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PERCEPTUAL AND COGNITIVE PERFORMANCE OF CHILDREN AS FUNCTIONS OF SOCIO-ECONOMIC CLASS

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DIANE JANICE WILLIS

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PERCEPTUAL AND COGNITIVE PERFORMANCES OF CHILDREN

AS FUNCTIONS OF SOCIO-ECONOMIC CLASS

APPROVED BY

Vladimir Pishkin

William R. Hood

Arthur Vega

Logan Wright

Michael O. Jacobs

DISSERTATION COMMITTEE

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PERCEPTUAL AND COGNITIVE PERFORMANCES OF CHILDREN

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CHAPTER I

INTRODUCTION

One of the central theoretical issues in the field of developmental and educational psychology deals with the question of how cultural deprivation acts to shape and depress cognitive functioning and academic achievement. For years the origin of these effects was argued in terms of heredity versus environment and considerable attention was focused on this controversy. More recently, psychologists have begun to question how one should conceptualize the effects of cultural deprivation upon the cognitive and perceptual faculties of the child.

The effects of cultural deprivation on the disadvantaged child are well documented by studies comparing social-class groups. There is evidence, for example, that deprived children from a lower socio-economic status have deficits in linguistic development (Bernstein, 1960, 1961a, & 1961b; Deutsch, M., 1967; John, 1963; King, 1967; Raph, 1965; Ryckman, 1967), in mental ability (Lesser, Fifer, & Clark, 1965), in auditory and visual discrimination (Clark & Richards, 1966; Deutsch, M., 1967; Katz & Deutsch, 1964; Katz & Deutsch, 1965), in conceptual and categorizing abilities (Deutsch, 1966; Deutsch, M., 1967; Klaus & Gray, 1968; Kofsky, 1967; Ryckman, 1967), and on tests of intelligence (Coleman, 1966; Jensen, 1969; Karp & Sigel, 1965).

Explanations offered for the disadvantaged child's lack of normal development of cognitive, perceptual, and/or language processes center around inadequacy in early preparation because of corresponding environmental deficiencies, and a general lack of experiences in common with middle-class children. While these processes can be seen as interrelated, several investigators (Bernstein, 1960; Deutsch, C., 1967; Ryckman, 1967) are of the opinion that the limited linguistic abilities of lower-class children may be the key factor contributing to their general cognitive impoverishment. Convincing arguments have been proposed for defining cultural deprivation as a language deprivation (Bereiter & Engleman, 1966). Essentially, the language deficit of culturally deprived children seems to be an inability or difficulty in use of language in problem-solving situations. The importance of language in problem-solving has been stressed in the work of Kendler and Kendler (1959) and Kendler, Kendler, and Leonard (1962). These investigators utilized a reversal non-reversal shift paradigm to test the hypothesis that solutions to problems are facilitated by verbal mediation. They found that children responding with relevant verbalizations, i.e., those children who could verbalize the correct dimension in the shift paradigm, produced significantly faster shifts than children responding with irrelevant verbalizations. On the basis of these results, the investigators concluded that verbal mediation facilitates problem-solving behavior.

Tighe and Tighe (1966) and Zeaman and House (1963), however, suggested that the factors operating in the shift paradigm are primarily attentional and that overt verbalizations serve primarily to direct attention to specific aspects of the stimulus material. Tighe and Tighe (1966) stressed the role of perceptual factors in the shift paradigm since a young child's analysis of stimuli is not well differentiated.

It would appear that a relationship must exist among the three factors thought to be occurring in the Kendlers' shift paradigm, i.e., attentional, perceptual and mediational, and all three would be important in solving conceptual tasks. It is precisely these areas in which lower-class children reportedly have difficulty.

In studies concerning the effects of socio-economic level on cognitive development, the tasks employed have either required considerable comprehension of language or have been measures of scholastic aptitude. Moreover, several investigators used materials and procedures with which the middle-class child may be more familiar and, in addition, the tasks did not include conditions designed to control for attentional factors. Consequently, it is difficult to determine whether the lower-class child's poor performance on cognitive tasks is due to a lack of familiarity with task materials and/or to the high degree of attention or language required by the tasks, or whether differences are attributable to the developmental level of basic cognitive abilities.

Likewise, the limited amount of research currently available regarding the perceptual and motivational faculties of lower-class children does not adequately corroborate the influence socio-economic status or motivation has on perceptual functioning. There appears to be an explicit assumption that children from lower socio-economic areas perform below chronological age level on perceptual tasks. The reasons for this assumption, however, are unclear and empirical evidence appears to be insufficient to warrant this conclusion. It is uncertain at this time whether observed differences in performance are due to the lower-class child's lack of experience with paper and pencil tasks, nutritional and environmental impoverishment in his early years, impulsivity and inattentiveness toward the perceptual task, or to a general developmental lag.

In general, it appears that few investigators have attempted to study the role of attention in the perceptual and cognitive performance of lower-class children. Moreover, several important variables have apparently not been controlled in previous studies of the cognitive functioning of these children. The purpose of the present study, therefore, was to compare the conceptual and perceptual abilities of children from two social-class groups on tasks which were assumed to be equally familiar to both and requiring minimal comprehension of language, and to investigate the influence of motivation on the performance levels of both groups.

CHAPTER II

REVIEW AND STATEMENT OF THE PROBLEM

Cognitive Studies

There is considerable evidence that concept identification is a useful paradigm for investigating the cognitive performance of children and adults. In a typical concept identification task, geometrically patterned stimuli varying in a number of dimensions, e.g., size, number, shape, color, position, etc., are presented to the subject. Since the stimuli are multivariate in nature, the experimenter must decide *a priori* which of the stimulus dimensions will be relevant, i.e., necessary for task solution, and which will be irrelevant. It then becomes the task of the subject to ascertain which variables are relevant and which are irrelevant. For example, in a problem using the dimensions color, form, and size, the relevant dimension on which subjects categorize stimuli might be form. The subject would then categorize form (circle, triangle, or square) regardless of color or size.

In the past, investigators have utilized this task to provide a quantitative assessment of human information processing rates. By systematically manipulating stimuli and feedback conditions, Bourne and Restle (1959) were able to generate a mathematical theory of concept identification. Since then, many experiments have been concerned with testing the Bourne and Restle model. Pishkin (1960), for example, introduced various degrees of misinformation feedback by reinforcing the wrong response on some trials. His data supported the model in that the subjects' errors were a linear function of misinformation feedback and number of irrelevant cues. Other types of experimental variables that have been used to test the model and investigate cognitive performance are: the functional relationships of concept performance to irrelevant information (Archer, Bourne, and Brown, 1955), misinformation feedback (Pishkin, 1960, 1961; Wolfgang, Pishkin & Lundy, 1962), the effects of drugs and induced stress (Pishkin, Wolfgang & Bradshaw, 1963; Pishkin, Shurley, & Wolfgang, 1967), stimulus redundancy (Bourne & Haygood, 1959), the influence of social cues and social interaction (Pishkin & Blanchard, 1963; Wolfgang, 1967), stimulus and response tendencies in concept identification (Pishkin, 1961), and the influence of social interaction, sex, and task complexity (Wolfgang, Pishkin, & Rosenbluh, 1968).

Concepts are important in the psychological behavior of man because they not only permit economy in communication and problem-solving but they also provide the basis for language abstractions. While concepts are generally related to language symbols, there is evidence that children's behavior demonstrates the existence of concepts before overt language facilities are manifested. For example, Long (1940) and Skeels (1932) demonstrated that children can correctly manipulate and discriminate spatial forms even though they cannot recognize the forms by name. The concluded, therefore, that verbal associations are preceded by form concepts in psychological development. Gellerman (1933) investigated the ability of chimpanzees and two-year-old children to discriminate triangularity. By selecting the correct stimulus, the subject was permitted access to food. The two-year-old children were able to discriminate triangularity better than the chimpanzees regardless of the position, size, or background of the stimulus. However, because of the degree of formal language and symbolic behavior exhibited by the children in solving the problem situation, it may be assumed that their language capabilities gave the children a basic superiority over the lower primates in form discrimination. Weinstein (1941) devised a similar experiment utilizing three-year-old children and rhesus monkeys. On the basis of his results, Weinstein concluded that children of this age are superior to monkeys in discriminating forms because of their greater generalizing ability and their ability to verbalize the concepts.

