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Concept Development Among Kindergarten Children

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CONCEPT DEVELOPMENT AMONG KINDERGARTEN CHILDREN

by

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ABSTRACT

Concept Development Among

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This thesis examined the basic developmental concepts, space, quantity, time, miscellaneous, as they related to family size, sex, and rural-urban environment among kindergarten children.

The Boehm Test of Basic Concepts was individually administered to 53 students from two kindergarten classes--one from Ogden City School District and one from Cache County School District.

The findings indicated that family size, sex of the child, or urban-rural environment produced no significant differences in concept development among kindergarten children.

(64 pages)

INTRODUCTION

Cognitive development in children has become increasingly important during the last few years. Many researchers have concluded that the child's intelligence is not pre-determined or fixed at the time of conception but rather is a product of the interaction between inherited qualities and environmental forces.

Almy, Chittenden, and Miller (1967) compared a group of children who participated in an environmentally rich nursery school with others who were in a day care program. They found that the nursery school children developed at a more rapid pace even though both groups were moving through the same sequence in stages of development. Their studies support the proposition that interaction between the child and his environment has an influence on cognitive development.

Deutsch (1965) has focused upon the "environmental disadvantaged." He charged society for withholding certain vital, fundamental experiences and concepts from the lower-class child. His solution for the environmental disadvantaged is massive "intervention" on the part of society early in the life of the child. This may enhance a child's cognitive development through an early environment rich in cognitive experience.

Bloom (1964) stated that deprived learning experience results in the effect of "cumulative deficit." Children from socially disadvantaged environments, without the benefit of an intervening enrichment program, may consistently lose ground as they progress in school.

Hunt summarized the term "cognitive development" as an interaction between the child's inherited composition and his environmental stimulation. It may be assumed that children from diverse cultural backgrounds will have different cognitive experiences. The aspect of cognitive development that will be studies in this thesis is that of concept development.

Statement of the Problem

The area of concept development is extensive. This study will focus on selected concepts that are assumed to be influenced by experience among kindergarten children. "Space," "quantity," "time," as well as a cluster of concepts under the heading of "miscellaneous" are the specific concepts that are covered.

This study will attempt to determine if family size, sex, or rural-urban environment is associated with concept development among kindergarten children. Findings of this study will contribute to the amalgamation of the above concepts as they relate to concept development.

Hypotheses

1. On certain developmental concepts, the size of the family produces no significant differences among kindergarten children.

2. On certain developmental concepts, the sex of the child produces no significant differences among kindergarten children.

3. On certain developmental concepts, rural or urban environment produces no significant differences among kindergarten children.

REVIEW OF LITERATURE

American society is dedicated to the development of intellectual ability wherever it is found. In the last two decades, intellectual ability has been located primarily with the aid of a few popular tests of intelligence. Anastasi (1958) reported that these intelligence tests have been frequently criticized for being too heavily loaded with verbal items that are both unfair to certain groups within our population and too narrow as assessment of intellectual functioning. In view of the many controversies that have arisen from the idea of a total-general intelligence score that can be associated with people from diverse backgrounds, it becomes necessary to consider that intelligence tests should be used appropriately with factors of social diversity cognizant.

Whatever the constitutional differences may be that make up variations in intellectual ability, they must be produced by the action of a multiplicity of genes. We must be aware that intelligence expresses itself in a variety of ways, and the various forms of intelligence may represent the action of very different genes and gene combinations. Church and Stone (1968) conclude from the available evidence that there is not much known about the relative contributions of constitution (heredity). But through the usage of infrahuman species,

the knowledge of environment and its effects on intelligence are becoming relevant to everyday application.

Thorndike (1931) in reference to environment and heredity states:

> But in another sense, the most fundamental question for human education asks precisely that we assign separate shares in the causation of human behavior to man's original nature on the one hand and his environment or nurture on the other. In this sense we neglect, or take for granted, the cooperating action of one of the two divisions in order to think more successfully and conveniently of the action of the other . . . the custom of thus abstracting out the original nature of man in independence of any and all influences upon it is so general and so useful that it is best to follow it throughout. (Thorndike, 1931, p. 153)

Thus, it is evident that we need to consider the combination of the two factors when we refer to intelligence.

Bloom (1964) states that the significance of early learning has arrived at a point where one could speak with assurance of a concept as general as the enhancing of human cognitive development through an early environment rich in experience. Evidence of a poor learning experience results in the effect known as cumulative deficit (decline in I.Q. score). Zingg's (1940) studies of intellectual growth in twins reared apart, children separated from parents early in life by adoption, and children affected by environmental deprivation show that there has been mounting evidence for the potency of early environment in shaping later cognitive abilities. The amount of which these adverse environmental effects are reversible for retardation of higher level cognitive skills in man remains poorly deferred. But there appears

to be extremes of social and cultural deprivation beyond which compensatory training provides only limited benefit.

Bloom (1964) suggests that there are studies of the past four decades that support the hypothesis that approximately 50 percent of the variance can be accounted for by the age of four; therefore, much of the child's intellectual growth is achieved between birth and four years of age. It is now necessary to bridge the inferential gap with more detailed and meaningful measures of the environment in order to relate these to cognitive performance.

A mother's pattern of interaction and communication with the child appears to play a pivotal role in cognitive skill level as is evident by the work of Hess (1965). His focus is upon the way in which mother assists the child in problem-solving tasks, and the nature of the "cognitive environment" which she provides. Thus when mother provides a restrictive language code; i.e., a language that provides a smaller number of alternatives for action diminishes a child's problem solving ability. Hess and Shipman (1965) show that the maternal behavior toward the preschool child, which includes emphasis on verbal skill acquisition along with other phases of achievement, has also been shown to be related to measured I.Q. scores.

Family Size

One of the variables on which the researcher will focus is direct relations to the structure and origin of the family. The size of a group will influence the relationship and interaction among its members. In attempting to assess the influence of family size upon the child's development, it is necessary to recognize the studies of sociologist Bossard (1956). His work strongly points to the importance of family size as a variable affecting the socialization process in ways that are relevant to the development of achievement motivation. Rozen (1961) describes the small family as a planned unit driven by ambition. Middle-class small families are regarded as particularly oriented toward status striving and upward mobility. Considerable attention can be given to the child's progress in the small family since its limited size affords the parents more opportunity to devote more of their time and effort to each child than would be possible in the large family. The organization of the small family is usually oriented around the child's development and future achievements; i.e., the parents' intense concern with the child's performance in school. Of course, some parental motives are not always altruistic. McArthur (1959) suggests that children in small families are sometimes "exploited to fulfill the expectation, even the frustrated desires of the parent." (McArthur, 1959, pp. 47-54) Whatever the motives may be, and surely they are varied, it seems safe to say that parents who

are more ambitious for themselves and their children

> . . . may expect to find much emphasis upon standards of excellence coupled with expectations for high achievement and intense parental involvement in the child's performance. Competition with standards of excellence and rivalry with peers and siblings are, in fact, often noted characteristics of the behavior of children from small, particularly middle class homes. (Rozen, 1961, p. 574)

Questions concerning the definition and etiology of intelligence or development of basic concepts are of great concern today. The variable involving the child's constellation feature--number of children in the family--would most likely fit the environmental rather than the hereditary category. But environment in this case may be the physiological environment prevalent at conception producing congenital, physiological, or behavioral differences. Thus, environment influences cognitive development from conception.

Anastasi (1956) found that the negative correlation between family size and intelligence may be attributed to by any or all of the following three hypotheses. (1) There may be inherited structural factors (neural, glandular, etc.) which serve as constraints, reducing the intellectual development measured by current intelligence tests. The obtained correlations would then result from the fact that, within a given culture, persons with inferior cognitive development tend to have more offspring. (2) Another explanation of the individual differences in children's abilities, due to psychological differences in the environment, is provided by parents of varying intellectual

levels. The correlation between family size and intelligence would result from a tendency for the less intelligent parent to have more children. Difference in intellectual levels among the offspring would occur from environmental stimulation. (3) A possible interpretation of the correlations is based directly on the size of family as a causal factor. For example, a large family would reduce the per capita funds available for education, recreation, etc. Also, the degree of adult contact in a larger family needs to be considered. The parents could not provide the contact necessary for progressive growth in cognitive development.

It is evident that the three hypotheses differ significantly in both their contribution or influence toward cognitive development. However, studies have added to the general information concerning the theories.

