three or more children is apt to be somewhat neglected. The middle child is rather easily influenced by suggestion; he is frequently flighty; his attention is easily distracted from the thing at hand; he shows more than the usual craving for physical demonstrations of affection; and he is generally gregarious in his social attitudes. It has been found that there are more extremely unpopular children among the middle children of families than those of any other position.[2]

Adler reports that the youngest children in families "bear unmistakable signs of the fact that they have been youngest." Adler also reports that they have the greatest incentive to strive to surpass their siblings. Youngest children expect help from other members of the family and assume that things will always come out the way they want

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[1]Bossard and Boll, loc. cit., p. 112.

[2]Hurlock, loc. cit.

them to because other people will always be there to help.[1]

Because their self-confidence has never been jolted by competition with a newly arrived sibling, Strauss contends that youngest children have an advantage over other siblings. This may result in an optimistic outlook on life.[2]

Contrary to many popularly held beliefs, Goodenough and Leahy found there is no "ideal position" within a family. In fact, there is "no position in the family circle which does not involve, as a consequence of its peculiar nature, certain special problems of adjustment."[3]

While there have been various studies that have dealt with the relationship of birth order and personality characteristics and the relationship of ordinal position and intelligence, relatively few studies have dealt with the relationship of birth order and school achievement.

A recent study by Dolph at the University of Colorado pointed out the need for more research in the area of sibling position and achievement. Dolph suggested that the relationship between sibling position and achievement must be studied within family groups. She also suggested further research

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[1]Alfred Adler, The Education of Children (New York: Greenberg, 1930).

[2]Bernard V. Strauss, "The Dynamics of Ordinal Position Effects," Quarterly Journal of Child Behavior, III (April, 1951), p. 140.

[3]Florence L. Goodenough and Alice M. Leahy, "The Effect of Certain Family Relationships Upon the Development of Personality," Journal of Genetic Psychology, (March, 1927), p. 71.

on achievement, using same-sex first and second siblings and research on achievement by first and second children regardless of family size.[1] Schoonover, in an earlier study, suggested using longitudinal sibling records to investigate the relationship of ordinal position, sibling's sex, and spacing.[2]

Statement of the Problem

The problem of this study was to determine if sibling position within a family has any relationship to academic achievement at the elementary school level. Using families with three siblings, the achievement level of first siblings was compared to the achievement level of second siblings. The achievement of second siblings was compared with third siblings. Academic achievement of siblings at the third grade level was used to establish comparisons in achievement.

Limitations

There were four limiting factors which entered into the study which could have had some bearing upon the results.

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[1]Eleanor J. Dolph, "A Comparative Study of the Ordinal Position of the Child and His School Achievement," (unpublished Ph.D. dissertation, University of Colorado, 1965), p. 82.

[2]Sarah M. Schoonover, "The Relationship of Intelligence and Achievement to Birth Order, Sex of Sibling, and Age Interval," The Journal of Educational Psychology, L (August, 1959, pp. 143-45.

The first factor was the range of I.Q. of the sibling groups used in the study. All three members of the sibling groups were within the I.Q. range of 75 and 125. Sibling groups with one or more members having an I.Q. above or below these limits were not included in the sample.

A second factor which may have affected the findings of the study is that only relatively "stable" pupils were included in the sample. A family of three siblings must have attended a Wichita School from three to five years depending on the age differences of siblings in order for all to have the necessary test data.

A third limiting factor was that the socio-economic background of sibling groups used in the sample was not considered. All levels of the social structure were represented in the city of Wichita, Kansas. If all members of a sibling group met the other criteria set forth for the study, they were included regardless of socio-economic background. By limiting the sample to three-child families, a socio-economic bias may have been created. Lower socio-economic groups tend to have larger families than middle class families.

The fourth limiting factor was the quality of instruction of pupils used in the sample. In general, the textbooks, materials, and guides used in the Wichita Public Schools are the same. A central office staff working with elementary school principals and teachers coordinates the curriculum in all the schools.

Definition of Terms

Sibling. One, two, or more children who have the same parents, but not of the same birth.

Sibling position. Position of the child in the family. Sibling position, ordinal position, and birth order were used interchangeably in this study.

Achievement. Academic achievement refers to grade equivalent scores earned by each child on the Iowa Tests of Basic Skills. The basic skills measured by this test are vocabulary, reading, language, and arithmetic. Only the spelling test of the language section is administered at the third grade level.

Sibling groups. A group of three siblings in the same family. Only sibling groups of three were used in this study.

Hypotheses

The hypotheses that were tested in this study were:

1. There is no statistically significant difference in the mean achievement of first, second, and third siblings.

2. There is no statistically significant difference in the mean achievement of first and second girls in the same family.

3. There is no statistically significant difference in the mean achievement of first and second boys in the same family.

4. There is no statistically significant difference in the mean achievement of first girls and second boys in the same family.

5. There is no statistically significant difference in the mean achievement of first boys and second girls in the same family.

6. There is no statistically significant difference in the mean achievement of second and third girls in the same family.

7. There is no statistically significant difference in the mean achievement of second and third boys in the same family.

8. There is no statistically significant difference in the mean achievement of second girls and third boys in the same family.

9. There is no statistically significant difference in the mean achievement of second boys and third girls in the same family.

Analysis of Data

The mean I.Q. and achievement were computed for the various sibling groups using first, second, and third siblings; first and second siblings of the same sex and same family; first and second siblings of different sex and same family; second and third siblings of the same sex and same family; and second and third siblings of different sex and

same family. An analysis of variance test and t-test were used to determine if any significant statistical difference existed in the hypotheses tested. The .05 level of confidence was used to reject the hypotheses.

Organization of the Study

This study consists of five chapters. The introductory chapter presents the background and need for the study, the statement of the problem, limitations, definitions, and hypotheses. The chapter also outlines the methods used for the analysis of the data.

Chapter II presents the procedures used to select the sample and a description of the sample. A description of the standardized tests that were used to make comparisons is also included in this chapter. Chapter III presents a review of the literature related to sibling position and achievement. Chapter IV gives a description of how the data was treated along with descriptive tables. Chapter V summarizes the findings of the investigation and presents recommendations.

CHAPTER II

PROCEDURES

Selection of Subjects

A school system with a large pupil enrollment was necessary in order to conduct a study of this kind. Since the writer was associated with the Wichita Public Schools it was decided that data on families with three siblings would be gathered there. Sibling groups were selected if they met the following criteria:

1. All siblings had an I.Q. within the range of 75 and 125, as determined by the California Test of Mental Maturity.

2. All siblings were attending regular classes. Pupils attending special education classes were not included.

3. Sets of twins were not included.

4. Siblings from families which had been divided through death or divorce were not included.

5. Pupils enrolled in the third grade during the 1966-67 school year with two older siblings with an age span not to exceed five years from youngest to oldest were included. This age span was chosen due to the fact that the

Iowa Tests of Basic Skills have been administered in the Wichita Public Schools since September 1961. Siblings beyond the eighth grade level would not have had this test.

The first step in obtaining data for this study was to secure permission to use data on pupils enrolled in the Wichita Public Schools. A research proposal was submitted to the Research Council during the 1966-67 school year for permission to conduct the study. The Research Council consists of Dr. Lawrence H. Shepoiser, Superintendent of Schools; Dr. Alvin E. Morris, Deputy Superintendent of Schools; Dr. Floyd M. Farmer, Assistant Superintendent, Curriculum Service Division; Dr. Dean R. Stucky, Director of Pupil Services; and Mr. Ralph E. Walker, Director of Research. Permission was granted by the Research Council to use available standardized test data on the permanent pupil records at the ninety-one elementary schools and the sixteen junior high schools.

Description of Sample

The subjects for the study were attending the Wichita Public Schools, Wichita, Kansas. The total enrollment in the kindergarten through grade six was 41,133 pupils.[1] Enrollment in grades seven, eight, and nine was 15,578.[2] The

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[1]Report of Superintendent, Unified School District No. 259, Enrollment, September 15, 1966, p. 6.

[2]Ibid., p. 8.

information required for all subjects was taken from the permanent pupil records maintained at the school level.

1. The sample contained a total of eighty-three sibling groups with three members each. A total of 249 children were included in the sample.

2. All the youngest members of the sibling groups were enrolled in the third grade during the 1966-67 school year.

3. The second members of the sibling groups were enrolled in these grades: one in third, eighteen in fourth, forty-one in fifth, twenty in sixth, three in seventh, and none in eighth.

4. The oldest members of the sibling groups were enrolled in these grades: none in fourth, seven in fifth, eighteen in sixth, thirty-one in seventh, and twenty-seven in eighth.

5. All ninety-one elementary schools and sixteen junior high schools in Wichita were surveyed to find sibling groups falling in the criteria set forth. Forty-three schools had no sibling groups meeting the criteria, and forty-eight had from one to five sibling groups meeting the criteria set forth.