Form discrimination appears to be among the first concepts attained by children followed by color concepts, which also develop early in the life of the child. Brian and Goodenough (1929), in an attempt to plot trends on the relative strengths of form and color concepts as they evolve developmentally, had subjects ranging in age from two to fourteen years choose between two alternatives of form and color in matching a series of three objects. They found that children of two and three years of age tended to choose form; from three to six years of age, color was the concept chosen, and, after age six, form again predominated in the subjects' choices. A few investigators (Huang, 1945 and Trabasso, 1963) do not completely agree with Brian and Goodenough on the basis that children can be influenced to choose form or color by manipulating certain experimental conditions. Huang (1945), for example, found that kindergarten aged children can be influenced to choose color or form in a matching situation by making the relative differences between the two qualities very pronounced. Trabasso (1963) used emphasizers such as color, angle, and the removal of irrelevant cues to draw attention to specific aspects of a stimulus and found that emphasizers served to produce faster learning on a concept identification task.

Individual differences regarding preference of one concept over another have been studied prior to solving a concept identification task. Suchman and Trabasso (1966a; 1966b) determined preschool children's preferences for color or form prior to a discrimination problem with either form or color relevant. Children preferring form over color learned the form problem quicker than the color problem; children preferring color over form learned the color problem faster than the form problem. Thus, children learn to discriminate color and form concepts quite early and, while there appears to be a developmental trend in the preference of these concepts, this can vary depending on individual differences or task manipulation, e.g., emphasizing certain aspects of the stimulus.

It was pointed out (Chapter I) that several of the studies investigating cognitive functioning in disadvantaged children utilized materials likely to be more familiar to middle-class (MC) children or used tasks requiring a high level of language or attention skills. For example, Ryckman (1967) administered a battery of eight instruments designed to assess certain information processing abilities to lower- and middle-class Negro kindergarten boys. The tests included: the Illinois Test of Psycholinguistic Abilities, Developmental Form Sequence, Cognitive Maturity Test, and several tests of auditory and visual discrimination. Eighteen of the cognitive measures discriminated between the socio-economic groups in favor of the MC boys ($\underline{P} < .01$). The major differentiating characteristic between the socio-economic groups was general language ability which accounted for the largest portion of the variance. The tasks Ryckman presented to both social-class groups were predominately verbal tasks and it is impossible to determine what the motivational levels were for either group of the boys.

Deutsch (1967) administered an array of tasks requiring precise abstract language and conceptualization. As expected, the performance of MC children was superior to lower-class (LC) children. Hess and Shipman (1965) summarized results of several studies showing that children from a lower socio-economic status have cognitive abilities which are less well developed than MC children. The children had three tasks to perform: first, to sort or group plastic toys by color and by function; second, to sort eight blocks by two characteristics simultaneously; and third, to copy five designs on an Etch-a-Sketch toy with mother and child working together. On the Sigel Sorting Task which was also administered, the LC children showed a decreasing use of the conceptual style dimensions (descriptive, relational, categorical, etc.). In addition, as social-class level decreased, there was an increase in nonverbal responses. Hess and Shipman suggested that the cognitive and linguistic differences obtained between lower and MC children can be attributed to the relations between mother and child. By assessing the teaching styles used by the mother, they concluded that the interaction patterns between mother and child help shape the learning style and information-processing strategies their children develop. As expected, MC children and mothers were superior in concept sorting and in their linguistic encoding associated with the reasons they gave for their various sorts.

Because of the extensive evidence which indicates that LC children have restricted language abilities in comparison to MC children, it appears that conceptual tasks requiring considerable comprehension of language would be more difficult for the LC child. The LC child's poorer performance on conceptual tasks might be attributable to the verbal instructions used by the experimenter rather than to the child's lack of conceptual skills.

Several investigators designed studies requiring minimal comprehension of language in problem-solving behavior of LC children. Comparisons between the performance of low and middle-class groups on this kind of task yielded interesting results probably because the task comes closer to being equally difficult for all children. Odom (1967) investigated the effects of social class on the development of problem-solving strategies in 5-, 6-, and 10-year old children. He administered a three-choice discrimination problem in which one choice was rewarded according to a partial schedule while the other choices were never rewarded. Odom found that strategies thought to reflect higher cognitive processes increased as age and socio-economic level increased. However, Odom failed to stress that LC children made more correct responses than MC children. The differences favoring MC children were differences in pattern responses and response changes, reflecting, according to Odom's definition, higher cognitive processes. Kofsky (1967), using disadvantaged five-year-old Negro children, found that practice in label pretraining of stimuli did not improve their conceptual performance. However, Scholneck, Osler, and Katzenellenbogen (1968), found that disadvantaged Caucasian children between the ages of 5- and 6 and 8- and 9-years, showed poorer discrimination learning of stimuli used in subsequent conceptual tasks than advantaged children, but performed no differently from these children on a concept identification task using the same stimulus materials. Rasmussen and Pishkin (1969) compared 4- and 5-year old Negro males from low, and white males from high, socio-economic strata on a concept identification task. They hypothesized that LC children, with their poorer discrimination ability, would not be as distracted by irrelevant information as advantaged children. Their hypothesis was supported. While increases in amount of irrelevant information resulted in more inefficient performance for both social-class groups, the effect was more detrimental to the performance of the high-social class group. In addition, the LC males performed significantly better than high socio-economic males on a form relevant problem, particularly when no visual cues were available. The better performance of the disadvantaged children was attributed to subject biases toward a particular relevant dimension.

In general, the results of concept formation studies using LC children are inconclusive since language, in actuality, seemed to be the factor under investigation. Additional research is needed regarding the ability of children from different social-class backgrounds to assimilate simple verbal instructions and to make use of informational and corrective feedback to existing cognitive schemata. With the exception of Rasmussen and Pishkin, few studies comparing social-class groups have utilized informational and corrective feedback. Moreover, since children must not only "catch on" to a concept but must also "keep it in mind", these two kinds of feedback should enhance the performance of LC children by calling attention to relevant cues and by aiding memory. The present investigation utilized this approach.

Perceptual Studies

Sensory-perceptual processes are as important and basic to intellectual functioning as language and conceptualization. In fact, children learn to perceive and discriminate form, color, etc., before linguistic symbols become associated with the stimulus. Visual-motor-perceptual functioning of children has received considerable attention within the past five years. Widespread psychological and educational screening of preschool children places major emphasis on selecting out or carefully observing children who perform extremely low on perceptual tasks for the purpose of providing them with sensory training. To date, however, very little research has been reported comparing LC and MC children on the Bender Visual-Motor Gestalt Test and the recently developed Vane Kindergarten Test (Vane, 1968), two procedures used to assess sensory-perceptual processes.

The Bender consists of a set of nine geometric figures printed on four-inch by six-inch white cards which are presented one at a time for the subject to copy on a blank sheet of paper. Wertheimer (1923) originally used the figures to demonstrate the relation of Gestalt orientation to perception. Later the figures were adapted by Bender (1938) and used as a visual-motor test primarily for clinical purposes. An objective scoring system for the Bender test was first developed by Billingslea (1948) because the test had become so widely used by clinicians, and since no scoring system was available. Other objective scoring systems have been published since that time (Gobetz, 1953; Hain, 1964; Keller, 1955; Pascal & Suttell, 1951; Peck & Quast, 1951; Koppitz, 1958a, 1960; and Koppitz, Sullivan, Blyth, & Shelton, 1959). The Bender has been widely used to diagnose brain injury (Halpin, 1955; Koppitz, 1962; Canter, 1966; Wagner & Evans, 1965; Stoer, Leopold, Coroto, & Curnutt, 1965), to screen for school readiness (Koppitz, Mardis, & Stephens, 1961; Smith & Keogh, 1962), to diagnose reading and learning problems (Thweatt, 1963; Keogh, 1965), to evaluate emotional difficulties (Clawson, 1962; Fromm, 1966; Fuller, 1963; Mogin, 1966), and to compare the validities of the various scoring systems on diverse populations (Friedman, Strochak, Gitlin, & Gottasagen, 1967; Holroyd, 1966; McConnell, 1967; Miller, Loewenfeld, Linder, & Turner, 1963; Mosher & Smith, 1965). Koppitz (1964) presented an extensive review of the research published utilizing the Bender with children.