The negative correlation between family size and intelligence may be attributed to the effect of sibling number and density factors. Dandes and Dow (1969) studied the effects of the above variables (family size and intelligence) and indicated that there is a significant relationship. In other words, the denser the family (as it relates to family size) the lower the I.Q. of the children. If this is indeed the case, then some remedial program in the school system needs to be considered to compensate for the deficiency in the family organization in terms of education and cognitive development.

In comparison to the negative correlations, there has been a number of studies that indicate the opposite of the above studies. For example, McCall's (1971) study of the hypothesis generally supported that "intelligence and special abilities were found to be independent of family size and birth order." (McCall, 1971, p. 16)

In recognition of the methodological and interpretive complexities of the problems, there is a need to design a definitive investigation between the relationship of intelligence and family size. Such an investigation would be all encompassing of children prior to educational experience to adulthood and when their families have been completed. From a practical standpoint, such a program is not unrealistic, especially with uniform tests and school systems present. From a theoretical standpoint, this approach would separate the many interrelated variables which are now intricately intertwined, and should bring us closer to an observable relationship between intelligence and family size.

Sex

It is important to note that other possible factors are involved in the concept known as intelligence. Hoffman (1966) indicates that although competence in intellectual and academic tasks in a sex type is not as clear as agression and dependency, it appears that a degree of sex type involvement is in most academic problems.

Differences between the sexes on particular cognitive abilities tend to be larger and more significant than on tests of general intelligence. According to Terman and Tyler (1954) sex differences in general intelligence tests tend to be negligible in magnitude and inconsistent in direction. Most of the obtained differences can be attributed to differential weighing of particular tests used with various components and aspects of intelligence in which boys and girls differ in opposite direction; i.e., vocabulary, verbal fluency, rote memory, spatial and numerical abilities.

Terman and Tyler (1954) show that the incidence of intelligence eminance is indisputably higher among males than among females during late adolescence and adulthood periods. Why is there a developmental shift between age six and seventeen? In kindergarten through the fourth grade, the girl typically outperforms the boy in all areas of development; and the ratio of boy to girl with reading problems ranges from three-to-one to six-to-one. How can the fact that girls' academic performances are superior to boys' during the early school years, but then gradually become inferior during late adolescence and adulthood be explained? Differential conditions of cultural expectations, motivation, opportunity, and physiological heredity cannot be ignored.

Church and Stone (1968) report that on the whole, many parents are more interested in whether the child is doing well, in the sense

of getting good marks, rather than in what or whether he finds learning exciting. This duality is also expressed in the contradictory attitudes communicated implicitly to boys and girls. Boys are expected to do well, but it is assumed that they will find intellectual activity unmanly and will dislike school. Girls are expected to be more docile and to accept the school process, but they are assumed not to be capable of serious intellectual achievements which in any case are viewed as irrevalent and perhaps even inimical to girls' eventual feminine role. In fact, girls do learn better in school than boys, partly at least, because the schools are run by women and offer an effeminate, prettified curriculum.

Usually without thinking, parents express their expectations through the manners they exhibit, through the things they do, through the objects they provide the baby, and through the things which they direct his attention and feeling. They enclose the baby with a material, social, and emotional environment which tells him what his capacities for action and feelings are. ". . . from toddlerhood onward, many parents forbid little boys to play with girls' things as though implying that masculinity is a fragile state of being, easily undermined by and deviation from the ideal." (Church and Stone, 1968, p. 157)

It is concluded that girls learn language earlier and may continue to have a very small lead over boys. In spatial abilities, McCarthy (1954) found that by the fourth grade, boys begin to excel and that the sex difference increases in high school students. Other studies by

McCarthy (1954) discovered that girls talk earlier, utter sentences earlier, and use a greater number of words earlier. Girls use longer sentences and continue to do so. Mead (1958) found these same differences in cross-culture analysis.

An interesting study of creativity in terms of how it relates to cultural expection by Torrence and Alliotti (1969) states that creativity has been measured in very different ways. The particular method of measurement seems to predict the sex differences that are found. If the test of creativity is a test of set breaking, it usually involves spatial perception; boys are better than girls. When the tests involve verbal abilities as those of divergent thinking versus convergent thinking, girls do better than boys.

It seems then that sex difference in spatial abilities and verbal abilities is at least partly a function of the cultural millieu in which the two sexes are reared.

The role of hormones in intellectual functioning is a new area of investigation. More and more is known about behavior-affecting hormones.

There have been a number of studies on hormonal influence on infrahuman and human species. For example, Dalton (1968) involved prenatal use of progesterone in treatment of toxemia in pregnancy. The result was that progesterone children (both boys and girls) received significantly more above-average grades than either the normal or control children. Ehrhardt and Money (1967)

had studies similar to Dalton's. In both their studies, there seemed to be a simple bias towards better education. That is, the majority of the cases studied came from parents who had completed college and had done some post-graduate work. Because the education of the parents is related to the child's I.Q., it would appear reasonable to conclude that a higher level of intelligence is due to the education variable.

It cannot be concluded that male or female hormones increase intellectual performance differentially. Apparently, no study has yet compared the effects of male and female hormones upon male and female children in one design.

The physiological explanations given for these differences have been examined and they can neither be fully supported or refuted. Psychological factors that might make a difference in the ability of the boys and girls to develop certain intellectual skills cannot yet be identified.

Fagot and Peterson (1969) found evidence for differential shaping by socialization agents. Findings showed that female teachers may encourage boys more than girls, usually in the process of trying to feminize the boys or trying to make them more tractable and well-behaved and interested in such female things as art and music.

Therefore, it should not be necessary to labor further the point that boys and girls grow up in different culturally determined emotional

atmospheres and different physiological consitutions from conception. All of the far-reaching implications for cognitive differences can most assuredly be related to cultural atmosphere.

Rural - Urban

Most investigators of cognitive development realize the influence of environment. Children whose early learning experience has been impoverished, enter public schools restricted psychologically, socially, and intellectually. According to Deutsch (1964), impoverished children have poor verbal skills. Kodman (1970) reported that knowledge of cultural patterns generally known to children is limited, and that these impoverished children have few abstract concepts and skills common to their age group.

A study conducted by Wheeler (1942) shows that cognitive development in the rural child is consistently lower and that it tends to diminish with age. It is noted that intelligence scales are typically devised by urban-reared psychologists and are valid on urban school children. Davis (1968) feels that there has not been sufficient research conducted to determine the proportion of items that favor urban over rural children. The difference in intelligence performance on the test may depend, in part, on the dissimilarity of the experimental background between rural and urban children. Boger (1952) has shown that when rural children are given training in answering current

intelligence test items, they have a much higher score than those children who were not trained. That is to say, Boger (1952) feels rural children have lower intelligence scores because of the test nature of mental abilities being used.

Lehmann (1959) suggests that with changes in our patterns of living, advances in mass media, and increases in the sophisticated rural school systems, the experience to which rural and urban children are subjected may have become so similar that there is no longer any appreciable difference in intelligence as measured by our present tests. Findings support previous investigations on rural-urban intelligence differences that urban children have a higher mean I.Q. score.

The latest studies have been based on urban populations and have shown that the occupational status of the fathers directly relates to the measured intelligence of the child. Generally speaking, children whose parents are in business and professional groups have higher intelligence test scores than children whose parents are in other occupational categories, with the children of unskilled laborers obtaining the lowest test scores. Sewell's (1931) study which has included both rural and urban group children of farmers, generally shows that these children have lower mean intelligence scores than children of all other laborers except unskilled workers. These findings are further evidence that the intelligence differentials are not primarly associated with residence but are more properly considered to be related to social status.

The major conclusion to be drawn from this information is that families who live in rural areas are more likely to have lower incomes than families who reside in rural non-farm of urban places. If the information of family income is combined with the findings from recent studies that rural schools tend to be inferior in quality when compared with urban schools, it can be inferred that rural students compete at a relative disadvantage in education processes.

An equally plausible explanation besides the validity scale mentioned above would be based on the cumulative impact of a low level of intellectual stimulation or on the selective migration of more highly endowed individuals to urban areas. For example, two theories of rural migration are selective and non-selective.

> (1) Selective. The industrial centers attract the rural people who are strong in mind and body; thus the vitality of the village slowly declined as the city in a hundred ways sucked away its blood and brains.
> (2) Non-Selective. The best families and the poorest are most likely to migrate to the cities. On the other hand, it is possible that the rural farms and villages are more attractive than cities to persons who are emotionally stable . . . . (Bosanquet, 1950, p. 75)

These dycotomous situations at present are only theories.