6. All socio-economic backgrounds were represented in the sample.

7. There were forty-four boys and thirty-nine girls in the oldest sibling group. There were forty-seven boys

and thirty-six girls in the group of second siblings. There were thirty-nine boys and forty-four girls in the youngest group of siblings.

8. Two sibling groups could not be used because of an older sibling with an I.Q. too low, six sibling groups could not be used because of an older sibling with an I.Q. too high, two sibling groups could not be used because the two oldest siblings were twins, and forty-one sibling groups could not be used because the older siblings did not have the necessary standardized test data.

Description of Measuring Instruments

Iowa Tests of Basic Skills

The Iowa Tests of Basic Skills, Form II, was administered to all subjects used in the study. The primary purpose of the test is to reveal how well each pupil has mastered the basic skills. The skills tested at the third grade level are:

> Vocabulary: knowing the meaning of words
> Reading: understanding what you read
> Language: spelling
> Arithmetic: understanding the number system, arithmetic terms and operations; problem solving.[1]

The content of each test has been very carefully selected to reflect the best of current curriculum practices.[2]

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[1] E. F. Lindquist and A. N. Hieronymous, Teacher's Manual, Iowa Tests of Basic Skills, (Boston: Houghton Mifflin Company, 1964), p. 7.

[2] Ibid., p. 3

California Short-Form Test of Mental Maturity

The California Short-Form Test of Mental Maturity, Primary Battery, 1957 S-Form, is an instrument for appraising mental capacity. The test consists of seven tests which contribute to scores in four factors: (1) spatial relationships, (2) logical reasoning, (3) numerical reasoning, and (4) verbal concepts. All tests are of the multiple-choice type.[1]

Four of the tests give results on non-language data, while three of the tests yield results on language factors. The total test intelligence quotient is an average of the language and non-language data. The authors have shown in comparison with Stanford-Binet and two Wechsler tests that the Short-Form correlates as well with the individually administered test as it does with other group tests and sometimes even better.[2] The California Short-Form Test of Mental Maturity yields a normal distribution of intelligence quotients, with a mean of 100, and a standard deviation of sixteen for the unselected general population.[3]

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[1]E. T. Sullivan, W. W. Clark, and E. W. Tiegs, Manual, California Short-Form Test of Mental Maturity, Primary Battery, 1957 S-Form. (Monterey, California: California Test Bureau, 1957), p. 3.

[2]Ibid., p. 7.

[3]Ibid., p. 14.

CHAPTER III

SURVEY OF RELATED LITERATURE

The relation of order of birth to achievement has been investigated for nearly a hundred years. The first known data appear in Sir Francis Galton's English Men of Science, published in 1874. Galton found more only sons and first-born sons were Fellows of the Royal Society. Galton maintained that only children and first-born children are given more responsibility and treated as a companion more than children of other positions. Thus first arrivals on the family scene were favored from the start.[1]

In 1904, Havelock Ellis published a study of eminent men and women. Among those eminent people, Ellis found some striking linkages to order of birth. The probability of appearance in the Dictionary of National Biography, was much greater for a first-born than for an intermediate child, and the youngest likewise was favored over the intermediate child, though not to the same degree.[2] Data published by Cattell

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[1]Francis Galton, English Men of Science: Their Nature and Nurture, (London: Macmillan Company, 1874), p. 26.

[2]Havelock Ellis, A Study of British Genius, (Boston: Houghton Mifflin Company, 1926), p. 103. (Originally published in 1904, by Hurst and Blackett, London).

in 1917, on American Scientists, showed the same relationship between birth order and eminence that Ellis found, the eldest and then the youngest being favored.[1]

Birth Order and Intelligence

Terman's study of gifted children indicated that birth order was related to intelligence. Terman studied gifted children with I.Q.'s of 140 or higher, and found the eldest the most numerous, followed by the youngest, and then by the in-between children. Most of the children came from small families; only a few came from families of five or more children.[2]

Arthur found that intelligence seems to be higher for younger siblings than for first-born. She studied Minnesota kindergarten children, all of whom were tested at the end of the year by the Kuhlman Binet Scale. Using ninety-two pairs of siblings, she found that the median I.Q. of the older was 93.05, and the median I.Q. of the younger was 99.14. She then studied eighty-five families containing three children. The median I.Q. for the oldest children was

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[1]James M. Cattell, "Families of American Men of Science," The Scientific Monthly, V (October, 1917), p. 371.

[2]Lewis M. Terman, Genetic Studies of Genius, Vol. I, The Mental and Physical Traits of a Thousand Gifted Children, (Stanford, California: Stanford University Press, 1925), p. 121.

82.70. The middle children had a median I.Q. of 90.34, and the youngest children had a median I.Q. of 95.34.[1]

Thurstone and Jenkins studied a group of 1430 children who ranged from one to twenty-one years. They found that twenty-three out of twenty-eight comparisons favor the later-born sibling. The fact that all the comparisons involving large samples consistently favor the last-born seems to justify the conclusion that intelligence increases on the average with order of birth in the same family.[2]

Wile and Jones support the theory that the oldest child tends to have a higher I.Q. than the younger. The median I.Q. for the entire group under study was 105, which was equalled by the only child, exceeded by the older and younger groups, but was not reached by the middle child or the youngest child groups. They suggest that I.Q. tends to decrease with the increased number of siblings.[3]

Altus carried through a study of nearly 1300 illiterates during World War II, which involved the relation between birth order and Wechsler I.Q. The family size in

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[1]Grace Arthur, "Relation of IQ to Position in the Family," Journal of Educational Psychology, XVII (November, 1926), pp. 541-550.

[2]Lewis L. Thurstone and Richard L. Jenkins, Order of Birth, Parent Age, and Intelligence, (Chicago: University of Chicago Press, 1931), p. 35.

[3]Ira S. Wile and Ann B. Jones, "Ordinal Position and Behavior of Young Children," The Journal of Genetic Psychology, LI (September, 1937), p. 87.

this study varied from two to thirteen. For 268 last-born soldiers the Wechsler I.Q.'s were higher than those of 988 born in some other ordinal position. The first-born were slightly but not significantly brighter than those born in an intermediate position, i.e., between first and last. In terms of intelligence, being the one born last was definitely favorable.[1]

Schoonover found a high degree of sibling resemblance in intelligence in her investigation of true sibling pairs. The data for her study were obtained from the records of the University Elementary School at the University of Michigan. She found that siblings with brothers consistently had higher mental ages than siblings with sisters. The sibling mean differences in intelligence were not statistically significant.[2]

Koch reports that five- and six-year-old boys and girls in two-child families earned higher scores on the Primary Mental Abilities Test if the other child in the family was a boy rather than a girl. Her finding is independent of birth order. Having a brother for a sibling helped both the younger and the older in the two-child family. Koch has pointed out that possibly the more aggressive,

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[1]William D. Altus, "Birth Order, Intelligence, and Adjustment," Psychological Reports, V (September, 1959), p. 502.

[2]Schoonover, loc. cit.

vigorous, and competitive male alerts his sibling to a greater extent than does the more passive female.[1]

In 1964, Nichols compared birth order and scholarship using contestants in the National Merit Scholarship contest as subjects. Nichols' data suggest that there may be hierarchies of aptitude related to birth order and family size. For instance, the first-born with three siblings had the highest mean aptitude scores of all birth ranks among those who came from families of two, three, four, or five children. The mean score of contestants with two older siblings was the lowest of all these ranks, significantly lower than that of the first-born from four-child families.[2]

Altus' data from the University of California confirm Nichols' findings. Altus has found birth order relationships to aptitude-test data among university students. In two samples, one consisting of 1800 undergraduates and another of 2500, the first-born scored higher to a small though statistically significant degree than did the later-born on tests of verbal intelligence, which measure such things as the size of general vocabulary and the ability to infer correctly the right words to make sense of statements

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[1]Helen L. Koch, "The Relation of Primary Mental Abilities in Five- and Six-Year-Olds to Sex of Child and Characteristics of His Sibling," Child Development, XXV (September, 1954), p. 209.

[2]Robert C. Nichols, "Birth Order and Intelligence," (Unpublished, National Merit Scholarship Corporation, 1964.)

from which words have been left out. When birth order was linked to another parameter, the sex of the sibling, certain correlations were noted. First-born students, either male or female, from four-child families earned a significantly higher mean score on a test of quantitative ability if their siblings were male.[1]

Birth Order and Personality Characteristics

The relation between birth order and certain personality characteristics has long been a source of speculation and research, but the findings are often contradictory and inconclusive. On the basis of his clinical experience, Adler attributes definite syndromes to first, second, and third children:

> The oldest child feels dethroned by the coming of his brother and wants to restore his place by fighting. Unless he can overcome in the struggle for supremacy in his universe he is apt to become depressed, peevish, more or less hopeless, and will show his hopelessness later in life if confronted by problems. He is very likely to be conservative, to understand power and to agree with it. If he is strong enough he becomes a fighting child.
>
> As for the second child, he is never alone, but is always confronted by the older child. This constant picture before him of an older and bigger child begets in him a sense of rivalry. If successful, he is an excellent type, but if defeated, for instance, if he is not able to compete successfully with the older child in work and in play, he loses hope, becomes depressed and has a bad time of it.
>
> The third child has to fight for a place in the sun, but he has no successor. This gives him a great sense of power, and if he is capable he often overcomes the older children in the family by his sense of importance.