Cross-cultural studies using the Bender Gestalt are few in number and rather inconclusive. Bender (1938) cited one of the earlier studies conducted by Nissen, Machover, and Kinder (1935) who compared American Negro and African children's drawings from the Army Performance Test. Drawings from both groups of children showed similar features but the drawings of the African children were more primitive. She attributed this to the African child's lack of experience with paper and pencil and felt that they were capable of producing copied forms with the same facility as average American children. Moseley (1969) investigated the visual-motor development of deprived and non-deprived 8-year to 10-year 11-month old Negro and white children in order to determine if differences in race and socio-economic level affected Bender reproductions. She found significant differences in performance with the deprived children performing worse than the non-deprived children on the Bender. In addition, the deprived Negro children were functioning approximately four years behind Koppitz's normative sample while the white deprived children were one year behind at all age levels. Carlson (1966) compared the Bender performance of southern negro and southern white psychiatric patients. While the patients were matched for IQ, diagnosis, and severity of illness, the negroes performed significantly worse than the white patients and the negroes reportedly had more education. Carlson suggested that the differences between the two groups might be a function of occupational and socio-economic differences and that individuals in a lower socio-economic level might not engage in activities important for developing perceptual motor skills, hence a poorer Bender performance. Carlson concluded that further research was necessary "to determine how and to what degree cultural and socio-economic factors do influence performance on the Bender Gestalt." (Carlson, 1966, p. 98)

Traditionally, the Bender Gestalt Test is considered to be minimally influenced by cultural variables. Hutt and Briskin (1960) recommend the Bender Test for the uneducated, the socially deprived, the relatively non-verbal, the illiterate and foreign born, assuming that the Bender is not influenced by cultural or educational factors.

Tolor and Schulberg (1963) reviewed the studies utilizing the Bender, including studies dealing with the influence of culture on Bender performance. They stated that no definitive conclusion could be made, due to studies inadequate in design, as to the status of the Bender test in relation to cultural variations. Nevertheless, based upon the few studies reported, it would appear that Bender reproductions are influenced by cultural and socio-economic factors (Carlson, 1966; Moseley, 1969), but definitive evidence corroborating this hypothesis is lacking.

To date, only one study has been published using the Vane Kindergarten Test (VKT) (Vane, 1968). Vane developed this test as a means of evaluating the intellectual and academic potential as well as the behavior adjustment of young children. If the VKT is a valid test, it should be of special value since the brief, one-sentence directions for the various subtests make it less likely to penalize children with limited linguistic abilities. In addition, the administration time is short, and scoring is rapid. The underlying assumption of Vane's test "is that samples of behavior taken at kindergarten age will give clues to the child's ability to function adequately in areas related to success in school" (Vane, 1968, p.1). Three subtests comprise the VKT: Perceptual-Motor, Vocabulary, and Man subtests, and all three need further validation on various groups of children. In addition, if social-class differences in performance are found on the Bender, the differences should be corroborated on the Vane Perceptual-Motor subtest; and if, indeed, LC children have limited linguistic abilities, they should have significantly lower Vocabulary scores on the Vane than the MC group.

Motivation and Attention

Any test a child takes requires a certain amount of attention if the results are to be at all useful. Low performance on any test can be caused by a number of factors such as low intelligence, physical disabilities, inattentiveness, lack of motivation, etc. Many of the concept identification studies reviewed in this chapter utilized experimental manipulations which served to draw attention or emphasize certain aspects of the stimulus. A child learns very early to be selective in what he perceives, inasmuch as he is constantly being exposed to more stimuli than it is possible for him to respond to. While children show a progressive improvement in selective attention (Inglis, Ankus & Sykes, 1968), it can probably be attributed to the fact that as children increase in age, they can begin to effectively attend to and store more information. Children from lower socio-economic areas are noted for their inattentiveness (Deutsch, 1967) and apparent lack of motivation toward academic pursuits (Black, 1966). Several investigators (Zigler & Butterfield, 1968; Zigler & deLabry, 1962; Stevenson & Fahel, 1961), while not denying the debilitating effects deprivation can have on cognitive, perceptual and language processes, feel that the motivational factors in the disadvantaged child have been overlooked. In the past, culturally deprived children have been found to be more wary of adults (McCoy & Zigler, 1965; Shallenberger & Zigler, 1961), more motivated toward obtaining their attention and praise (Stevenson & Fahel, 1961; Zigler, 1963), are not as motivated to be correct for correctness alone (Terrell, Durkin, & Wisely, 1959; Zigler & deLabry, 1962); and, unlike a MC group of children, they are willing to settle for lower levels of achievement (Gruen & Zigler, 1968). Zigler and Butterfield (1968) established a testing paradigm to determine the role of motivational factors in increasing standard intelligence test performance of deprived children. They found that nursery school experience seems to alleviate debilitating motivational factors and that this experience did not necessarily facilitate cognitive development. The deprived children seemed better able to use their intelligence in a standard testing session perhaps because of the positive experiences with a particular adult (McCoy & Zigler, 1965; Sach, 1952). In another study (Douvan, 1956), an examination was given to MC and deprived children with no mention of a reward for good performances. The MC group appeared to be more motivated and performed better on the test. At a later date the test was rerun; however, this time rewards were offered for successful performance on the test. Douvan found that the motivational level of deprived children increased considerably more than that of MC children. Thus it would appear that MC children perform close to their maximum level with or without a reward while LC children respond at a higher level when the test situation promises direct, practical, immediate and meaningful rewards. This combination of motivational and attentional factors, in addition to language problems, could have devastating effects on the conceptual and/or perceptual performances of LC children. The differences attributed to social-class variations may, in fact, be differences in attentiveness, motivation, or language.

Problem

The major purpose of this study was to compare kindergarten, first and second grade LC and MC children on conceptual and perceptual tasks. Conceptual tasks employed with LC children have been criticized because the materials and procedures utilized favored MC children and the tasks used often required considerable comprehension of language. The present study used a concept identification (CI) task composed of geometric forms and colors which, according to the developmental research presented, should be equally familiar to all children, particularly if they have had kindergarten experience. Explanatory instructions for solving the CI task were simple and informational and corrective feedback were given to enhance attentiveness and memory for the relevant dimension. A reinforcement felt to be meaningful (money) was used to increase the motivational level of the children and enhance attentiveness to the perceptual task. The following hypotheses, based on the above review of evidence, were generated:

Hypothesis 1. The use of a conceptual task requiring minimal linguistic skills, consisting of stimuli equally familiar to both social-class groups, and using informational and corrective feedback to enhance attentiveness and memory would result in LC children performing as well as MC children.

Hypothesis 2. Performance on the CI task would improve with grade level, resulting in a linear decrease in errors.

Hypothesis 3. The LC child's limited experiences, deprived background, inattentiveness, and possible lack of motivation would have detrimental effects on perceptual functioning. While it seems to be accepted that LC children perform poorer on perceptual tasks, definitive evidence corroborating the precise role socio-economic factors play in perceptual functioning is not clear. Thus, the present study compared social-class groups on a perceptual test (the Bender Visual-Motor Gestalt Test), with the hypotheses that the LC child's Bender reproductions would be worse than the MC child's.

Hypothesis 4. Reinforcement would serve to motivate LC children more than MC children because MC children tend to perform close to their maximum level with or without reward, while LC children respond at a higher level when promised a reward. Thus, the second Bender reproductions of LC children would result in performance equal to or better than their first Bender performance. In addition, the second Bender reproductions of reinforced MC children would be equal to or worse than their first reproductions, i.e., they would not necessarily be more attentive, thus removal of the stimulus card would hinder their performance more than the LC child's performance.

Hypothesis 5. Comparisons made between LC and MC children receiving no reinforcement would result in poorer Bender performance for LC children when compared to their first Bender reproductions. LC children would perform worse because of poor motivation, hence, they would not attend as carefully to the task. However, both social-class groups would perform worse under the no reinforcement condition since decreased motivation would prevent them from being attentive to the stimulus card prior to its removal.

Hypothesis 6. Significant improvement in Bender Gestalt performance would occur as a function of increasing age.

Hypothesis 7. The VKT would differentiate between social-class and between age groups. Performance on the three subtests would improve with increases in age levels and LC children would perform worse than MC children on all the subtests.

Hypothesis 8. The perceptual-motor subtest scores of the Vane test would correlate with Bender scores across age and population groups.

CHAPTER III

METHOD

Subjects

The subjects (Ss) used in the present investigation were 120 male and female white children attending kindergarten, first and second grades in the Oklahoma City Public School system. Sixty Ss, thirty males and thirty females, were from middle-class areas and attended Monroe School. The remaining sixty Ss, thirty males and thirty females, attended schools in Title 1 areas and met one of the three criteria set forth in this study. A Title 1 area was defined as an area where 30 per cent of the children came from parents with income of $3,000 or less or were receiving Aid For Dependent Children. Schools in Title 1 areas were eligible for Title 1 funds.