It is important to consider that the control of development or achievement could be directly related to the identity of self-esteem of a child as an individual. Lehmann (1959) suggests that a belief in internal locus of control constitutes a motivational influence upon development or achievement performance. Buck (1971)

states that the child who feels that he, rather than someone else, is responsible for his success and failure, appears to show great initiative in seeking higher grades, intellectual rewards, and teacher approval. The factors of family life that affect and influence the cognitive development are important concepts in the field of child development. Therefore, it would seem possible that a comparison of uran and rural areas, sex, and family size would contribute to the amalgamation of factors involved with a child's cognitive development.

METHODS AND PROCEDURES

Sample

The population of this study consisted of 53 students. The students came from two different kindergarten classes--one from Ogden City School District, and one from Cache County School District.

All of the students in both classes were employed for testing purposes. All of the students who participated in the study were present during the three-day testing period. Students who were absent during these individual testing times were not represented in the study.

Each of the two kindergarten teachers had two sessions of class per day. Because the researcher had to travel 50 miles per testing session, the afternoon session was used in the Ogden school as a matter of convenience. The morning session was used in the Cache County school.

Combining the children sampled, the mean and median of the family size was 6 individuals per family. Note that the digit 6 reflects the average number of individuals in the family including the parents in both Ogden City and Cache County groups.

Selection of Schools

In selecting the specific schools, the researcher considered the following factors: (1) The school had to be classified as either an urban or rural school. (2) The school had to be defined in the middle socio-economic stratification of the community. (3) The school had to have an accomodating and functioning kindergarten class. (4) The kindergarten class had to have a reasonable number of children (over 25). (5) The study had to be confirmed and approved by the district administration and the school principal.

The selection of the Ogden school was undertaken by the school district's research director who was cognizant of the above-mentioned factors. The research director suggested X Elementary as meeting the urban variable in this study.

The Cache County School District's elementary director selected Y Elementary as meeting the five factors. This school represented the rural variable. It is necessary to mention at this time that Y Elementary makes no distinction on factor 2 because the socio-economic discrimination is difficult to measure in the rural community. Employment of the parent is more homogeneous in rural than in urban communities. Therefore, the researcher made no distinctions between socio-economic levels in the rural culture.

Setting

The greater Ogden area has a population of approximately 126,278 with socio-economic stratification prevalent. X Elementary is located in the middle socio-economic section of the city thus meeting the urban variable. A city in Cache County with a population of about 1,612 was the location of Y Elementary meeting the rural variable.

Each of the two schools afforded the researcher adequate accomodations consisting of an appropriate testing room, desks, chairs, lighting, etc. The faculty lounge was designated as the testing room at Ogden's X Elementary. A combination nurse and book storage room was used at Cache County's Y Elmentary. The testing rooms allowed for the appropriate testing milieu. The student sat at a desk to the left of the researcher at both schools. The tape recorder was located on a desk in front of the researcher making it easily accessible. In both testing situations, the doors to the rooms were closed to allow a minimum of noise or disturbance.

Instrument

The Boehm Test of Basic Concepts was utilized as the testing instrument. The purpose of the test is to assess beginning school children's knowledge of frequently used basic concepts (sometimes

mistakenly assumed to be familiar to children) at the time of entry into kindergarten or first grade.

The test has 50 items which are placed in two booklets with alternate forms available to facilitate administration in two sessions to children in kindergarten and grades one and two.

Testing in one form includes two 25-item booklets. The questions were answered by the child's marking X's on pictures. The test required 10 to 15 minutes per form to complete.

The booklets are made up of black line drawings on a variety of colored backgrounds. The people in the illustrations are appropriately integrated racially.

Scoring instructions were clear and the mechanics were about as simple as possible when working with test protocol for children in kindergarten.

The Boehm Test assessment procedures were directed toward the child's understanding of space (location, direction, orientation, dimension); time and quantity (numbers); plus a few miscellaneous concepts selected on the basis of their contributions in the internal consistency and validity of the test.

Content validity, the only validity reported, seemed adequate since the items were selected on the basis of relevancy to currently used curriculum materials in kindergarten and grades one and two.

Split-half reliability cofficient is fairly good (60-90). The researcher avoided the necessity of test-retest reliability because

it was only necessary to use one form (two booklets). As a matter of convenience, Form B was used.

In summary, the manual and test materials for the Boehm Test of Basic Concepts appear to be of high quality. It is an instrument that the teacher can administer, interpret, and utilize in remedial work. It has implications for both the advantaged and the handicapped.

Pilot Study

The pilot study was conducted at the Edith Bowen School, on campus at Utah State University. Six kindergarten children were selected without systematic design by the teacher of the class. The selection was based on the availability of the children during the time of testing. The researcher's major reason for conducting the pilot study was to space the questions at a reasonable pace on a tape recorder. The tape recorder was a simple portable cassette recorder with the researcher's voice asking questions to the proper visual cue on the test (Form B, Booklets I and II).

The testing environment was adequate but far from ideal. The room used was an empty class with a great number of visual distractions. Two desks were placed side by side, facing the center of the room. The subject was placed to the left of the researcher.

In the first trial, the recording was too slow, which afforded the children time to study the environment. Consequently, they lost concentration on the tasks of the test.

The researcher at the time of testing, realized that the six children used for the pilot study may not have been a random sample. First, the subjects who were asked to participate were the students who had completed their tasks in class and were searching for another project. Second, the students in the kindergarten class were all children from either middle- or upper-class status parents (or higher) or from parents who were attending college. However, the pacing of questions on the recorder was established as a result of the experience of working with this group of children.

Collection of Data

The Boehm Test of Basic Concepts was administered individually to the 53 students who participated in the study. Form B, Booklets I and II and a portable cassette tape recorder with the researcher's voice stating the questions was used. The same explanation and instructions were given to each child on an individual basis after he entered the room. Simple conversation was used to develop a relaxed atmosphere with the child. For example, the researcher asked the child several questions such as, "How are you today?" Have you ever been in the faculty lounge (nurse's room)?" Have you ever seen a tape recorder like this one?" Proceding, the researcher would then explain, "This (holding up the test Form B, Booklet I) is a very easy game and I know you can do well with it." The researcher

then asked, "You know how to make an X don't you?" (demonstrating how to make an X for each child on the bottom of his booklet with a red felt tip pen). Stating the child's name, the researcher continued by saying, "John, make an X (pointing to the demonstration X) everywhere the tape recorder tells you to make an X. You may use this pen (handing him the pen). Are you ready?" Then the researcher would start the recorder and assist when necessary during the three sample questions. The test questions on the tape recorder are listed in Appendix A.

There were approximately three to five seconds between questions on the tape. The time intervals were quite adequate for the majority of the children, but a small percentage was allowed the convenience of having the recorder stopped or, if needed, the questions repeated. The explanation of the instructions were slow and pronounced.

The philosophy of the testing was to allow every child the chance to produce an X in the appropriate box. This of course doesn't imply that there was any prompting.

Data Collection on Family Size

The procedure for gathering information concerning the family size variable was quite simple. The researcher asked the child, after each testing period, "How many brothers and sisters do you have?" and "You have a mother and father, right?" If there was any hesitation in the child's response, the child was asked to name

his brothers and sisters. In retrospect, the researcher believes that the question, "You have a mother and father, right?" could have been phrased in more meaningful terminology to the young students. This was realized, however, after the testing sessions had taken place.

Since the child's most dominating institution at this age consists of his family, the researcher felt that there was no need to receive special permission to probe through school records to obtain family size. This procedure was employed for both elementary schools.

Analysis of Data

The statistical method employed to test the two means between large families and small families was a Z-test for large uncorrelated data. The uncorrelated method was used because of the independent sampling. The Boehm Test consists of one form of measurement used on two different sets of sampled subjects; i.e., large families and small families.

Analysis of variance was employed on family size because of the construction of three categories. The categories within family size were supplied by standard deviation. For example, the mean of 6 individuals in a family has been established with the standard deviation of 1.27 for large familes and 1 for small families. Rounding off the deviations and subsequently combining the mean include

families with 5, 6, and 7 members as one category, families with 2, 3, and 4 members as the second category, and families with 8 or more members as the third category.