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[1]William D. Altus, "Birth Order and Its Sequelae," Science, CXLI (January, 1966), p. 46.

> If he is not capable, he perhaps hides behind the fact of being spoiled, and becomes lazy, escaping from tasks, wasting time and making excuses.[1]

Koch conducted a study on self-confidence of siblings. Teachers rated sibling pairs on their degree of self-confidence. First-borns were rated more self-confident, a condition which might be expected from their being abler members of the sibling pairs. The self-confidence ratings, however, were based on school behavior. Since first-borns tend to be more adult-centered or oriented, the latter attitude may appear to the teacher as confidence. In a school situation where an adult presides, first-borns may be more self-confident than second-borns.[2]

A study undertaken at the Iowa Child Welfare Research Station by Sears revealed that second children are somewhat less dependent than first. Dependent behavior is related to a history of frustration in nursing and weaning experiences, and the mothers of second and later children tend to be somewhat less frustrated than the mothers of first children. It was not clear from the study whether this difference was related to some basic difference in the family

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[1]Alfred Adler, "Characteristics of the First, Second, Third Child," Children, III (1928), pp. 14 and 52.

[2]Helen L. Koch, "Some Emotional Attitudes of the Young Child in Relation to Characteristics of his Sibling," Child Development, XXII (December, 1956), p. 422.

structure and the roles composing it, or to greater experience of the mother and her decreasing anxiety about the child, or to her social status mobility upward.[1]

Using the same population of 1300 World War II soldiers that he used to study the relationship of birth order and intelligence, Altus also studied the relationship of birth order and adjustment. He found that the last-born in families of ten to thirteen were significantly better adjusted than the last-born in smaller families of two to nine children or those born first in big families. The older in a family of two was significantly better adjusted than the younger in a family of two and also better adjusted than all first-born. The middle child of a family of three proved to be better adjusted than all other children born in an intermediate position. These data imply that good adjustment is positively related to being born first, particularly in a family of two, to being born as the middle child in a family of three, and to being the last-born in truly big families with ten or more children.[2] A more recent study by Schachter revealed that first-born students were not so

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[1]Robert R. Sears, "Ordinal Position in the Family as a Psychological Variable," American Sociological Review, XV (June, 1950), p. 401.

[2]William D. Altus, "Birth Order, Intelligence, and Adjustment," Psychological Reports, V (September, 1959), p. 502.

well liked as later-born students who were fraternity brothers in the University of Minnesota.[1]

Fischer investigated the results of parents' preferential treatment of the first child upon the second-born. Thirty-one families seen during a six year span of practice as a pediatrician were chosen for study. They were chosen because behavior on the part of the second-born suggested difficulties. Of the thirty-one families surveyed, twenty-one had two children and ten had three. In twenty-six instances both siblings, or the two older siblings in families with three children, were of the same sex. In only five were the sexes different. Of the twenty-six similar sets, seventeen were males and nine were females. Fischer summarized his findings on the three-child families as follows:

> In families with three siblings no patterns could be established relating the middle child's behavior to the arrival and existence of the third. At times, however, the problems of the second child were aggravated following the birth of the third child. It is interesting that no unusual behavior pattern appeared in the third child in nine of the ten families with three children. In only one of them was there brief rebellion. It seems likely that by the time that two children are in the home the parents' attitudes are sufficiently labile that no special conflict arises with the arrival of the third sibling. This was true even in families in which difficulties were encountered with the second born.[2]

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[1]Stanley Schachter, "Birth Order, Eminence and Higher Education," American Sociological Review, XXVIII (October, 1963), p. 767.

[2]Alfred E. Fischer, "Sibling Relationships With Special Reference to the Problems of the Second Born," Journal of Pediatrics, XL (February, 1952), p. 256.

Lasko theorized that parental handling of first children would be marked by less warmth, more anxiety, more interference, and more restrictiveness than would the handling of second children. She compared forty pairs of siblings, matched for age, ranging from two to ten years. Scores on twenty-one variables of the Fels battery of rating scales were utilized as measures of parent-child relationship. "The age trend analysis indicates that the first child, in the pre-school years, is subjected to a great deal of verbal stimulation, and acceleration. Special accelerative attempts seem to occur before the first child is two and again when he is five. These scores probably represent parental emphasis on skill-acquisition (language, toilet training, etc.) for the very young child and school readiness for the five-year-old. The second child is also subjected to acceleratory pressures by the time he is school age but escapes the earlier efforts to speed up his development. The third child is treated slightly more warmly and indulgently than is the second, though few of the differences reached statistical significance."[1]

Birth Order and Achievement

The two previous sections of this chapter included numerous studies dealing with the relationship of birth

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[1]Joan K. Lasko, "Parent Behavior Toward First and Second Children," Genetic Psychology Monographs, XLIX (February, 1954), pp. 130-133.

order and intelligence, and the relationship of birth order and personality characteristics. Relatively few studies have dealt with the relationship of birth order and academic achievement at the elementary school level. In Schoonover's longitudinal investigation of ordinal position and achievement older and younger siblings consistently were found to have means of achievement that were very similar to each other. Family resemblances in intelligence were found to be somewhat greater than they were in achievement. An interesting aspect of her study revealed that siblings with brothers had significantly higher achievement scores than siblings with sisters in language, literature, science, social studies, and arithmetic. Differences were not significant in intelligence, reading, education, and spelling. Schoonover also investigated the matter of age interval between siblings. The results showed no relationship between age interval and the achievement means. It appears that variations in birth intervals are without influence on measures of achievement.[1]

Davis and Havighurst point to sibling competition as a factor in achievement. Some of the more common goals of sibling competition are parental attention, approval, affection, praise, encouragement, and rewards. "Frequently, children are encouraged or almost forced into the process.

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[1]Schoonover, loc. cit.

For example, parents sometimes press their younger children to live up to the scholastic achievement of their older siblings. 'Why can't you get good grades like your sister?' is a question commonly asked by parents. Perhaps teachers also contribute to the process when they welcome a new pupil with the comment, 'We're glad to have you in our room, John. I know you'll be a good student like your brother Henry'."[1]

Altus tabulated data on the birth order of students on the University of California, Santa Barbara, campus in 1959. "Of the 1817 representatives of the two-child family sixty-three percent were first-born. The figures for men and women are almost exactly alike. During the same period, 1299 representatives of the three-child families matriculated; 50.5 percent of these were first-born, 30.8 percent were second-born, 18.7 percent were third-born. Matriculants from four-child families numbered 538, of whom 50.5 percent were first-born, 25.8 percent second-born, 14 percent third-born, 9.7 percent were fourth-born."[2]

In 1962, Stewart reported on a study of 7000 boys and girls carried out in grammar and modern secondary school in London. The grammar school is largely college preparatory and is entered by passing the "11 plus" examination.

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[1]Allison W. Davis and Robert J. Havighurst, Father of the Man, (Boston: Houghton Mifflin Company, 1947), p. 120.

[2]William D. Altus, "Birth Order and Its Sequelae," Science, CLI (January, 1966), p. 46.

She found the first-born to be overrepresented in the grammar school and the later-born in the modern school. However, of those who remain in school after the legal attendance requirements have been met at age fifteen, roughly the same proportion of first-borns is found in both schools, when the ratio of the first- to the later-borns becomes slightly greater than two to one.[1]

Hodges and Balow found that males experiencing learning difficulties tend more often to have brothers than they do sisters. Having a sister and the effect of this upon the disabled male learner in a two-sibling family appeared to be without significance in the sample studied. "The significant finding that males with learning difficulties tend to have more brothers than sisters reiterates the fact that learning difficulties occur more frequently in two-boy families as compared to boy-girl families."[2]

Rosenberg found that birth order of the child and the sibling's sex tended to influence cognitive abilities. First-born children were found superior to second-born children on cognitive activity. The presence of a male sibling tended to increase the quantative scores while the presence

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[1]Mary Stewart, The Success of the First Born Child, (Workers Educational Association, London, 1962), pp. 1-19.

[2]Allen Hodges and Bruce Balow, "Learning Disability in Relation to Family Constellation," Journal of Educational Research, XLV (September, 1961), pp. 41-42.

of a female increased the language scores. Males tended to have a greater effect on females than vice versa.[1]

Anastasi found the first-born tended to excell on relatively abstract, verbal items, while the second and later-born were superior on a larger number of items involving realistic concrete tasks. The superiority of the first-born on verbal items may be the result of adult companionship.[2]

A doctoral study by Dolph at the University of Colorado using members of three-child families showed no significant difference between boys and girls in achievement. Subjects for this study were all ninth grade students in the Boulder Valley Public School System. There were 104 first children, 120 second children, and 67 third children. Treatment groups for part one of the study were first boy, first girl, second boy, second girl, third boy, and third girl.