All LC Ss met at least one of the following criteria: 1) attendance in a Title 1 school, or 2) parents income less than $5,000 when both parents were working or less than $3,000 when only one parent was working, or 3) the family was on welfare or received Aid for Dependent Children. The middle-class (MC) Ss were chosen according to the area in which they resided and according to the occupation of the fathers. All fathers of the MC Ss were professional people (i.e., teachers, social workers, lawyers). However, no information could be obtained from the parents concerning income or number of years of education in the MC group. A final criterion for selection was that all first and second grade _S_s had to have attended kindergarten. All _S_s in each grade group had an equal number of years in which they attended public school. No _S_ was selected who had repeated a grade in school or who was retarded.

Design

The experimental design was basically a 2x3x2 factorial. The independent variables were: two sexes, three age groups, and two social-class groups. Each _S_ was tested individually on the CI, Bender, and VKT. Dependent variables for the study were the number of errors on the CI and Bender, and the number of correct responses on each subtest of the Vane Kindergarten Test.

Task and Procedure

The tests were administered in the following order by one male and one female examiner experienced in working with children and naive as to the purpose of the investigation: 1. VKT; 2. PPVT; 3. CI task; and 4. Bender reproductions. Examiner 1 ($\underline{E}_1$), a male administered the VKT and PPVT and within one to twelve days Examiner 2 ($\underline{E}_2$), a female, administered the CI task and Bender to the same _S_s. The testing of all _S_s took six consecutive weeks.

The VKT and the PPVT were administered according to standard test instructions. The VKT consisted of Perceptual-Motor, Vocabulary, and Man subtests. $\underline{E}_1$ administered the VKT and PPVT to all _S_s. Upon entering the room _S_ was administered the Perceptual-Motor subtest of the VKT according to Vane's (1968) instructions. This subtest required the

S to draw three boxes, crosses, and hexagons similar to the stimulus design. The test paper was placed before the S along with a #2 pencil and Vane's instructions were read (Appendix I). Those Ss who made figures so large that three would not fit on the page were given an extra blank. Blanks for left-handed children were inverted so the model figures were to the right and not covered by Ss hand as S worked. Ss who appeared frustrated were reassured by saying "Yes, this is hard. You are doing very well." Ss were encouraged to finish their drawings but were not required to do so.

Next the Man subtest of the VKT was administered. The examiner turned the S's paper to the blank side and Vane's instructions were read (Appendix I). If S made an incomplete drawing E said, "I don't think it's finished. Finish the man. Make the best one you can. Don't leave anything out." Ss were not urged further to complete the drawing and upon completion of this subtest S was asked to put his first and last name on the paper. The Vocabulary subtest of the VKT was then administered to each S according to Vane's instructions (Appendix I). If S did not respond E shifted to an easier word such as hat and said, "Tell me about a hat. What is a hat?" If S still did not respond E said, "Tell me what you do with a hat." Once S was asked to define the standard list of eleven words no other leading questions were asked. When ambiguous responses were given to words E said, "Tell me more, or What do you mean?" All of the vocabulary words were administered in the order listed on the test blank (Appendix II).

Next, the PPVT was administered to each S according to Dunn's (1959) instructions for Ss below and above eight years of age (Appendix

III). The test was discontinued after S made six errors in any eight consecutive presentations. The PPVT was administered merely as a screening test and Ss receiving IQ's below eighty were dropped from the study and another S was selected. Only nine Ss had to be dropped, two MC Ss and seven LC Ss.

The test material for the CI task (administered by E_2) was fashioned after the Wisconsin Card Sorting Test in that each card contained one of two forms (triangle or square) in one of two colors (red or blue) and one of two sizes (1" or 3/8" in vertical height). The deck of ninety-six stimulus cards was arranged in a random order with the restriction that one particular stimulus card did not immediately follow itself. The Ss categorized the series of geometric patterns in accordance with the form of the pattern. The irrelevant dimensions were size and color.

A brown wooden sorting tray, with two compartments, was used. Informational feedback, i.e., the verbal response "Right" if S categorized form correctly and the response "Wrong" if S categorized incorrectly, was used. Following the informational feedback, S was required to correct his "Wrong" response (corrective feedback). The task was subject-paced and was terminated following sixteen consecutively correct responses or a total of ninety-six trials.

At the start of the second testing session S was given the CI task by E_2. E_2 sat at a table directly opposite S. The brown wooden tray was placed in front of each S with the metal box of stimulus cards placed slightly to the left of the S. After E_2 read the instructions (Appendix IV), each S took the cards one by one from the metal box and placed it in either the right or left side. If S made the correct choice E responded Right and S then turned the card face down in the slot. If S made an incorrect choice, i.e., placed the relevant dimension in the wrong compartment of the tray, E responded "wrong". Ss were then required to place the card in the correct compartment face down (corrective feedback). Ss placed all triangles regardless of size or color in the slot to the right and squares (irrelevant dimension) were placed on the left.

Following the CI task the first Bender (BI) was administered to all Ss individually using the standard administration procedure set forth by Koppitz (1964). Second Bender reproductions were then obtained from all Ss using different sets of instructions and reinforcing one-half the Ss. E_2 laid one sheet of unlined paper, size 8 1/2 x 11", and a #2 pencil with an eraser before the S. Extra paper was laid to the right of the S for easy access should the S desire more than one sheet. Koppitz's (1964) standard instructions were then read to each S (Appendix V). Each Bender card was placed parallel to the top of the blank paper in front of the S. The cards were presented in orderly sequence one at a time and there was no time limit.

Upon S's completion of the last Bender drawing, the paper or papers upon which the reproductions were made was removed. The paper was then placed in a folder out of Ss vision. Immediately afterwards, another sheet of 8 1/2 x 11" unlined paper was placed before the S. Those Ss receiving no reinforcement (BNR) on the second Bender presentations were given different instructions (Appendix V). Each card was exposed five seconds, then removed from S's view, and after a three-second delay Ss could begin drawing the figure. Upon S's completion of the last Bender drawing, E wrote S's name, grade and BNR on the back of the paper or papers.

For those Ss receiving reinforcement the same procedure was followed with the exception of the instructions (Appendix V). Each of the Ss in the reinforced group (BR) was given a penny after each Bender reproduction regardless of the similarity of their reproduction to the original design. Upon S's completion of the last Bender drawing, E_2 wrote S's name, grade, and BR on the back of S's paper or papers. S's questions pertaining to the tests were responded to in a non-committal way.

The average testing time for both the CI and Bender was approxmately forty minutes per S. Testing time for the PPVT and VKT was approximately thirty minutes per S.

CHAPTER IV

RESULTS

The data consisted of analyzing results obtained on a concept identification task, the Bender Visual-Motor Gestalt Test, and the Vane Kindergarten Test. All test data were first visually inspected for homogeneity of variance, with all but two variables (CI & Bender) appearing to readily meet this assumption. A Cochran test (Winer, 1962) for heterogeneity of variance confirmed that the CI data met the criterion of homogeneity of variance. However, the Bender data did not meet this criterion, thus error scores on the Bender were transformed to logarithmic scores to meet it.

Concept Identification

The dependent variable for the CI task was the number of errors to solution. Hypothesis 1, which stated that the use of a conceptual task requiring minimal linguistic skills, consisting of stimuli equally familiar to both social-class groups, and using informational and corrective feedback to enhance attentiveness and memory would result in LC children performing as well as MC children, was supported. An analysis of variance (ANOVA) revealed no significant error differences between lower and middle-class groups of Ss. In addition, the ANOVA on the errors disclosed that all of the main effects and interactions were non-significant. A summary of this analysis is presented in Table 1.

TABLE 1

CONCEPT IDENTIFICATION TASK: ANALYSIS OF VARIANCE ON ERRORS

Source	*df*	MS	*F*	*p*
Sex	1	99.01	0.218	NS
Age	2	335.32	0.737	NS
Socio-economic Status (Ses)	1	261.07	0.574	NS
Age x Sex	2	1097.86	2.413	NS
Age x Ses	2	182.58	0.401	NS
Ses x Sex	1	594.08	1.306	NS
Age x Ses x Sex	2	285.07	0.627	NS
Error	108	454.98		

Hypothesis 2 stated that performance on the CI task would improve with grade level, resulting in a linear decrease in errors was not supported in that no significant differences were obtained among any of the grade groups. In fact, rather than a linear decrease in errors the opposite trend occurred with the kindergarten group obtaining the lowest mean error score ($\bar{X}$=19.42) and the second grade the highest mean error score ($\bar{X}$=24.65).