FINDINGS

Presentation of Findings

Hypotheses were tested regarding the differences among kindergarten children on concept development as they related to family size, sex, and rural-urban environment.

Hypothesis I

The results of the first hypothesis, which is stated in the null form, are summarized in the following paragraphs. The hypothesis states that on basic developmental concepts, the size of the family produces no significant differences among kindergarten children.

The data collected support the null hypothesis that the size of the family does not affect concept development in kindergarten children above and below the mean of 6 individuals per family.

The standard deviation for the large family size was 1.27. The standard deviation for the small family was 1. Thus, using the method of deviation of difference between means, the product was $Z = 1.37$ which is less than the required 1.96 for a significant level at .05. Therefore, 1.37 is not significant and supported the null hypothesis. Due to the interesting ramifications of these data, the researcher chose to apply more statistical procedures. Analysis of variance was used to determine if any of the three categories of family

size (5, 6, and 7 members; 2, 3, and 4 members; and 8 or more members) caused differences in concept development among kindergarten children. The F ratio of 1.75 is less than the required 3.18 at 52 degrees of freedom for a significant level at .05. Therefore, none of the family size categories cause significant differences in concept development among kindergarten children. (See Table 1)

Table 1. Analysis of variance of family size

Source of variation	Degrees of freedom	Sum of squares	Mean squares	F test value
Between	2	16	8	1.75
Within	50	229	4.58	
Total	52	245		
Probability $<.05$		F at .05 = 3.18		

Hypothesis II

The second hypothesis states that on basic developmental concepts, the sex of the child produces no significant differences among kindergarten children. The method used to compute the data was a Z-test for large uncorrelated means. The boys' standard deviation was 6.7 while the girls' standard deviation was 7.4 After computing

the data using the process of difference between mean method, the researcher found the product to be Z = .1989. Z at .05 level is 1.96. Therefore, it appears that the sex of a child does not affect concept development among kindergarten children.

Hypothesis III

The third hypothesis involved the variable of rural versus urban culture. It states that on certain developmental concepts, rural or urban environment produces no significant differences among kindergarten children. Again the statistical procedure involved was an uncorrelated Z-test using the method of difference between means. Z = 1.78 is less than 1.96 at .05 level. Therefore, it is necessary to accept the null hypothesis.

Summary of Findings

The data support the three hypotheses that family size, sex, and rural-urban environment do not affect concept development among kindergarten children. A Chi Square analysis was used to test the difference between proportions of the three concept development categories (space, quantity, time). The results indicated that family size, sex, and rural-urban environment do not affect concept development.

As an aid in interpreting test results, the percentage of students passing each test item is given in Appendix B, Charts 1, 2, and 3.

DISCUSSION

Home Experience Model

It would be prudent to analyze a causal model for concept development through experience at the home level. An informal guide, Figure 1, would help conceptualize the interrelated factors that are elements in development of concepts. For example, education of mothers and fathers, experiences of husbands and wives, and the number of children in the family have direct bearing on occupations. The education of the mother and father has an indirect relation on concept development of children. Therefore, the association of these related elements affect concept development. (See Figure 1)

School Experience Model

Paralleling the home experience model of concept development is a causal model for concept development in the school system. This model is also necessary to conduct proper analysis. (See Figure 2)

Many factors contribute to development of a child's concepts. When a specific element is missing in the child's experience, there may be a lag in a directly- or indirectly-related concept.

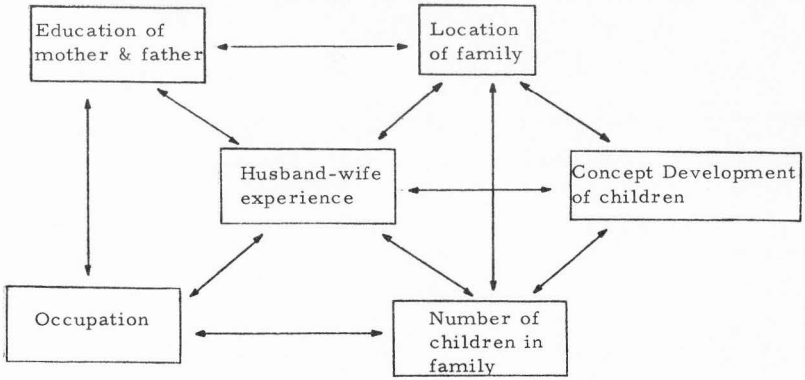

Figure 1. Causal model of home experience.

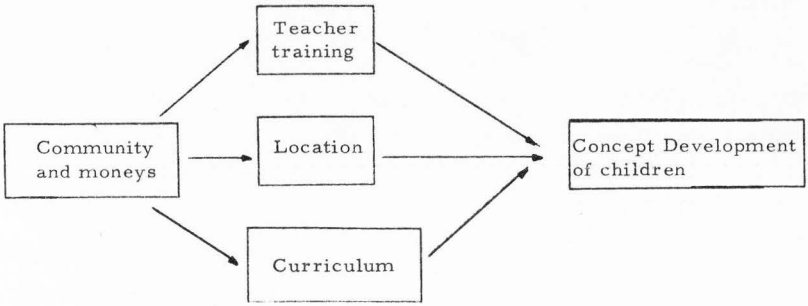

Figure 2. Causal model for school experience.

Discussion of Findings

Findings of this study support the hypotheses that family size, sex, and urban-rural environment produce no differences, at significant levels, in concept development among kindergarten children.

Rural- urban environment

Although no significant concept development differences were found in cumulative scores regarding urban-rural environment, the total amount of scores produced by urban children exceeded the total amount of scores produced by rural children. In the rural or urban environment, the small difference between the .05 level at 1.96 and Z = 1.78 is exactly .18 away from significance.

This data indicate that there may be a developmental sequence or element missing in either the rural or urban home environment or school system. As the causal comparative models in Figures 1 and 2 show, there are many elements to be considered in a remedial program.

A possible explanation for the significant lack of difference in the rural or urban culture is the availability of mass media. Perhaps the children's opportunities to watch the same programs on television has a blending effect on the data. It would seem at this point that children may encounter the same developmental experiences. It

would seem logical to apply a principle of mass media in a futuristic national compensatory education program.

Family size

Literature cited concerning family size indicated disagreement. Of the studies cited, Rozen (1961) and Dandes and Dow (1969) reported that children from large families have slower cognitive development; while McCall (1971) stated that there is no difference in cognition among children from small or large families. The findings in this study do not agree with the majority of studies cited in this thesis.

This study implies that there may be an association between concept development and family size, although such an association was not established at a significant level.

National family size is significantly lower than the sample collected. The logical explanation is that the area tested has larger families perhaps due to the religious emphasis placed on the family.

The data indicated that the scores of children who were reared in a small family were higher than those of children reared in a large family. Although the difference between the scores of the two groups were not statistically significant, it is the opinion of the researcher that the data do suggest that the small family may offer an advantage to children in terms of facilitating concept development.

Sex

McCarthy (1954) and Bentzen (1963) show that girls' academic performances are superior to boys' during the early school years. The Z-test showed that there was a very small difference between boys and girls on a cumulative score in this study. The researcher theorized that the kindergarten group of boys and girls was at a threshold of the enculturation process. The enculturation is both a home and school conditioning process. The explanation of a "differential shaping" or double standard as mentioned by Fagot and Peterson (1969), seemed to be related to a feminizing or masculinizing of the children. It is interesting to note that the academic performance may again reverse in the late adolescence due to cultural patterns.

SUMMARY AND CONCLUSIONS

Summary

The purpose of this study was to examine various concept abilities in kindergarten children from different backgrounds, family size and sex.

The sampling included 53 students. The students came from two different kindergarten classes--one from Ogden City representing the urban variable, and one from Cache County, representing the rural variable.

The students were evaluated with Form B, Booklets I and II of the Boehm Test of Basic Concepts. They were tested individually with the usage of a portable cassette tape recorder. The recorder was used to maintain reliability through the individual testing sessions.

The study supported the three hypotheses that (1) family size produces no significant differences among kindergarten children, (20 sex of the child produces no significant differences among kindergarten children, and (3) rural-urban environment produces no significant differences among kindergarten children in their development of basic concepts.

General Conclusions

From this study, it may be concluded that there are more similarities than differences in the kinds and meanings of experiences associated with concept development as it relates to family size, sex of child, and rural-urban environment.