A second part to her study used thirty-six complete family groups of three siblings each. When family group members were compared it was found that the first child's achievement was more consistent and higher, while the second child's achievement was more variable and lower. These

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[1]B. W. Rosenberg and B. Sutton-Smith, "The Relationship of Ordinal Position and Sibling Sex Status to Cognitive Abilities," Psychonimic Science, I (1964), pp. 81-82.

[2]Anne Anastasi, Differential Psychology, (New York: The Macmillan Company, 1958), p. 428.

differences were not statistically significant. Further analysis, using groups with the same sex older and the same sex younger was computed. It was found that the second girl having an older sister, achieves at a significantly lower level than first boy, first girl, or second boy. This finding was not true for second boys with older brothers.[1]

Summary

The literature devoted to the study of birth order and its relation to achievement indicates a concern for this problem over the last hundred years. Conclusions vary concerning the effect of birth order and intelligence, personality characteristics, and academic achievement.

Some of the findings from studies of intelligence indicate that first-borns have higher intelligence than youngest siblings. Other findings show that youngest children are favored in intelligence. Agreement seems to exist in the finding that siblings in the intermediate position are somewhat lower in intelligence. Evidence seems to support that boys and girls have equal intelligence and that much resemblance exists among siblings in intelligence. Investigations conducted on birth order and personality characteristics such as self-confidence, dependency, adjustment,

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[1]Dolph, loc. cit., p. 79.

cooperation, and acceptance vary as to which sibling possesses any one or all of these characteristics.

Evidence exists that achievement among siblings shows a close resemblance. First-borns seem to have the favored position in academic achievement. Siblings with brothers seem to have higher achievement than those with sisters.

CHAPTER IV

TREATMENT OF DATA

The purpose of this study was to determine if birth order in a family had any relationship to academic achievement at the elementary school level. It was possible to observe this relationship by the selection of eighty-three sibling groups with three siblings in each group. All the sibling groups were attending the Wichita Public Schools at the time the data were collected.

Comparisons of siblings were made on the basis of the grade equivalent scores earned for the Iowa Tests of Basic Skills. Tests were administered to all siblings when they were enrolled in third grade. Vocabulary, reading, language, arithmetic, and total educational development were the fundamental areas used in the comparisons. The raw data for the study are presented in Appendix E.

The sibling groups for this study were chosen on the basis of the criteria outlined in Chapter II. Essentially these criteria were: (1) all siblings were in the 75 to 125 I.Q. range as determined by the California Test of Mental Maturity, (2) the youngest siblings were in the third grade during the 1966-67 school year and had two older siblings,

neither of which were beyond the eighth grade, and (3) all the siblings had taken the Iowa Tests of Basic Skills in the third grade.

All raw data were punched on data-processing cards. The data were then analyzed by an IBM 1620 computer. The technique used for analyzing the data was the analysis of variance. The level of significance of the variance ratio was determined by the F Table developed by Snedecor.[1] The t-test was applied to determine whether the observed difference was large enough that it could not be attributed to chance factors.[2] By definition, the .05 level of significance would indicate that a given F ratio would occur five times out of 100 by chance alone. The .01 level of significance would indicate that a given F ratio would occur one time out of 100 by chance alone.

The following groups were analyzed by the analysis of variance:

1. First, second, and third sibling in the same family for variance in I.Q.
2. First, second, and third sibling in the same family for variance in achievement.
3. First and second girls in the same family for variance in I.Q.

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[1]G. W. Snedecor, Statistical Methods, (Ames, Iowa: State College Press, 1946).

[2]Allen L. Edwards, Statistical Methods for the Behavioral Sciences, (New York: Rinehart and Company, Inc., 1956), p. 249.

4. First and second girls in the same family for variance in achievement.

5. First and second boys in the same family for variance in I.Q.

6. First and second boys in the same family for variance in achievement.

7. First boys and second girls in the same family for variance in I.Q.

8. First boys and second girls in the same family for variance in achievement.

9. First girls and second boys in the same family for variance in I.Q.

10. First girls and second boys in the same family for variance in achievement.

11. Second and third boys in the same family for variance in I.Q.

12. Second and third boys in the same family for variance in achievement.

13. Second and third girls in the same family for variance in I.Q.

14. Second and third girls in the same family for variance in achievement.

15. Second boys and third girls in the same family for variance in I.Q.

16. Second boys and third girls in the same family for variance in achievement.

17. Second girls and third boys in the same family for variance in I.Q.

18. Second girls and third boys in the same family for variance in achievement.

The findings from the use of these analyses were used to determine whether or not a relationship existed between

birth order of siblings within a family and academic achievement according to the sample population of this study.

Hypothesis 1. There is no statistically significant difference in the mean achievement of first, second, and third siblings.

The first siblings had a mean I.Q. score of 106.80, the second siblings had a mean I.Q. score of 105.80, and the third siblings had a mean I.Q. score of 107.35. The mean I.Q. scores were compared by the analysis of variance technique with an obtained F ratio of .46 which was not significant at the .05 level. An F value of 3.04 was needed for significance with two degrees of freedom for the mean square between the groups and 246 degrees of freedom for the mean square within groups. As shown in Table I, the mean achievement scores were found for vocabulary, reading, language, arithmetic, and for the composite. The resulting F ratios were .77 for vocabulary, 1.87 for reading, 1.95 for language, .70 for arithmetic, and .94 for the composite. None of these were significant at the .05 level, since an F value of 3.04 was required for significance with two degrees of freedom for the mean square between groups and 246 degrees of freedom for the mean square within groups. The first hypothesis was accepted, and it can be assumed that the variances among the achievement means of the first, second, and third siblings were not significantly different.

TABLE I

INTELLIGENCE QUOTIENTS AND ACHIEVEMENT MEANS FOR FIRST, SECOND, AND THIRD SIBLINGS

	First Sibling N=83		Second Sibling N=83		Third Sibling N=83		
	Mean	S.D.	Mean	S.D.	Mean	S.D.	F-Ratio
I.Q.	106.80	10.09	105.80	11.11	107.35	10.44	.46
Vocabulary	3.45	1.09	3.27	1.08	3.29	.77	.77
Reading	3.30	1.19	3.20	1.22	3.53	1.00	1.87
Language	3.50	1.24	3.28	1.24	3.65	1.10	1.95
Arithmetic	3.19	.80	3.23	.83	3.33	.80	.70
Composite	3.38	1.05	3.26	.99	3.46	.79	.94

Hypothesis 2. There is no statistically significant difference in the mean achievement of first and second girls in the same family.

The first girls had a mean I.Q. score of 107.91 and the second girls had a mean I.Q. of 108.45. The analysis of variance was used to determine if there was a significant difference in the mean I.Q. scores of first and second girls. The resulting value of F was .03 which was not significant at the .05 level. An F value of 4.07 was required for significance with one and forty-two degrees of freedom. The mean achievement scores were found for vocabulary, reading, language, arithmetic and for the composite and shown in Table II. The F values were .13 for vocabulary, .37 for reading, .51 for language, .02 for arithmetic, and .05 for the composite. None of these were significant at the .05 level. An F value of 4.07 was required for significance with one and forty-two degrees of freedom. The second hypothesis was accepted, and it can be assumed that no significant variance difference existed between the achievement means of first and second girls in the same family.

Hypothesis 3. There is no statistically significant difference in the mean achievement of first and second boys in the same family.

The mean I.Q. of first boys was 106.60 and 104.60 for second boys. The F ratio was .65 and was not significant at the .05 level, since a value of 4.02 was necessary with

TABLE II

INTELLIGENCE QUOTIENTS AND ACHIEVEMENT FOR FIRST AND SECOND GIRLS IN THE SAME FAMILY

	First Girls N=22		Second Girls N=22		F-Ratio	t-Test
	Mean	S.D.	Mean	S.D.		
I.Q.	107.91	11.65	108.45	10.07	.03	.17
Vocabulary	3.35	1.15	3.23	1.14	.13	.36
Reading	3.26	1.47	3.50	1.21	.37	.60
Language	3.78	1.43	3.47	1.48	.51	.71
Arithmetic	3.15	.95	3.11	.95	.02	.14
Composite	3.41	1.22	3.33	1.06	.05	.22

one and fifty-eight degrees of freedom for significance. Table III shows the resulting F ratios for the achievement means: vocabulary .53, reading .09, language .02, arithmetic .44, and the composite .06. These values were not significant at the .05 level. An F value of 4.02 was necessary for significance for one and fifty-eight degrees of freedom. The third hypothesis was accepted, therefore it may be concluded that no statistically significant difference existed between the mean achievement scores of first and second boys in the same family.

Hypothesis 4. There is no statistically significant difference in the mean achievement of first girls and second boys in the same family.