Although the difference was not significant, LC *Ss* obtained fewer errors than MC *Ss* at the kindergarten level ($\bar{X}$LC=15.60; $\bar{X}$MC=23.25) and slightly fewer errors at the second grade level ($\bar{X}$LC=23.70; $\bar{X}$MC=25.60) (Figure 1).

Strict adherence to the procedures of an ANOVA prevent t tests from being estimated between cells when the ANOVA itself is not significant. However, since the Age x Sex and Ses x Sex interactions approached significance on the ANOVA, subsequent t tests were performed, but only to provide more information regarding sex and social-class differences

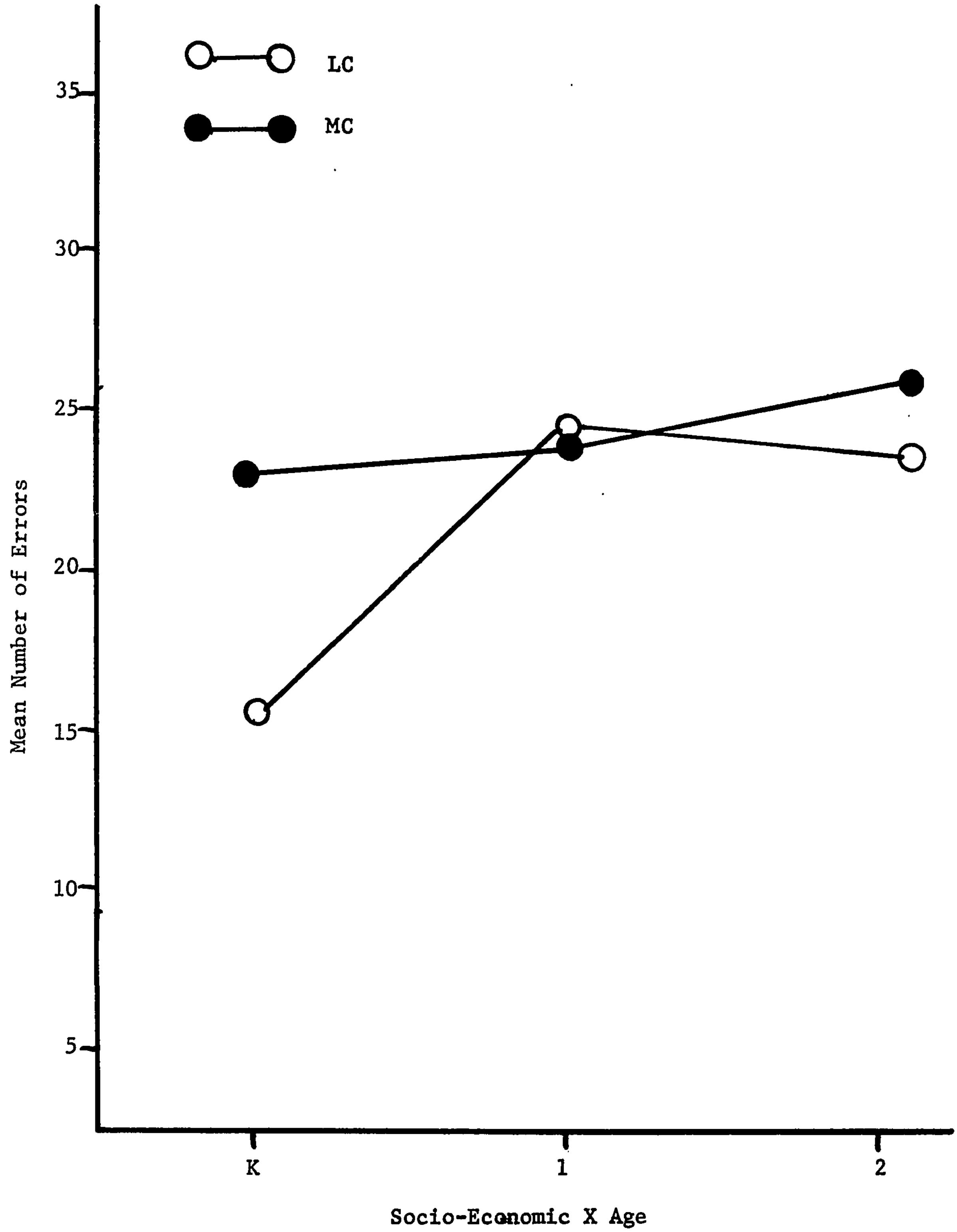

Figure 1. Mean errors to solution for socio-economic by age groups on concept identification task.

at each grade level. For the Age x Sex interaction t tests were significant only at the kindergarten level (t=1.87 $p < .05$) where the kindergarten males obtained a substantial reduction of errors over the females (Figure 2). The reverse situation occurred at Grade 1 with the females performing better than the males although the difference was not significant (t=1.27 $p < .20$). At Grade 2 the males again obtained fewer errors than the females but the difference was negligible and did not approach significance. Kindergarten males performed significantly better than all other Age x Sex groups with the exception of first grade females (Table 2). Overall, males had fewer errors than females on the CI task

TABLE 2

SUMMARY OF t TEST FOR AGE X SEX ON CI TASK

Age	t	df	p
Kindergarten (K)			
Male vs females	1.87	19	.05
First			
Male vs females	1.27	19	NS
Second			
Males vs females	0.317	19	NS
K males vs 1st males	2.35	19	.025
K males vs 1st females	1.04	19	NS
K males vs 2nd males	1.73	19	.05
K males vs 2nd females	1.91	19	.05
1st males vs 2nd females	0.405	19	NS
1st males vs 2nd males	0.750	19	NS

but the mean error differences for the combined grade groups were only slight ($\bar{X}$ males=21.85; $\bar{X}$ females = 23.66, Table 3).

In analyzing the Ses x Sex differences (Figure 3) the LC females

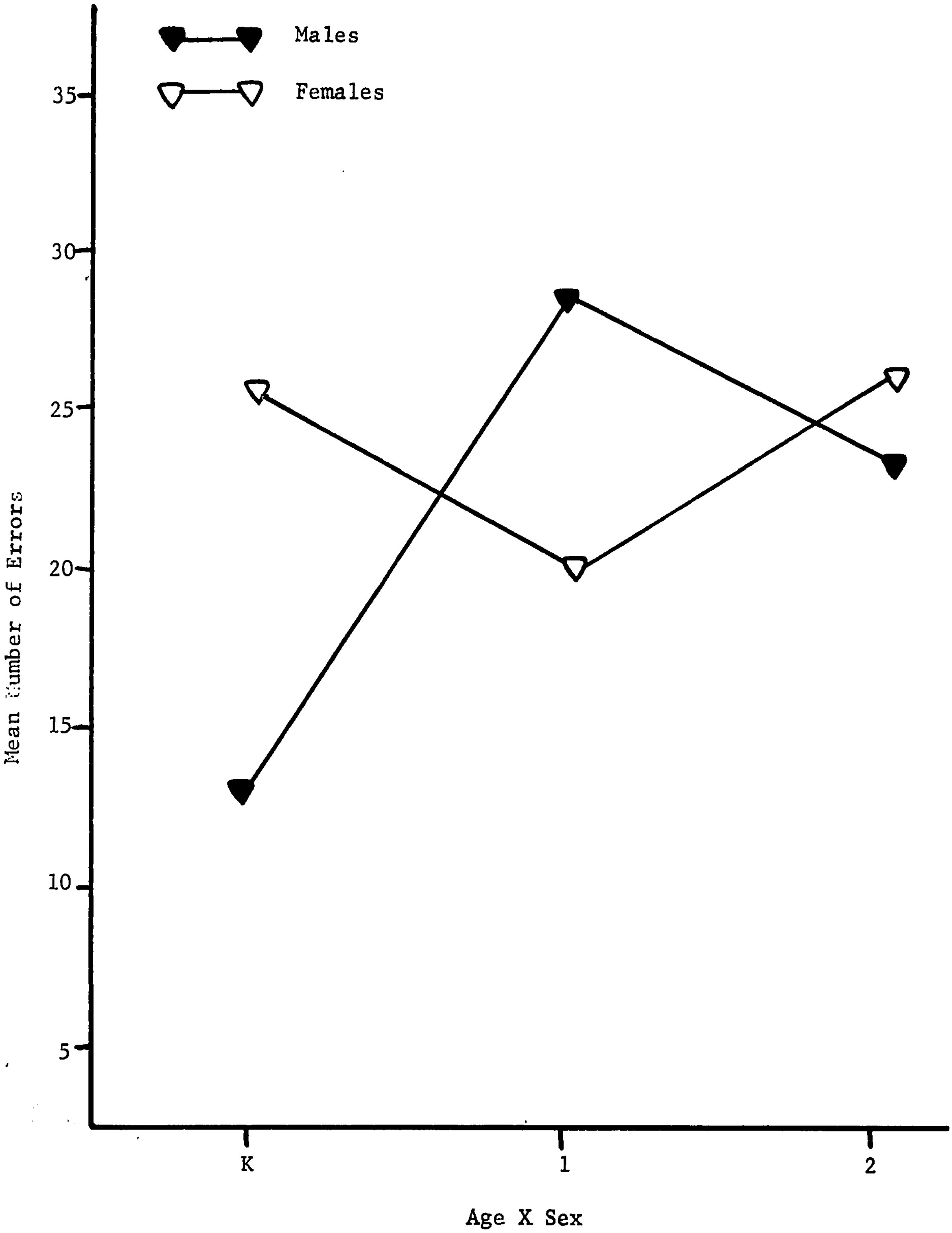

Figure 2. Mean errors to solution for age and sex groups on concept identification task.