The researcher resolves that the influence of modern communication will have a tendency to blend concept development to a commonality among children.

Suggestions for Further Studies

1. Similar studies could be done comparing the density of a family structure (age range of siblings) and children's concept development.

2. A similar research design using another testing instrument could be done.

3. A study could compare the influence of television on children's concept development.

4. A study could sample more diverse cultural backgrounds.

5. Children of different ages could be employed in a study of the same design and purpose.

6. A study could be done using a group testing procedure rather than an individual testing procedure.

LITERATURE CITED

Almy, Millie, E. Chittenden, and Paula Miller. 1967. Young children thinking. Teachers College Press, New York.

Altus, William. 1965. Birth order and academic primogeniture. Journal of Personality and Social Psychology 2:872-876.

Anastasi, Anne. 1956. Intelligence and family size. Psychological Bulletin 53:187-209.

Ausubel, D. P. 1962. Theory and problems of child development. Stratton, New York.

Bayley, Nancy. 1965. Comparison of mental and motor test scores for ages 1-15 months by sex, birth order, race, and geographic location, and education of parents. Child Development 36:379.

Bentzen, F. 1963. Sex ratios in learning and behavior disorders. American Journal of Orthopsychiatry 33:92-98.

Bernard, Harold. 1970. Human development in western culture. Allyn and Bacon, Inc., Boston.

Bieri, James. 1958. Sex difference in perceptual behavior. Journal of Personality 26:1-12.

Bing, Elizabeth. 1963. Effect of childbearing practices on development of differential cognitive abilities. Child Development 34: 630-648.

Bloom, B. S. 1964. Stability and change in human character. Wiley, New York.

Boger, J. H. 1952. An experimental study of the effects of perceptual training on group I.Q. scores of elementary pupils in rural ungraded schools. Journal of Educational Research 46:48-52.

Bosanquet, Barbara. 1950. The quality of the rural population. The Eugenics Review 42:75-92.

Bossard, James and Eleanor Bell. 1955. Personality roles in the large family. Child Development 26:71-78.

Buck, M. R. and H. R. Austrin. 1971. Factors related to school achievement in an economically disadvantaged group. Child Development 42:1813-1816.

Burros, O. C. 1972. Mental measurement yearbook. 7th Edition. The Gryphon Press, New York.

Church, Joseph, and Joseph Stone. 1968. Childhood and adolescence. Random House, New York.

Conrad, H. S., F. N. Freeman, and R. Jones. 1944. Differential mental growth. 43rd Yearbook of the National Society of Standard Education. University of Chicago Press, Chicago.

Dalton, Katherine. 1968. Anta-natal progesterone and intelligence. British Journal of Psychiatry 114:1377-1382.

Dandes, Herbert, and Dorothy Dow. 1969. Relation of intelligence to family size and density. Child Development 40:641-645.

Davis, A. 1948. Social influences upon learning. Cambridge-Harvard University Press, Massachusetts.

Deutsch, Martin. 1965. The role of social class and language development and cognition. American Journal of Orthopsychiatry 33:78-88.

Deutsch, S. 1964. Facilitating development in the preschool child. Social and Psychological Perspectives. Merrill-Palmer Quarterly 10:249-263.

Douglas, J. W. B. 1965. The home and school: a study of ability and attainment in primary school. MacGibbon and Kee, London.

Ehrhardt, Anke A., and John Money. 1969. Progesterone induced hermaphroditism, I.Q., and psycholsexual identity in a study of ten girls. Journal of Sex Research 3:83-100.

Fagot, B. L., and G. R. Peterson. 1969. An in vivo analysis of reinforcing contingencies for sex role behavior in the preschool child. Developmental Psychology 1:563-568.

Featherman, David. 1970. Farm, rural and urban background of rearing and socio-economic career achievement in metropolitan stratifications systems. Presented at the annual meeting of Rural Sociological Society, Washington, D.C.

Havighurst, R. S., and F. H. Breese. 1947. Relation between ability and social status in a middle western community, III primary mental abilities. Journal of Educational Psychology: 18:241-247.

Herzberg, Frederick A. 1954. A study of sex differences on the primary mental abilities test. Educational and Psychological Measurement 14:670-687.

Hess, R. D., and Virginia C. Shipman. 1965. Early experience and the socialization of cognitive modes in children. Child Development 36:869-886.

Hoffman, L. W. and M. L. Hoffman. 1966. Review of child development research. Russell Sage Foundation, New York.

Hobson, James. 1947. Sex differences in primary mental abilities. Journal of Educational Research 41:126.

Hunt, J. McVicker. 1967. The psychological basis for using pre-school enrichment as an antidote for cultural deprivation. In A. Harry Passow, M. Goldberg, and A. J. Tannenbaum (Eds.). Education of the Disadvantaged. Holt, Rinehart, and Winston, Inc., New York.

Jacklin, D. N., and E. E. Maccoby. 1972. Sex differences in intellectual abilities: a reassessment and a look at some new explanations. Presented at the 1972 American Education Research Association Convention, Chicago.

Kock, H. L. 1954. The relation of primary mental abilities in five and six year olds to sex of child and characteristic of his sibling. Child Development 25:209-223.

Kodman, F. 1970. Effects of preschool enrichment on intellectual performance of appalachian children. Exceptional Children 36: 321-334.

Kostick, Max Martin. 1954. A study of transfer: sex differences in the reasoning process. Journal of Educational Psychology 45:449-458.

Lehmann, I. S. 1959. Rural-urban difference in intelligence. Journal of Educational Research 53:62-67.

Lesser, Gerald, 1965. Mental abilities of children from different social class and cultural groups. Monographs of the Society for Research in Child Development 30:4.

McArthur, C. 1959. Personalities of first and second children. Psychiatry 19:47-54.

McCall, John. 1971. The variation of family size, birth order, and socio-economic status to the abilities of high school students. High School Department of Health, Education, and Welfare, Bureau of Research, Washington, D. C.

McCarthy, Dorothea. 1954. Language development in children. Manual of Child Psychology. Wiley, New York.

Mead, Margaret, J. M. Tanner, and B. Inhelder. 1958. Discussions on child development. International University Press, New York.

Passow, A. Harry. 1967. Education for the disadvantaged. Holt, Rinehart, and Winston, Inc., New York.

Pines, Maya. 1970. Revolution in Learning. Harper Row Company, New York.

Rozen, B. 1961. Family structure and achievement motivation. American Sociological Review 26:574-585.

Schmuck, Richard. 1963. Sex of sibling, birth order position, and female disposition to conform to two child families. Child Development 34:913-918.

Sewell, W. H., and B. L. Ellenbogen. 1953. Social status and the measured intelligence of small city and rural children. American Sociological Review 17:612-616.

Silverman, Susan B. 1965. Education and cultural deprivation. In B. Bloom (Ed.). Compensatory Education for Cultural Deprivation. Holt, Rinehart, and Winston, Inc., New York.

Solomon, D., K. A. Houlihan, and R. F. Parelins. 1969. Intellectual achievement responsibility in negro and white children. Psychological Reports 24:479-483.

Stroup, Atlee and Katherine Jamison Hunter. 1965. Sibling position in the family and personality of offspring. Journal of Marriage and the Family 27:65-68.

Terman, L. M. and L. E. Tyler. 1954. Nature-nurture, Houghton-Mifflin, New York.

Thorndike, E. L. 1931. The original nature of man. Columbia University Press, New York.

Torrance, E. P., and N. C. Aliotti. 1969. Sex difference in level of performances and test-retest reliability on the torrence tests of creativity thinking ability. Journal of Creative Behavior: 3:52-57.

Werner, E. E. 1969. Sex difference in correlation between children's I.Q. and measures of parental ability and environment ratings. Developmental Psychology 3:280-285.

Wheeler, L. R. 1942. A comparative study of the intelligence of east tennessee mountain children. Journal of Educational Psychology 33:321-334.

Witmer, Helen L. 1966. Children and poverty, p. 23-33. In G. R. Hawks and J. L. Frost (Eds.). The Disadvantaged Child. Houghton Mifflin Co., Boston.

Zingg, R. M. 1950. Feral man and extreme cases of isolation. American Journal of Psychology 53:487-517.