First girls had a mean I.Q. of 105.65 and second boys had a mean I.Q. of 105.71. The analysis of variance did not show any significant difference at the .05 level. When the mean achievement scores were compared the following F ratios were found: 1.25 for vocabulary, 4.89 for reading, 4.42 for language, .002 for arithmetic, and 2.65 for the composite. An F ratio of 4.15 is needed to reach significance at the .05 level with one and thirty-two degrees of freedom, therefore, a statistically significant difference did exist between the mean reading achievement and the mean language achievement scores of first girls and second boys. The fourth hypothesis was rejected, and it was concluded that there was a statistically significant difference between

TABLE III

INTELLIGENCE QUOTIENTS AND ACHIEVEMENT FOR FIRST AND SECOND BOYS IN THE SAME FAMILY

	First Boys N=30		Second Boys N=30		F-Ratio	t-Test
	Mean	S.D.	Mean	S.D.		
I.Q.	106.60	9.05	104.60	10.09	.65	.81
Vocabulary	3.39	1.22	3.16	1.20	.53	.73
Reading	3.15	1.08	3.05	1.42	.09	.30
Language	3.24	.91	3.28	1.30	.02	.14
Arithmetic	3.14	.93	3.29	.82	.44	.66
Composite	3.23	1.02	3.16	1.15	.06	.25

first girls and second boys in mean reading and language achievement scores. These mean differences favored the first girls in both cases. Data concerned with these comparisons are shown in Table IV.

Hypothesis 5. There is no statistically significant difference in the mean achievement of first boys and second girls in the same family.

Table V contains the results of the comparisons of first boys and second girls in the same family. The mean I.Q. scores for the first boys and second girls were 106.86 and 104.29 respectively. The F ratio did not show a statistically significant difference between the I.Q. means. The comparison of mean achievement scores of first boys and second girls resulted in an F ratio of .03 for vocabulary, .05 for reading, .29 for language, .06 for arithmetic and .33 for the composite. Since none of these reached an F value of 4.22 for one and twenty-six degrees of freedom needed for statistical significance, hypothesis five was accepted.

Hypothesis 6. There is no statistically significant difference in the mean achievement of second and third girls in the same family.

There was no statistically significant difference in the mean I.Q. scores of the second and third girls when tested with the analysis of variance test. The mean I.Q. score of the second girls was 106.06 and the mean for the

TABLE IV

INTELLIGENCE QUOTIENTS AND ACHIEVEMENT FOR FIRST GIRLS AND SECOND BOYS IN THE SAME FAMILY

	First Girls N=17		Second Boys N=17		F-Ratio	t-Test
	Mean	S.D.	Mean	S.D.		
I.Q.	105.65	9.69	105.71	14.02	.0002	.01
Vocabulary	3.61	.83	3.27	.94	1.25	1.12
Reading	3.71	.91	2.99	.98	4.89*	2.21*
Language	3.81	1.38	2.29	1.07	4.42*	2.10*
Arithmetic	3.36	.53	3.38	.87	.002	.05
Composite	3.69	.89	3.20	.88	2.65	1.63

*Significant at .05.

TABLE V

INTELLIGENCE QUOTIENTS AND ACHIEVEMENT FOR FIRST BOYS AND SECOND GIRLS IN THE SAME FAMILY

	First Boys N=14		Second Girls N=14		F-Ratio	t-Test
	Mean	S.D.	Mean	S.D.		
I.Q.	106.86	11.00	104.29	11.33	.37	.61
Vocabulary	3.52	1.04	3.59	.89	.03	.18
Reading	3.19	1.25	3.29	1.03	.05	.23
Language	3.21	1.33	3.44	.87	.29	.54
Arithmetic	3.14	.56	3.08	.64	.06	.25
Composite	3.25	1.00	3.44	.66	.33	.58

third girls was 108.89. Table VI shows the results of comparisons in I.Q. and achievement. The comparisons of mean achievement scores in language (4.96), arithmetic (6.07), and the composite (5.33) reached an F value which was statistically significant at the .05 level. An F ratio of 4.15 for one and thirty-two degrees of freedom was required for statistical significance. Mean achievement scores in vocabulary and reading yielded an F ratio of 3.60 and 3.65 respectively. Hypothesis six was rejected and it was concluded that a difference in the language, reading, and composite mean achievement scores did exist between second and third girls in the same family. This difference favored the third girls over second girls.

Hypothesis 7. There is no statistically significant difference in the mean achievement of second and third boys in the same family.

The analysis of variance test showed that no statistically significant difference existed between the mean I.Q. scores of second and third boys in the same family. The mean I.Q. score for second boys was 104.50 and the mean I.Q. score for third boys was 107.70. When comparing the mean achievement scores of second and third boys the F values for the fundamental areas were 1.65 for vocabulary, .04 for reading, .42 for language, 1.80 for arithmetic, and .23 for the composite. All of the achievement areas failed to reach statistical significance, since an F ratio of 4.10 for one

TABLE VI

INTELLIGENCE QUOTIENTS AND ACHIEVEMENT FOR SECOND AND THIRD GIRLS IN THE SAME FAMILY

	Second Girls N=17		Third Girls N=17		F-Ratio	t-Test
	Mean	S.D.	Mean	S.D.		
I.Q.	106.06	9.31	108.88	8.84	.82	.91
Vocabulary	3.05	1.09	3.61	.50	3.60	1.90
Reading	3.14	.68	3.61	.77	3.65	1.91
Language	2.97	.91	3.72	1.06	4.96*	2.23*
Arithmetic	2.89	.55	3.42	.69	6.07*	2.46*
Composite	3.07	.66	3.59	.66	5.33*	2.31*

*Significant at .05.

and thirty-eight degrees of freedom was required. Therefore, hypothesis seven was accepted and it was concluded that there was no statistically significant difference in the mean achievement of second and third boys. Table VII shows the results of this comparison.

Hypothesis 8. There is no statistically significant difference in the mean achievement of second girls and third boys in the same family.

The mean I.Q. scores of second girls and third boys were nearly equal with a mean of 107.53 and 107.79 respectively. An analysis of the mean I.Q. and mean achievement scores are shown in Table VIII. A comparison of the mean achievement scores gave the following F ratios: vocabulary 1.81, reading .05, language 2.91, arithmetic .07, and the composite 1.05. An F value of 4.11 with one and thirty-six degrees of freedom was required to reach statistical significance. Hypothesis eight was accepted and its was concluded that no statistical significant difference existed in the mean achievement scores of second girls and third boys in the same family.

Hypothesis 9. There is no statistically significant difference in the mean achievement of second boys and third girls in the same family.

Second boys and third girls had mean I.Q. scores that were quite homogeneous, therefore, there was no statistical difference in the two means. Variances were observed in the

TABLE VII

INTELLIGENCE QUOTIENTS AND ACHIEVEMENT FOR SECOND AND THIRD BOYS IN THE SAME FAMILY

	Second Boys N=20		Third Boys N=20		F-Ratio	t-Test
	Mean	S.D.	Mean	S.D.		
I.Q.	104.50	12.00	107.70	10.35	.82	.90
Vocabulary	3.09	1.19	2.68	.81	1.65	1.29
Reading	2.98	1.19	2.91	1.14	.04	.20
Language	3.10	1.21	3.35	1.19	.42	.64
Arithmetic	3.36	.87	2.99	.85	1.80	1.34
Composite	3.15	1.07	3.00	.89	.23	.48

TABLE VIII

INTELLIGENCE QUOTIENTS AND ACHIEVEMENT FOR SECOND GIRLS AND THIRD BOYS IN THE SAME FAMILY

	Second Girls N=19		Third Boys N=19		F-Ratio	t-Test
	Mean	S.D.	Mean	S.D.		
I.Q.	107.53	11.88	107.79	11.54	.005	.07
Vocabulary	3.65	.95	3.27	.80	1.81	1.34
Reading	3.67	1.39	3.59	1.02	.05	.21
Language	3.89	1.39	3.24	.95	2.91	1.71
Arithmetic	3.28	1.00	3.21	.90	.07	.26
Composite	3.62	1.04	3.33	.82	1.05	1.02

mean achievement scores in reading with a resulting F value of 7.69, in language with an F ratio of 9.02, and the composite with an F ratio of 7.05. Reading and language were significant at the .01 level. An F ratio of 7.17 with one and fifty-two degrees of freedom was required to reach significance at the .01 level. Hypothesis nine was rejected and it was concluded that there was a significant difference in the mean achievement scores of second boys and third girls in the same family. This difference favored third girls over second boys as shown in Table IX.