TABLE 3

MEAN ERRORS TO SOLUTION FOR LC, MC AND COMBINED GROUPS OF SUBJECTS ON CI TASK

Variable	$\bar{X}$
Combined	
K	19.42
1	24.20
2	24.65
Males	21.85
Females	23.66
LC	21.28
MC	24.23
K males	13.35
K females	25.50
1st males	28.60
1st females	19.80
2nd males	23.60
2nd females	25.70
Lower-Class	
K	15.60
1	24.55
2	23.70
Males	22.60
Females	19.96
Middle-Class	
K	23.25
1	23.85
2	25.60
Males	21.10
Females	27.36

obtained the lowest mean error score ($\bar{X}$=19.96) and the MC females obtained the highest mean error score ($\bar{X}$=27.36). However, none of the differences between the scores were significant.

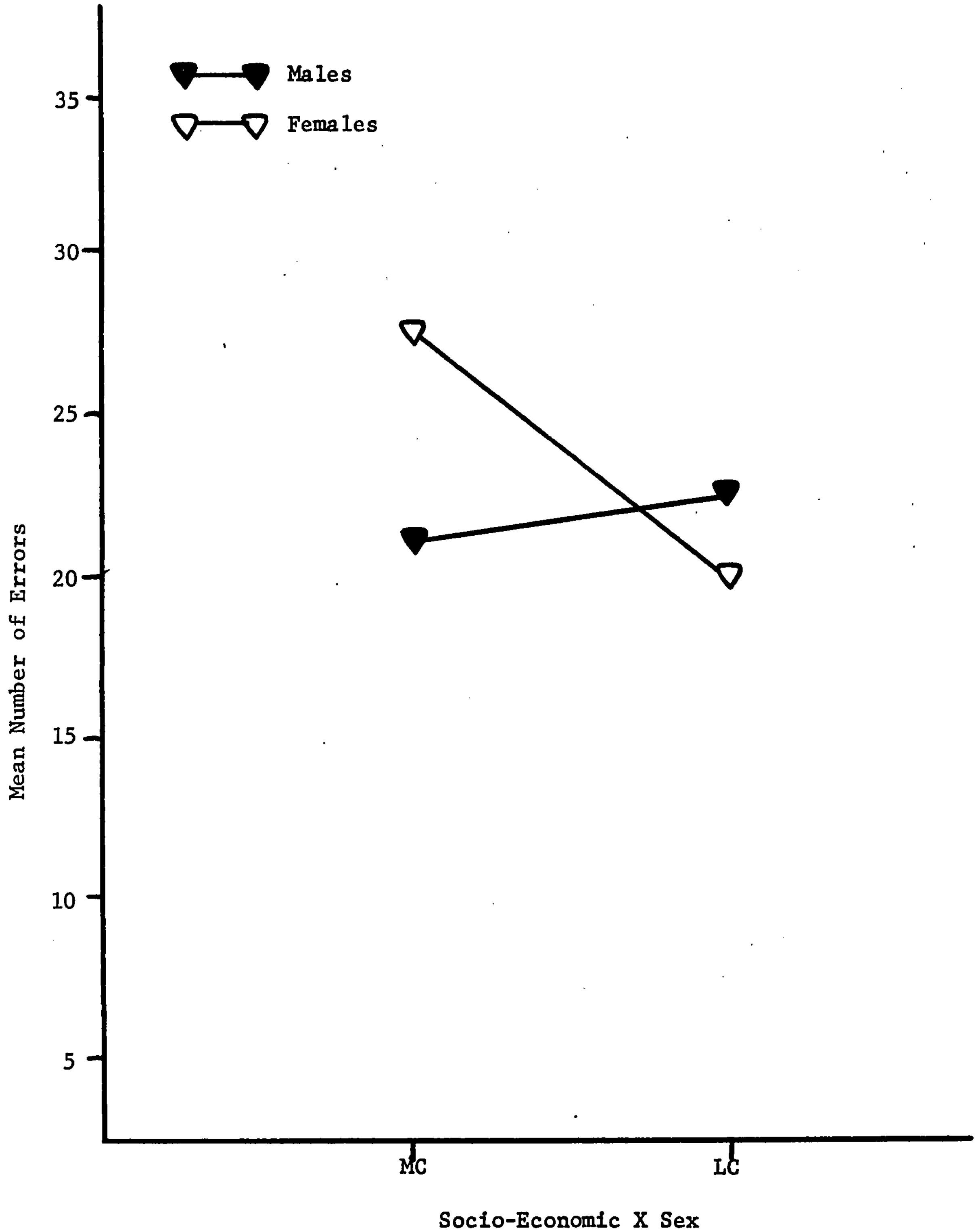

Figure 3. Mean errors to solution for socio-economic by sex groups on concept identification task.

Scoring: Bender Visual-Motor Gestalt Test

All Bender Gestalt Tests were scored by the present investigator using Koppitz's (1964) developmental scoring system. Under this scoring system thirty mutually exclusive items are scored as either absent or present. A child could conceivably obtain a score of thirty and since the Bender is scored for errors the higher the score the worse the performance, the lower the score the better the performance. Essentially, a score of zero reflects a perfect performance. Since S's name and condition of Bender drawing, i.e., BR or BNR, was written on the back of the sheets by E_2, a female, the investigator was not always aware of the social-class standing of S's reproductions being scored. However, regardless of the precautions taken it was not possible to be completely unaware of the S's social-class background. Hence, twenty Benders were selected at random for a qualified psychologist, a female, to score. The psychologist was unaware of the purpose of the study and was asked only to score the Benders. Interscorer reliability was obtained by a Pearson product moment correlation coefficient and was highly significant for the set of scores ($r=.986$ $p < .005$).

Analysis of Bender Data

Error scores on the Bender were transformed to logarithmic scores in order to meet the criterion of homogeneity of variance. The standard deviations for Bl, BNR, and Br are presented in Table 4. A Cochran test on BR resulted in a critical value greater than 0.2813 (BR=0.304, $df=9$), thus signifying heterogeneity of variance. Once all Bender scores were transformed to log scores a 2x3x2 analysis of variance

TABLE 4

STANDARD DEVIATIONS AND COCHRAN TEST VALUES FOR BI, BNR AND BR FOR GRADE, SEX, AND SOCIAL-CLASS LEVELS

Bender I				Cochran Test
	K	1	2	
LC males	3.10	2.75	2.71	
LC females	3.68	3.26	2.76	
MC males	3.38	2.88	3.01	
MC females	4.83	2.75	1.49	0.197
Bender II Non-Reinforced				**Cochran Test**
	K	1	2	
LC males	3.19	3.32	1.52	
LC females	2.49	3.05	3.08	
MC males	2.51	3.96	3.21	
MC females	1.52	4.16	2.28	0.164
Bender II Reinforced				**Cochran Test**
	K	1	2	
LC males	1.10	2.68	3.46	
LC females	3.13	3.54	2.70	
MC males	4.28	2.59	2.88	
MC females	6.30	1.52	2.28	0.304

yielded results supporting Hypotheses 3 and 6 for all three Bender conditions.

Hypothesis 3 stated that LC children would perform worse than MC children on a perceptual task; and Hypothesis 6 stated that errors would decrease as a function of age. These were supported by two of the three main effects, Age and Ses, ($p < .01$), although no other main effects and none of the interactions were significant for Bender I (Table 5, Figures 4 and 5).