APPENDIXES

Appendix A

Tape Recorded Version of the
Boehm Test of Basic Concepts (Form B: Booklets I & II)
As Used in This Study

Tape Recorded Version of the
Boehm Test of Basic Concepts (Form B: Booklets I and II
as Used in This Study

Test questions and instructions were recorded on a cassette tape recorder for the testing procedure. Pauses in the questions are shown on this form by means of elipses. The researcher assisted the children with the three sample questions.

Sample Questions

(1) Look at the shoe, the hat, and the sock. Mark an X on the hat . . . . Mark an X right on the hat.

(2) Look at the things to ride in. Mark an X on the boat . . . . Mark an X on the boat.

(3) Look at the fruit. Mark the banana . . . . Mark the banana.

Test Questions and Instructions (As exactly recorded)

Now, turn the first page.

(1) Look at the flags on the poles. Mark the pole with the flag at the top . . . . Mark the pole with the flag at the top.

(2) Look at the dogs and the hoops. Mark the dog that is going through the hoop . . . . Mark the dog that is going through the hoop.

(3) Look at the baby and the blocks. Mark the block that is away from the baby . . . . Mark the block that is away from the baby.

(4) Look at the animals. Mark the animal that is next to the rabbit . . . . Mark the animal that is next to the rabbit.

(5) Look at the boxes and balls. Mark the box with the balls inside it . . . . Mark the box with the balls inside it.

(6) Look at the bowls of flowers. Mark the bowl that has some but not many flowers . . . . Mark the bowl that has some but not many flowers.

(7) Look at the children. Mark the child who is in the middle . . . . Mark the child who is in the middle.

Now turn the page.

(8) Look at the pictures of boxes. Mark the picture that has a few boxes . . . . Mark the picture that has a few boxes.

(9) Look at the clothes hanging on the line. Mark the dress that is farthest from the socks . . . . Mark the dress that is farthest from the socks.

(10) Look at the flowers and the strings. Mark the flower that has a string around it . . . . Mark the flower that has a string around it.

(11) Look at the children and the rope. Mark the child who is over the rope . . . . Mark the child who is over the rope.

Look at the top of the next page.

(12) Look at the ties. Mark the tie that is widest . . . . Mark the tie that is widest.

(13) Look at the boxes of buttons. Mark the box that has the most buttons . . . . Mark the box that has the most buttons.

(14) Look at the pictures of toys. Mark the picture that has a bear between two blocks . . . . Mark the picture that has a bear between two blocks.

(15) Look at the apples. Mark the apple that is whole . . . . Mark the apple that is whole.

Now turn the page.

(16) Look at the dogs and the bone. Mark the dog that is nearest the bone . . . . Mark the dog that is nearest the bone.

(17) Look at the line of trucks and the sign. Mark the second truck from the sign . . . . Mark the second truck from the sign.

(18) Look at the buildings. Mark the building that is at a corner of the street . . . . Mark the building that is at a corner of the street.

Look at the top of the next page.

(19) Look at the groups of knives, forks, and spoons. Mark the group that has several spoons . . . . Mark the group that has several spoons.

(20) Look at the boys and the wagon. Mark the boy who is behind the wagon . . . . Mark the boy who is behind the wagon.

(21) Look at the pictures of bottles. Mark the picture where all the bottles are in a row . . . . Mark the picture where all the bottles are in a row.

Now, turn the page.

(22) Look at the piles of books. Mark the pile that is different from the others . . . . Mark the pile that is different from the others.

(23) Look at the pictures of a piece of wood. Mark the picture that shows how the wood looked after it was cut. . . . Mark the picture that shows how the wood looked after it was cut.

(24) Look at the baskets of fruit. Mark the basket that is almost full . . . . Mark the basket that is almost full.

(25) Look at the boxes. Mark the box that is half black . . . . Mark the box that is half black.

"Here is the second booklet. Turn the page and you may begin when the tape recorder tells you to." (Not on recorder)

(26) Look at the ring and the marbles. Mark the marble that is at the center of the ring . . . . Mark the marble that is at the center of the ring.

(27) Look at the box of pencils and the groups of pencils. Mark the group that has as many pencils as the box . . . . Mark the group that has as many pencils as the box.

(28) Look at the car and the boys. Mark the boy at the side of the car . . . . Mark the boy at the side of the car.

Look at the top of the next page.

(29) Look at the boys on the stairs. Mark the boy who is beginning to climb the stairs . . . . Mark the boy who is beginning to climb the stairs.

(30) Look at the toys. One is a doll and one is a truck. Mark the other toy. . . . Mark the other toy.

(31) Look at the socks. Mark the socks that are alike . . . . Mark the socks that are alike.

(32) Look at the ducks in the water. Mark the duck that is not the first or the last . . . . Mark the duck that is not the first or the last.

Now turn the page.

(33) Look at the lamp, the wristwatch, and the shoe. Mark the thing that a child should never wear . . . . Mark the thing that a child should never wear.

(34) Look at the bench and the birds. Mark the bird that is below the bench. . . . Mark the bird that is below the bench.

(35) Look at the shirts and pants. Mark the pants that match one of the shirts . . . . Mark the pants that match one of the shirts.

Look at the top of the next page.

(36) Look at the box, the wheel, and the feather. Mark the thing a bicycle always has . . . . Mark the thing that a bicycle always has.

(37) Look at the butterflies. Mark the butterfly that is medium-sized . . . . Mark the butterfly that is medium-sized.

(38) Look at the apples on the shelf. Mark the apple at the right end of the shelf . . . . Mark the apple at the right end of the shelf.

(39) Look at the little chicks. Mark the chick that is bending forward . . . . Mark the chick that is bending forward.

Now turn the page

(40) Look at the rabbits and carrots. Mark the rabbit that has zero carrots . . . . Mark the rabbit that has zero carrots.

(41) Look at the windows of the house. Mark the window that is above the door . . . . Mark the window that is above the door.

(42) Look at the groups of circles and dots. Mark the group that has a dot in every circle . . . . Mark the group that has a dot in every circle.

Look at the top of the next page.

(43) Look at the pictures of boxes. Mark the picture where the boxes are separated. . . . Mark the picture where the boxes are separated.

(44) Look at the trees. Mark the tree on the left . . . . Mark the tree on the left.

(45) Look at the pictures of dolls. Mark the picture that shows a pair of dolls . . . . Mark the picture that shows a pair of dolls.

(46) Look at the circles. One circle has an X in it. Skip a circle and make another X . . . . Skip a circle and make another X.

Now turn the page.

(47) Look at the groups of stars. Mark the groups that have equal numbers of stars . . . . Mark the groups that have equal numbers of stars.

(48) Look at the pictures of boxes. Mark the picture where the boxes are in order from small to large . . . . Mark the picture where the boxes are in order from small to large.

(49) Look at the store and the houses. Mark the third house from the store . . . . Mark the third house from the store.

(50) Look at the pictures of ice cream cones. Mark the picture that has the least cones . . . . Mark the picture that has the least cones.