TABLE IX

INTELLIGENCE QUOTIENTS AND ACHIEVEMENT FOR SECOND BOYS AND THIRD GIRLS IN THE SAME FAMILY

	Second Boys N=27		Third Girls N=27		F-Ratio	t-Test
	Mean	S.D.	Mean	S.D.		
I.Q.	105.37	11.38	105.81	11.00	.002	.15
Vocabulary	3.29	1.05	3.57	.57	1.59	1.26
Reading	3.07	1.34	3.91	.82	7.69**	2.77**
Language	3.18	1.26	4.12	1.00	9.02**	3.00**
Arithmetic	3.30	.81	3.62	.65	2.60	1.61
Composite	3.20	1.05	3.81	.60	7.05*	2.66*

*Significant at .05.

**Significant at .01.

CHAPTER V

SUMMARY, FINDINGS, CONCLUSIONS, AND RECOMMENDATIONS

Summary

The problem of this study was to determine if sibling position within a family had any significant relationship to academic achievement at the elementary school level. Academic achievement was based on test scores in the areas of vocabulary, reading, language, arithmetic, and the composite, as measured by the Iowa Tests of Basic Skills. This study was concerned only with the relationship of birth order and achievement within family groups. The comparisons in mean achievement scores were based on each sibling's achievement scores at the third grade level.

The data for the study were gathered during the 1966-67 school year in the Wichita, Kansas, Public Schools. The permanent pupil records at each of the ninety-one elementary schools and the sixteen junior high schools were used for the necessary data. All sibling groups which met the necessary criteria as set up in Chapter II, were included in the study. The sample included 83 sibling groups or 249 siblings to observe. Comparisons were made on nine sub-groups from the sample.

The I.Q. and achievement means were computed for the various sibling groups using first, second, and third siblings; first and second siblings of the same sex and same family; first and second siblings of different sex and same family; second and third siblings of the same sex and same family; and second and third siblings of different sex and same family. An analysis of variance test and t-test were used to determine if any significant statistical difference existed in the hypotheses tested. The level of significance selected for this study was the .05 level of confidence.

Findings

An analysis of the data revealed the following findings:

1. There was no significant difference in the mean achievement scores of first, second, and third siblings in any of the academic areas. While it was not significant, the youngest siblings had the highest mean composite achievement score, the oldest siblings were next highest, and the middle siblings had the lowest mean composite achievement score. The mean I.Q. scores of this grouping followed the same ranking pattern, but were not significant.

2. First girls had a higher mean vocabulary, language, arithmetic, and composite achievement score than second girls, but not to the extent that they were significant. Second girls had a slightly higher mean reading

achievement score than first girls. Second girls had a slightly higher mean I.Q. score than first girls, but not significantly so.

3. No significant difference was found between the achievement means of first and second boys. Mean achievement scores in vocabulary, reading, and composite favored first boys. First boys were also favored slightly in mean I.Q. score. Second boys were favored in mean language and arithmetic scores.

4. First girls' achievement scores in reading and language were significantly higher than second boys'. The mean vocabulary and composite achievement scores favored first girls, and the mean arithmetic and mean I.Q. scores favored second boys, but not significantly.

5. There was no significant difference in the mean achievement level of first boys and second girls. The mean achievement scores favored the second girls in all academic areas except arithmetic. First boys were favored over second girls by 1.57 I.Q. points, but differences did not reach significance.

6. Third girls' mean achievement scores were significantly higher than second girls' in the academic areas of language, arithmetic, and composite. Mean achievement scores for reading and vocabulary were also higher for third girls, but not significantly so. While not significant, the mean I.Q. score for third girls was higher than for second girls.

7. The comparison of mean achievement scores of second and third boys did not reach significance. The mean achievement scores did favor second boys in vocabulary, reading, arithmetic, and composite, while third boys were favored in mean language achievement. Third boys were favored in mean I.Q.

8. There was no significant difference in the mean achievement scores of second girls and third boys. Second girls were favored in all mean achievement scores. The mean I.Q. scores favored the second girls by only .13 of a point.

9. A statistically significant difference existed between second boys and third girls in the mean achievement scores in reading, language, and composite. This mean difference favored third girls over second boys. The mean achievement scores for vocabulary, and arithmetic followed the same pattern though not significantly. The mean I.Q. scores slightly favored third girls.

Conclusions

Data collected on the pupil population included in this study support the following conclusions:

1. There is a relationship between birth order and school achievement of siblings.

2. There is no relationship between intelligence quotients and either sibling order or sex of siblings.

3. School achievement is related to the order of birth of siblings only when sex differences are considered.

4. First-born girls have higher mean achievement scores than second-born brothers.

5. There is no apparent difference between mean achievement scores of first-born and second-born brothers or between first-born and second-born sisters.

6. Third-born girls have higher mean achievement scores than do second-born siblings of either sex.

Recommendations

1. Additional study should be given to the following aspects of the relation of achievement to birth order of siblings:

   a. Using successive grade levels to determine whether similar relationships exist as found in this study.

   b. Using a sample of slow learners to determine whether or not the same relationship exists as with the relatively homogeneous sample used in this study.

   c. Using a sample of rapid learners to determine whether or not the same relationship exists as with the relatively homogeneous sample used in this study.

2. The findings of research dealing with the relation of school achievement to birth order of siblings should be taken into consideration by school personnel concerned with making provision for individual differences among pupils.

3. Parents should be made aware of research dealing with the relation of achievement to birth order to provide one more basis for better understanding of their children.

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APPENDIX A

RESEARCH PROPOSAL FOR WICHITA PUBLIC SCHOOLS

RESEARCH PROPOSAL

NAME _____ DATE _____

HOME ADDRESS _____ SCHOOL _____

Complete this form using brief, concise statements. Send four copies to the Director of Research for approval prior to the initiation of any new project.

1. Title and brief description of the proposed study.

2. Statement of the educational problem as seen by the building principal.

3. Specific purposes and expected outcomes. Hypotheses to be tested may be stated.

4. Personnel (administrators, teachers, pupils, and others), schools, and classes to be involved.

5. Expected starting date, duration of study, and expected date of final report.

RESEARCH OFFICE USE

_____
Date Research Completed

_____
Date Report Filed

6. Materials and supplies needed. How financed? Personal, school, or division?

Item	Estimated Cost	Account Number
Total		

7. Procedures and methods to be employed. (What will be done by the investigator and the participants in the study, data to be gathered, data-gathering instruments to be used). If possible, attach copies of instruments to be used in obtaining data.

8. Methods of evaluation, including data analysis.

9. Suggested follow-up activities.

Approval	Date
Principal _____	_____
Director of Research _____	_____
Director of Pupil Services _____	_____
Assistant Superintendent _____	_____
Deputy Superintendent _____	_____

October, 1966

APPENDIX B

APPROVAL LETTER FROM RESEARCH COUNCIL

WICHITA PUBLIC SCHOOLS
Research Department
February 13, 1967

TO: Elementary and Junior High School Principals

FROM: Ralph E. Walker, Director of Research

SUBJECT: Research Study

Mr. Kenneth Wolf, Principal of South Hillside Elementary School, has received approval of the Research Council to conduct a study of the relationship of academic achievement and sibling position in the elementary school. The data-gathering will involve perusal of permanent pupil records at both the elementary and junior high school levels. Even though children's names and school names will appear on copies of the survey form, you may be assured that anonymity of children and schools will be maintained.

Your cooperation in allowing Mr. Wolf to glean information from pupil records will be appreciated. If you have questions pertaining to the study, please feel free to call me.

Ralph E. Walker

APPENDIX C

LETTER SENT TO PRINCIPALS

1249 High
Wichita, Kansas
February 14, 1967

Dear (Individual Principal's Name)

As you know, I am currently on leave of absence to work on a research study at the University of Oklahoma. The study deals with sibling position in the family and its relationship to achievement in the elementary school. Pupils currently enrolled in the third grade with two older siblings and none younger, will be used in the project.

In order to collect the necessary data, I will need to come to your building. The Pupil Permanent Record will be used to obtain the California Test of Mental Maturity scores and the third grade Iowa Tests of Basic Skills scores for each sibling. If you or the third grade teachers could survey the third graders and jot down a list of families falling in the above family classification it would greatly facilitate the process.

This study has been cleared through and approved by the Research Council. Results of this study will be made available upon completion.

If all goes well, I should see you within the next two weeks. Your assistance will be greatly appreciated.