TABLE 5

BENDER GESTALT TEST I: ANALYSIS OF VARIANCE ON LOG ERROR SCORES

Source	df	MS	F	
Sex	1	.0041	.0823	NS
Age	2	2.6098	52.4056	.01
Socio-Economic Status (Ses)	1	.7576	15.2129	.01
Age x Sex	2	.0976	1.9598	NS
Age x Ses	2	.0739	1.4839	NS
Ses x Sex	1	.0055	.1104	NS
Age x Sex x Ses	2	.0723	1.4518	NS
Error	108	.0498		

Reinforcement caused considerably more variability in performance compared to no reinforcement. The main effects Age, Sex, Ses, and the two-way interactions were all significant ($p < .05$) under the BR condition while the BNR condition yielded significant results only on the Age and Ses main effects and the Age x Ses x Sex interaction. The significant main effects Age and Ses for BNR and BR supported Hypothesis 3, that LC Ss would perform worse than MC Ss on a perceptual task, and Hypothesis 6, that Bender errors would decrease as a function of age (Figure 6). In addition, the significant interactions Age x Sex, and Age x Ses for BR and the significant Age x Ses x Sex interaction for both BR and BNR (Tables 6 and 7; Figures 7 and 8), indicated that with increasing age the Bender reproductions of both sex groups and socioeconomic groups improved. The Age x Ses interaction favored MC Ss in

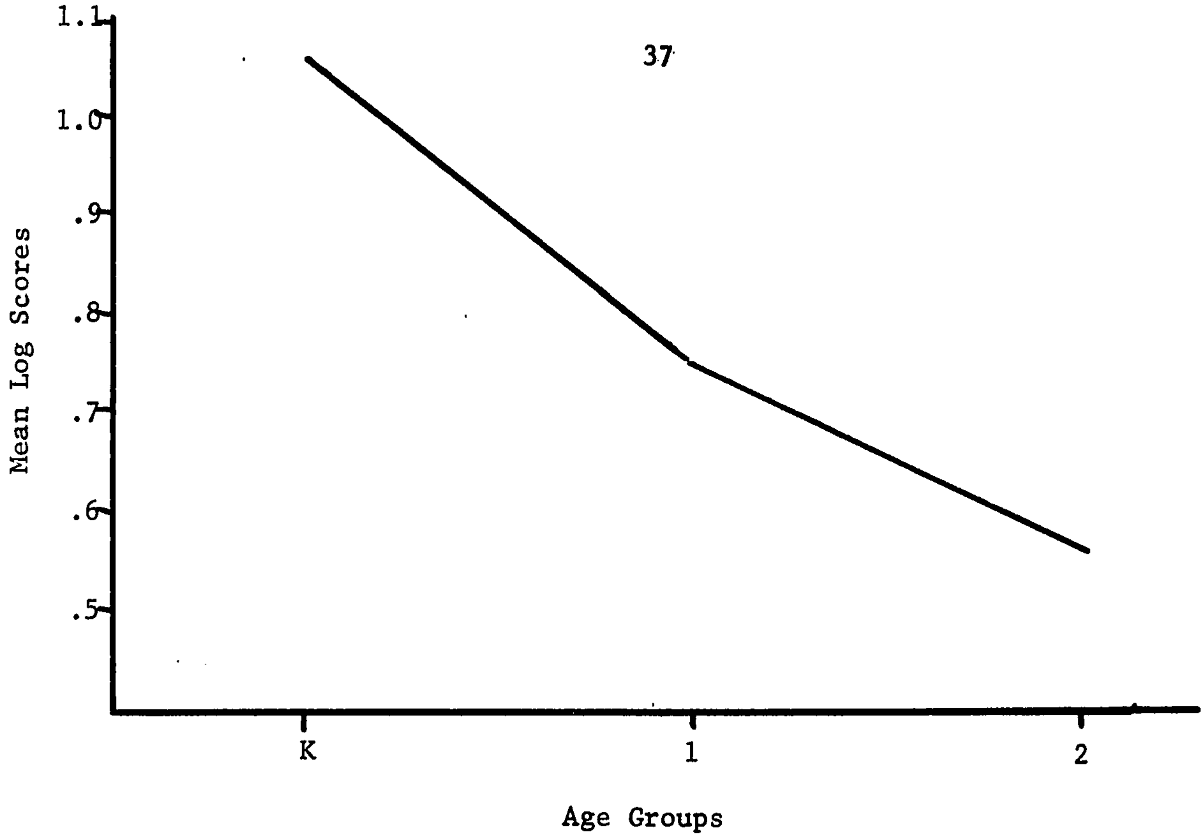

Figure 4. Mean log errors for each age group on Bender Visual-Motor Gestalt Test I.

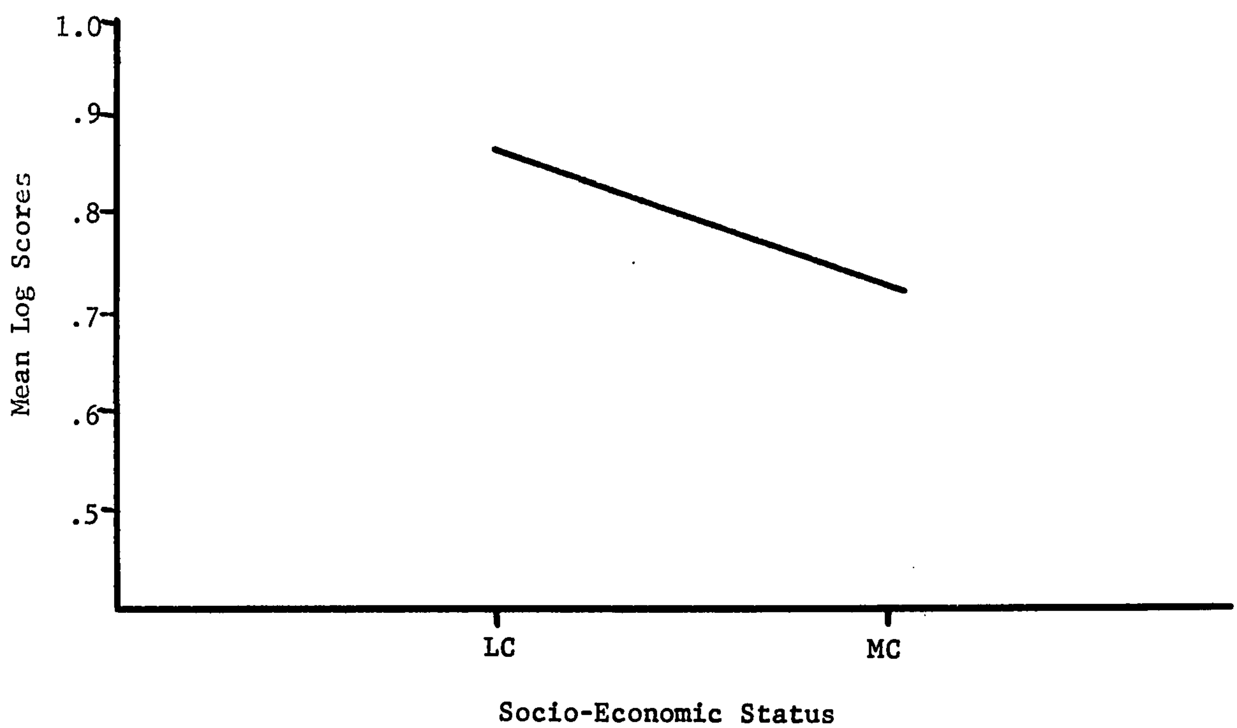

Figure 5. Mean log error for each social-class group on Bender Visual-Motor Gestalt Test I.