Appendix B

Percentage of Students Passing
Each Test Item

Charts 1, 2, & 3

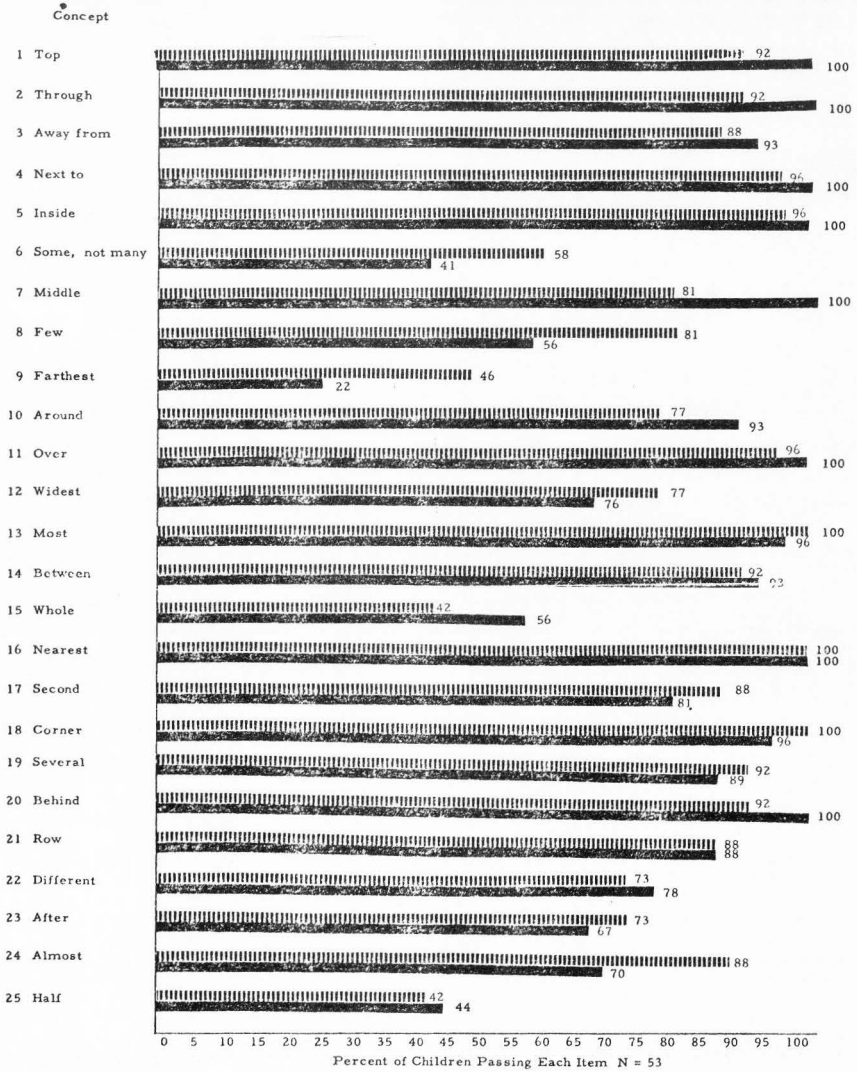

Chart 1. Comparison of family size.