Sincerely,

Kenneth Wolf

APPENDIX D

DATA-GATHERING FORM

DATA-GATHERING FORM

Family Name _____

3rd Sibling or Youngest (1958 or 1957 Birthdate) _____ Child's Name _____ School

Birthdate _____ Age _____ Sex _____

CMM IQ score ____ Percentile ____ Date Administered _____

3rd Grade
ITBS scores - _____ Vocab. %ile _____ Read. %ile _____ Lang. %ile

_____ Arith. %ile _____ Comp. %ile

Date Administered _____

2nd Sibling or Middle (1957, 1956 or 1955 Birthdate) _____ Child's Name _____ School

Birthdate _____ Grade ____ Age _____ Sex _____

CMM IQ score ____ Percentile ____ Date Administered _____

3rd Grade
ITBS scores - _____ Vocab. %ile _____ Read. %ile _____ Lang. %ile

_____ Arith. %ile _____ Comp. %ile

Date Administered _____

1st Sibling or Oldest (1956, 1955, 1954, 1953 or 1952 Birthdate) _____ Child's Name _____ School

Birthdate _____ Grade ____ Age _____ Sex _____

CMM IQ score ____ Percentile ____ Date Administered _____

3rd Grade
ITBS scores - _____ Vocab. %ile _____ Read. %ile _____ Lang. %ile

_____ Arith. %ile _____ Comp. %ile

Date Administered _____



APPENDIX E

RAW DATA

RAW DATA

CALIFORNIA TEST OF MENTAL MATURITY SCORES,
SEX, AND IOWA TESTS OF BASIC SKILLS
GRADE EQUIVALENT SCORES

First Siblings	I.Q.	Sex	Vocab-ulary	Read-ing	Lan-guage	Arith-metic	Com-posite
1	109	F	2.7	2.7	3.8	3.0	3.1
2	110	F	2.9	2.1	3.2	3.4	2.8
3	104	F	2.0	1.5	2.5	3.1	2.1
4	124	F	3.0	2.7	2.0	3.0	2.6
5	87	F	2.0	3.2	2.1	2.2	2.4
6	115	F	3.8	3.7	5.4	3.8	4.2
7	113	F	4.0	3.9	4.7	2.1	3.8
8	112	F	4.4	4.3	5.2	4.1	4.6
9	117	F	5.5	5.4	5.4	4.3	5.4
10	108	F	3.8	2.7	5.0	3.6	3.9
11	119	F	2.7	2.7	3.2	3.0	2.8
12	79	F	3.2	1.8	2.5	2.1	2.4
13	96	F	2.3	2.0	3.1	2.6	2.5
14	98	F	1.3	1.7	1.5	1.8	1.6
15	124	F	2.2	1.5	1.4	2.2	1.7
16	120	F	5.2	5.9	6.1	4.3	5.4
17	117	F	4.7	6.2	5.2	5.4	5.4
18	98	F	2.9	2.1	3.0	2.7	2.6
19	102	F	3.4	3.7	5.2	3.3	3.9
20	98	F	2.5	2.6	3.2	1.7	2.5
21	110	F	4.9	4.9	5.0	4.0	4.7
22	114	F	4.4	5.0	4.5	3.7	4.6
23	97	F	2.3	2.7	2.7	2.7	2.6
24	97	F	2.4	3.2	2.1	3.3	2.7
25	109	F	3.2	2.6	2.7	2.9	2.9
26	120	F	4.1	4.6	4.1	4.1	4.3
27	103	F	3.9	4.5	5.4	3.4	4.4
28	111	F	5.2	4.5	4.7	4.1	4.8
29	109	F	3.6	3.4	3.3	4.1	3.6
30	102	F	4.5	5.7	6.1	3.7	5.3
31	93	M	3.6	3.8	3.6	3.2	3.6
32	121	M	3.2	1.5	3.4	3.1	2.8
33	105	M	3.3	3.7	1.8	2.7	2.8
34	110	M	1.1	1.1	1.4	2.8	1.4
35	119	M	4.2	3.3	2.1	3.2	2.6
36	96	M	2.7	2.3	2.0	2.6	2.4
37	121	M	5.2	4.3	4.3	4.1	4.7
38	102	M	3.4	2.9	3.0	3.3	3.2
39	100	M	3.3	1.6	3.4	3.3	3.0
40	103	M	3.2	3.4	2.3	3.6	3.1

First Siblings	I.Q.	Sex	Vocab-ulary	Read-ing	Lan-guage	Arith-metic	Com-posite
41	101	M	4.1	3.7	2.8	3.8	3.6
42	93	M	3.5	2.6	3.2	3.2	3.2
43	114	M	6.1	5.1	4.1	4.4	5.1
44	106	M	2.7	1.8	2.5	3.2	2.2
45	103	M	3.5	3.8	3.3	2.0	3.2
46	113	M	4.9	4.4	4.0	4.0	4.4
47	98	M	2.0	1.9	1.6	1.9	1.8
48	83	M	2.5	2.6	3.8	2.0	2.7
49	112	M	3.1	2.4	3.6	3.3	3.2
50	112	M	3.3	2.4	3.3	2.2	2.8
51	108	M	1.3	1.5	1.6	1.7	1.5
52	97	M	3.4	2.2	1.7	2.8	2.5
53	121	M	2.0	3.9	2.5	2.6	2.5
54	100	M	2.3	3.4	3.2	3.2	2.7
55	113	M	4.7	4.8	4.1	4.0	4.4
56	105	M	2.7	2.3	2.4	2.6	2.5
57	124	M	6.1	4.1	5.1	5.2	5.3
58	113	M	3.1	3.4	3.6	3.6	3.4
59	100	M	3.9	4.1	4.1	4.1	4.1
60	94	M	4.4	5.0	5.4	3.8	4.8
61	117	M	4.9	4.5	3.6	4.5	4.5
62	116	M	2.7	3.8	3.8	3.2	3.4
63	117	M	1.5	1.6	2.3	1.5	1.6
64	105	M	3.0	2.6	2.8	3.6	3.0
65	108	M	3.7	3.4	3.2	3.6	3.5
66	113	M	1.7	1.9	3.4	1.8	1.6
67	107	M	4.7	4.3	3.5	3.3	4.1
68	105	M	4.5	5.7	5.2	3.9	4.9
69	120	M	3.1	2.9	3.0	2.8	3.0
70	103	M	3.6	2.3	3.6	3.8	3.4
71	116	M	4.8	3.8	3.1	2.4	3.5
72	95	M	2.9	3.3	1.8	2.4	2.5
73	97	M	2.9	2.1	3.8	3.2	3.1
74	101	M	4.2	4.5	5.9	3.7	4.8
75	90	F	3.3	3.5	3.1	3.1	3.2
76	106	F	3.3	3.4	2.7	2.4	3.0
77	102	F	2.9	2.9	2.0	3.2	2.7
78	122	F	4.5	4.6	5.7	4.1	4.8
79	96	F	4.0	3.8	3.2	3.2	3.6
80	108	F	2.2	2.1	2.4	2.8	2.5
81	124	F	3.9	3.5	5.9	3.6	4.4
82	105	F	4.0	4.3	4.6	3.4	4.1
83	95	F	4.1	3.8	4.0	3.1	3.9

CALIFORNIA TEST OF MENTAL MATURITY SCORES,
SEX, AND IOWA TESTS OF BASIC SKILLS
GRADE EQUIVALENT SCORES

Second Siblings	I.Q.	Sex	Vocab-ulary	Read-ing	Lan-guage	Arith-metic	Com-posite
1	99	F	1.5	2.9	2.1	2.5	2.2
2	93	F	1.7	2.6	1.8	2.0	2.0
3	101	F	2.1	2.7	3.5	2.3	2.7
4	114	F	4.5	4.1	4.1	3.7	4.1
5	120	F	2.2	3.3	1.5	2.5	2.4
6	118	F	2.0	2.3	3.1	3.1	2.6
7	97	F	3.3	3.2	1.7	2.3	2.6
8	119	F	4.5	3.1	3.8	4.0	3.9
9	111	F	2.0	3.0	2.5	2.6	2.5
10	109	F	3.6	3.3	4.0	3.4	3.6
11	108	F	3.2	1.9	2.3	2.3	2.4
12	101	F	3.4	3.8	5.2	2.1	3.6
13	107	F	3.4	3.5	5.6	3.5	1.0
14	125	F	3.0	4.1	4.6	3.2	3.7
15	107	F	2.3	2.5	3.5	2.0	2.6
16	121	F	3.9	4.8	5.0	4.8	4.6
17	100	F	6.4	7.7	7.6	5.4	6.7
18	97	F	3.6	2.9	2.5	2.6	3.0
19	119	F	3.7	3.3	3.0	4.1	3.5
20	95	F	2.9	3.0	2.3	2.3	2.6
21	123	F	3.8	4.9	3.2	3.8	4.0
22	102	F	4.1	4.2	3.4	4.0	4.0
23	99	M	2.3	2.4	1.8	2.2	2.2
24	83	M	2.5	1.7	1.6	2.1	2.0
25	105	M	4.1	3.2	3.5	4.0	3.7
26	124	M	4.7	3.8	4.2	4.4	4.3
27	109	M	2.5	2.2	2.1	2.4	2.3
28	124	M	4.2	4.5	2.7	4.4	4.1
29	92	M	3.0	3.5	3.3	3.1	3.0
30	98	M	2.5	2.7	2.4	3.1	2.7
31	96	F	1.5	2.6	3.4	2.4	2.5
32	112	F	3.7	2.6	4.2	3.4	3.5
33	110	F	3.7	4.3	2.5	3.2	3.4
34	110	F	3.8	3.8	2.5	2.6	3.2
35	102	F	4.3	4.0	3.7	3.2	3.8
36	90	F	3.6	3.7	3.8	3.0	3.6
37	102	F	3.9	1.8	2.3	3.0	3.6
38	94	M	3.0	2.1	1.6	3.0	2.4
39	115	M	4.7	4.7	4.6	4.3	4.6
40	95	M	3.3	2.6	3.3	2.5	2.9
41	109	M	3.7	3.4	4.0	4.1	3.8
42	106	M	2.0	1.5	3.4	2.0	2.1