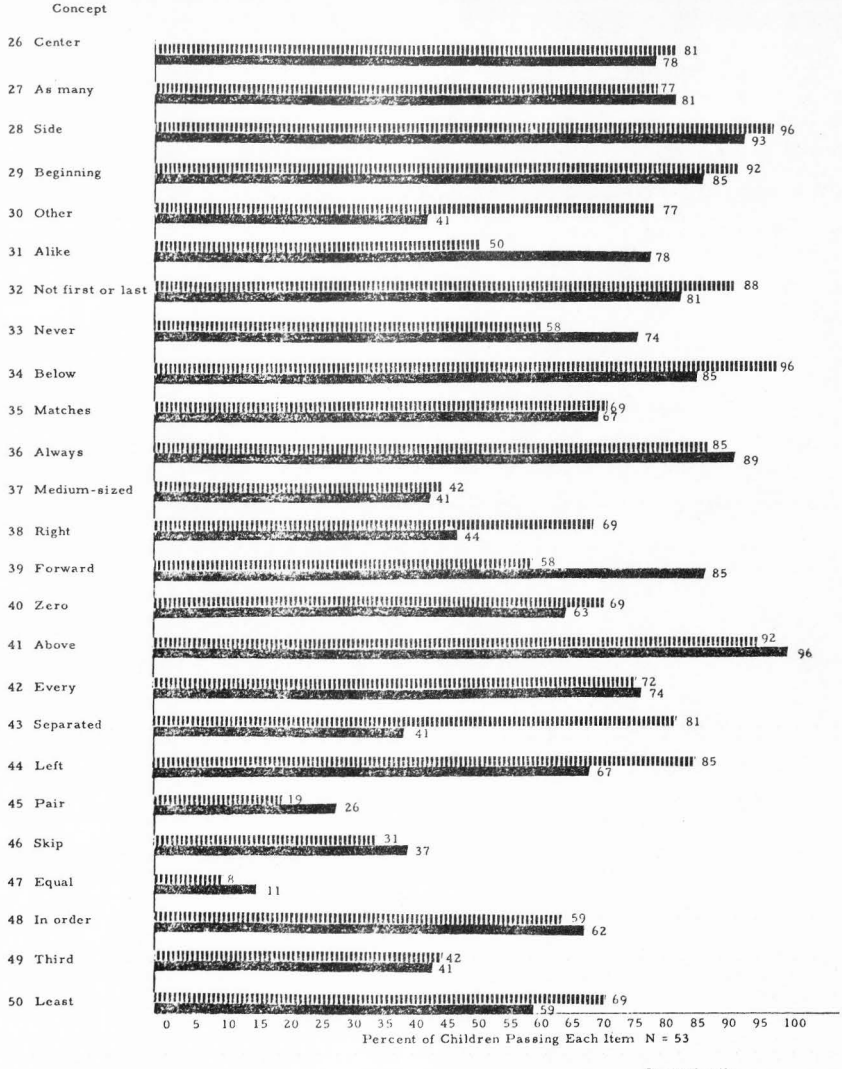

Chart 1. Continued

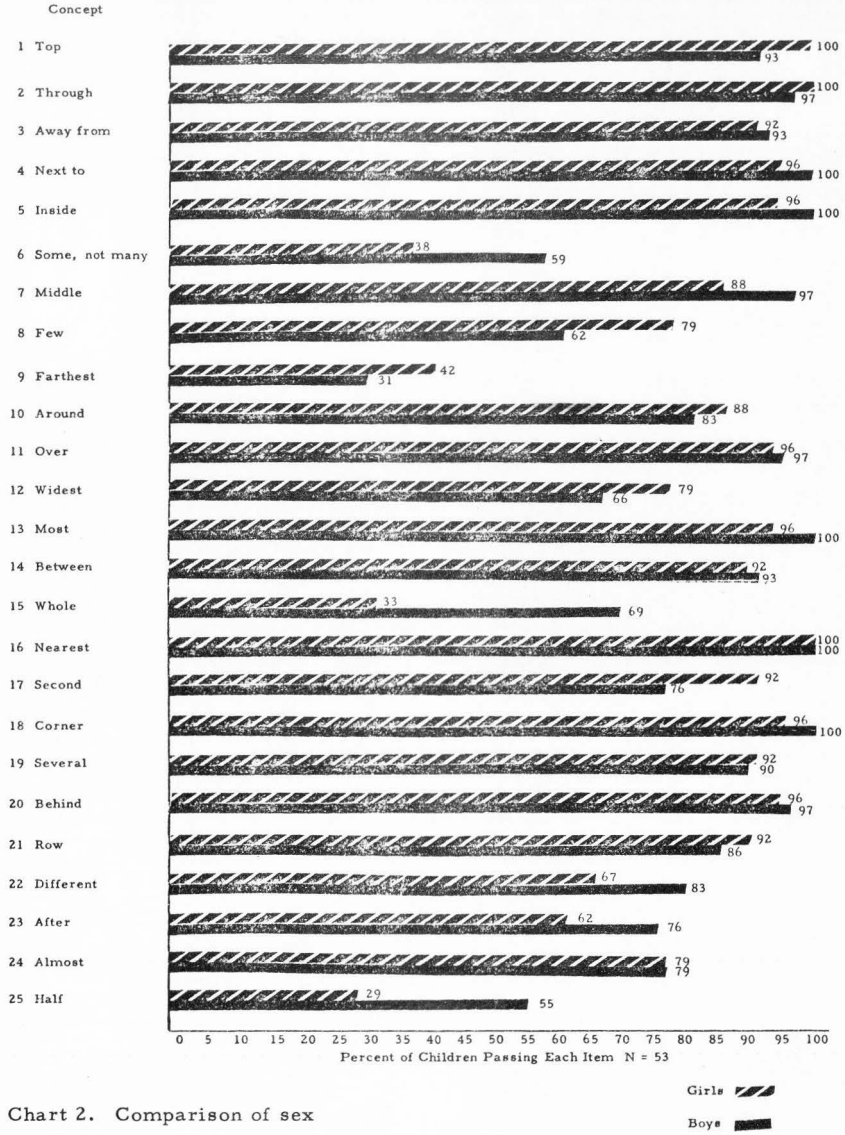

Chart 2. Comparison of sex

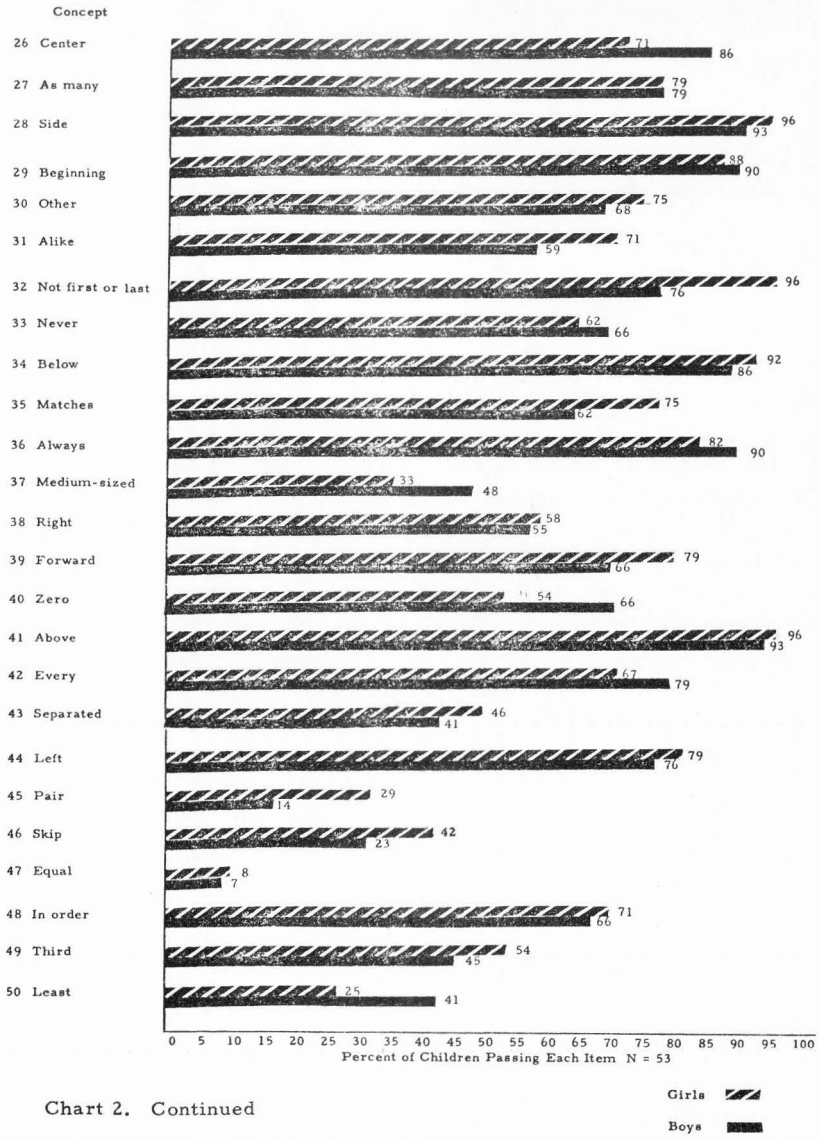

Chart 2. Continued

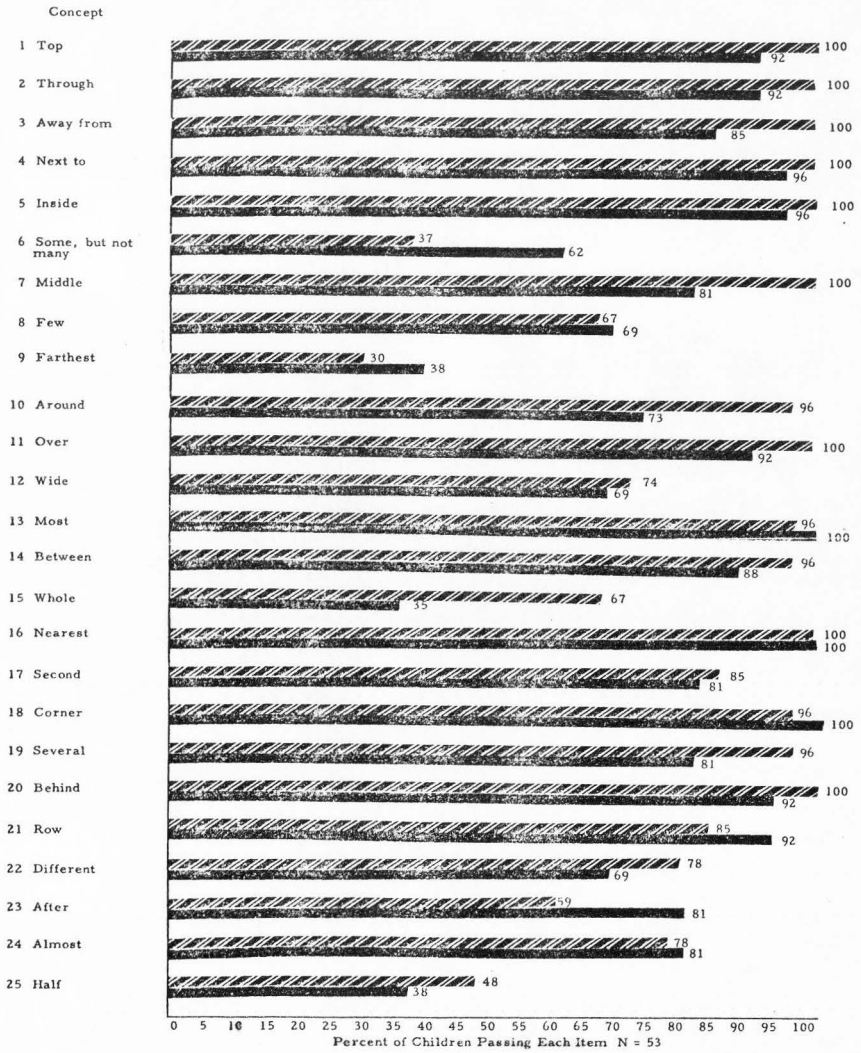

Chart 3. Comparison of urban-rural environment

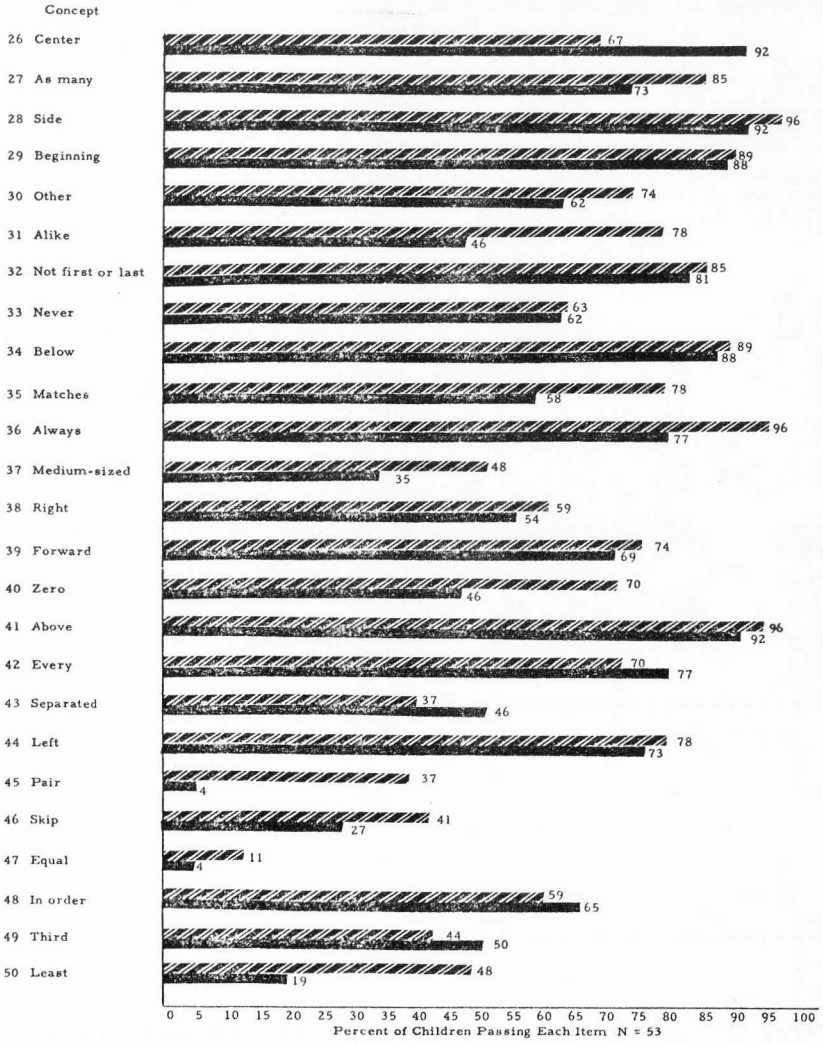

Chart 3. Continued

VITA

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Candidate for the degree of

Master of Science

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Major Field: Family and Child Development

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