Second Siblings	I.Q.	Sex	Vocab-ulary	Read-ing	Lan-guage	Arith-metic	Com-posite
43	121	M	4.8	5.3	5.0	4.8	5.0
44	94	M	1.8	2.1	1.4	2.7	2.0
45	89	M	1.6	2.4	3.6	3.8	2.8
46	107	M	4.4	4.5	3.5	3.4	4.0
47	97	M	1.2	1.5	1.5	2.0	1.1
48	100	M	1.5	2.6	2.1	2.8	2.2
49	89	M	3.0	2.5	2.9	2.8	2.8
50	118	M	2.9	1.2	1.5	2.2	2.0
51	99	M	2.7	2.3	2.1	2.5	2.4
52	103	M	1.6	1.4	2.2	2.1	1.8
53	123	M	5.0	6.4	5.7	4.3	5.4
54	97	M	2.5	3.0	2.2	3.0	2.7
55	109	M	1.6	1.1	1.3	2.7	1.4
56	93	M	4.2	3.0	5.0	3.5	3.9
57	116	M	3.8	2.7	5.7	3.6	4.0
58	98	M	2.2	2.3	2.7	3.3	2.6
59	94	M	3.4	2.6	2.5	3.4	3.1
60	116	M	4.8	4.7	4.8	4.2	4.6
61	96	M	2.1	1.9	2.4	3.5	2.5
62	113	M	3.9	3.8	3.8	4.0	3.9
63	112	M	5.3	5.9	5.0	5.0	5.3
64	116	M	2.5	3.2	3.0	3.1	3.0
65	97	M	3.6	2.9	4.0	3.1	3.4
66	114	M	4.4	5.3	3.6	4.2	4.4
67	108	M	3.4	2.6	2.0	2.8	2.8
68	121	F	4.4	4.3	4.0	3.4	4.0
69	109	F	3.0	2.0	2.9	3.8	2.9
70	113	F	4.2	3.7	4.6	3.8	4.1
71	105	F	2.1	3.3	2.5	1.5	2.4
72	75	F	3.1	1.6	2.7	2.6	2.5
73	106	F	4.5	3.3	4.8	3.6	4.1
74	109	F	4.4	5.0	4.3	3.6	4.5
75	76	M	2.5	2.1	2.4	2.4	2.4
76	106	M	1.6	1.6	3.1	2.9	2.6
77	100	M	4.4	4.4	5.7	3.8	4.7
78	125	M	4.4	4.1	4.0	4.5	4.3
79	104	M	3.4	2.9	2.1	3.8	3.6
80	106	M	2.5	1.9	1.6	3.4	2.2
81	123	M	3.0	2.4	2.7	4.0	3.1
82	112	M	3.8	3.1	2.8	2.4	3.0
83	111	M	4.2	4.4	3.6	4.5	4.2

CALIFORNIA TEST OF MENTAL MATURITY SCORES, SEX, AND IOWA TESTS OF BASIC SKILLS GRADE EQUIVALENT SCORES

Third Siblings	I.Q.	Sex	Vocab-ulary	Read-ing	Lan-guage	Arith-metic	Com-posite
1	116	F	3.6	3.3	4.2	3.6	3.7
2	111	F	4.0	3.5	4.2	4.4	4.0
3	112	F	3.0	3.2	1.8	2.7	2.6
4	125	F	4.6	4.9	4.0	4.7	4.5
5	112	F	3.5	3.5	3.6	2.6	3.3
6	113	F	3.2	3.5	3.8	2.8	3.3
7	93	F	2.7	2.2	1.2	2.4	2.1
8	119	F	3.7	4.6	3.8	3.8	4.0
9	93	F	3.7	3.9	3.0	3.0	3.4
10	114	F	4.0	4.1	4.8	4.0	4.2
11	120	M	3.3	3.2	2.8	2.9	3.0
12	103	M	1.6	1.6	1.0	1.8	1.5
13	115	M	3.2	3.0	3.3	2.9	3.1
14	97	M	2.1	3.3	2.8	2.9	2.8
15	100	M	2.5	2.7	2.6	2.9	2.7
16	124	M	3.6	4.4	2.6	3.5	3.5
17	125	M	4.8	5.4	4.2	4.2	4.7
18	104	M	4.3	5.5	4.8	3.7	4.6
19	98	M	3.2	3.3	3.3	3.4	3.3
20	105	M	3.5	3.0	4.2	3.2	3.7
21	123	M	3.9	4.8	4.6	3.7	4.3
22	121	M	2.7	3.7	3.2	3.6	3.3
23	120	F	3.8	4.3	4.6	4.2	4.2
24	93	F	3.5	3.9	3.8	3.8	3.8
25	116	F	3.4	3.0	2.1	3.6	3.0
26	124	F	3.3	5.0	5.0	4.2	4.4
27	109	F	3.4	3.7	4.4	4.1	3.9
28	89	F	2.8	2.8	2.9	2.1	2.7
29	89	F	3.2	3.4	2.8	2.9	3.1
30	84	F	2.3	2.7	3.2	3.0	2.8
31	110	F	2.8	2.2	4.0	2.8	3.0
32	107	F	3.2	3.3	4.2	3.4	3.5
33	103	F	3.8	4.3	3.8	3.2	3.8
34	115	F	4.3	4.4	4.2	4.1	4.3
35	97	F	3.7	3.0	4.2	3.1	3.5
36	102	F	3.7	3.2	2.8	3.3	3.3
37	109	F	3.8	4.3	5.7	4.3	4.6
38	116	M	2.5	2.9	2.2	2.6	2.6
39	105	M	3.2	3.9	3.7	3.9	3.7
40	100	M	3.0	2.2	3.5	2.3	2.7
41	112	M	4.3	5.2	5.2	4.4	4.8
42	106	M	2.5	3.5	3.7	3.0	3.2

Third Siblings	I.Q.	Sex	Vocab-ulary	Read-ing	Lan-guage	Arith-metic	Com-posite
43	118	M	4.6	5.6	5.9	4.7	5.2
44	120	M	2.3	2.0	3.5	2.9	2.7
45	106	M	2.3	2.4	2.9	2.3	2.5
46	114	M	2.1	3.0	5.6	3.3	3.5
47	93	M	2.3	1.9	3.3	2.0	2.4
48	92	M	3.2	2.9	3.2	2.6	3.0
49	105	F	4.1	4.4	5.0	3.5	4.3
50	92	F	4.5	4.0	5.7	3.5	4.4
51	102	F	2.8	2.5	4.2	2.8	3.1
52	102	F	3.5	2.7	3.5	3.2	3.2
53	111	F	4.4	5.2	4.0	4.1	4.4
54	103	F	3.9	4.3	3.2	2.7	3.5
55	123	F	3.4	4.4	3.0	3.6	3.6
56	110	F	3.9	4.8	3.7	3.8	4.1
57	104	F	4.0	3.9	5.0	4.0	4.2
58	113	F	2.3	3.1	5.4	4.5	3.9
59	101	F	3.7	4.2	5.0	3.5	4.1
60	113	F	3.7	4.1	3.8	2.4	3.5
61	114	F	3.7	3.2	3.3	3.8	3.5
62	99	F	3.1	2.8	3.5	3.4	3.2
63	108	F	3.9	4.8	5.2	4.9	4.7
64	90	F	3.7	4.7	6.1	4.2	4.7
65	112	F	3.8	4.4	3.4	4.2	4.0
66	114	F	4.0	4.0	4.2	3.9	4.0
67	117	F	4.4	5.2	5.2	3.9	4.7
68	101	M	4.4	5.0	3.7	5.0	4.5
69	104	M	2.8	2.7	3.7	3.5	3.2
70	109	M	3.1	2.8	3.0	3.3	3.1
71	110	M	3.8	3.3	2.5	.9	2.6
72	79	M	3.1	3.3	2.2	2.1	2.4
73	106	M	2.5	3.3	2.6	4.0	3.1
74	104	M	3.7	3.9	4.4	3.4	3.9
75	84	M	2.1	3.0	2.2	2.9	2.6
76	99	M	2.4	3.2	2.5	3.0	2.8
77	108	M	2.5	3.7	3.3	2.7	3.1
78	124	M	3.7	3.8	4.2	4.3	4.0
79	111	M	2.2	1.9	3.6	3.3	2.7
80	112	M	1.4	2.2	1.4	3.0	2.0
81	121	M	2.3	1.5	2.6	1.8	2.1
82	105	M	3.0	2.0	3.4	3.3	2.9
83	108	M	1.6	1.3	1.6	1.5	1.5