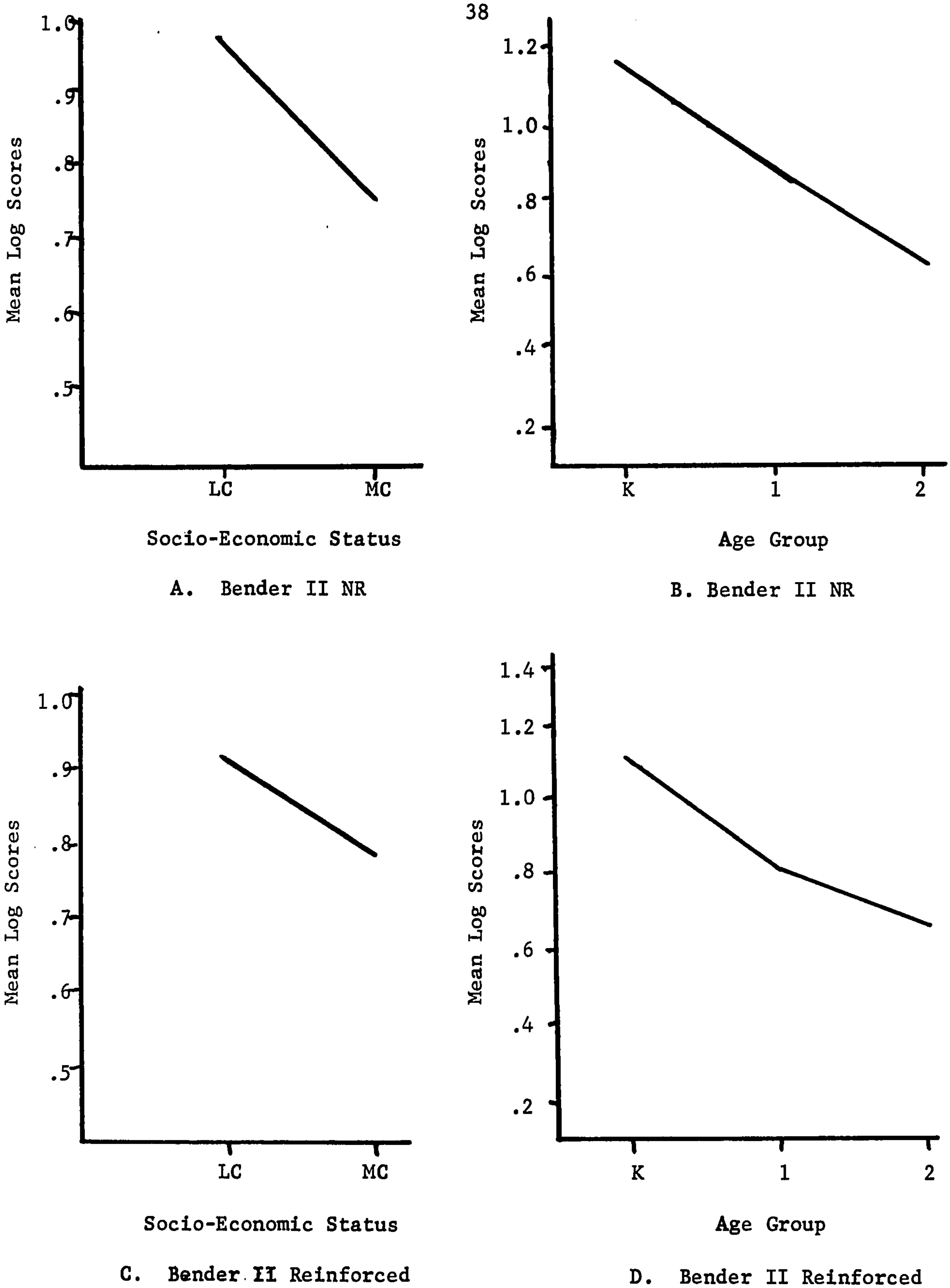

Figure 6. Mean log errors for social-class groups and age groups on Bender II non-reinforced and Bender II reinforced.

TABLE 6

BENDER II NON-REINFORCED: ANALYSIS OF VARIANCE ON LOG ERROR SCORES

Source	df	MS	F	p
Sex	1	.0017	.074	
Age	2	1.4790	64.030	.01
Socio-Economic Status (Ses)	1	.6432	27.84	.01
Age x Sex	2	.0503	2.18	NS
Age x Ses	2	.0688	2.98	NS
Ses x Sex	1	.0174	0.75	NS
Age x Ses x Sex	2	.0926	4.01	.05
Error	108	.0231		

TABLE 7

BENDER II REINFORCED: ANALYSIS OF VARIANCE ON LOG ERROR SCORES

Source	df	MS	F	p
Sex	1	.1333	5.85	.05
Age	2	1.0846	47.57	.01
Socio-Economic Status (Ses)	1	.2168	9.51	.01
Age x Sex	2	.1780	7.81	.01
Age x Ses	2	.0965	4.23	.05
Ses x Sex	1	.0069	0.30	NS
Age x Ses x Sex	2	.0445	1.95	NS
Error	108	.0228		

that their Bender reproductions were significantly better regardless of the reinforcement-non-reinforcement conditions. In addition, under the BR condition MC males tended to perform significantly better than MC and LC females at the first grade level. At grade two both MC and LC males

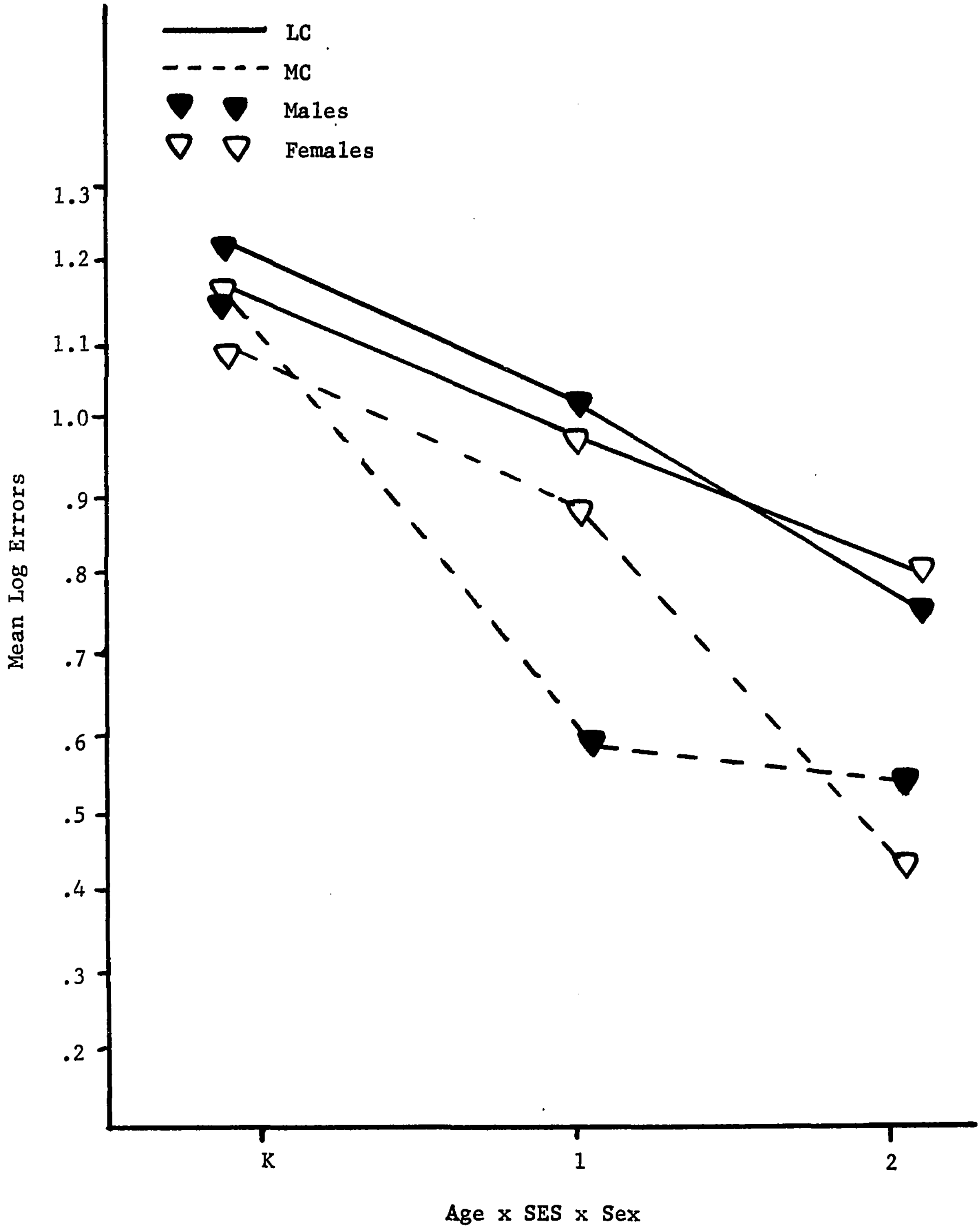

Figure 7. Mean log errors for each age, social-class, and sex group on the Bender Non-Reinforced condition.

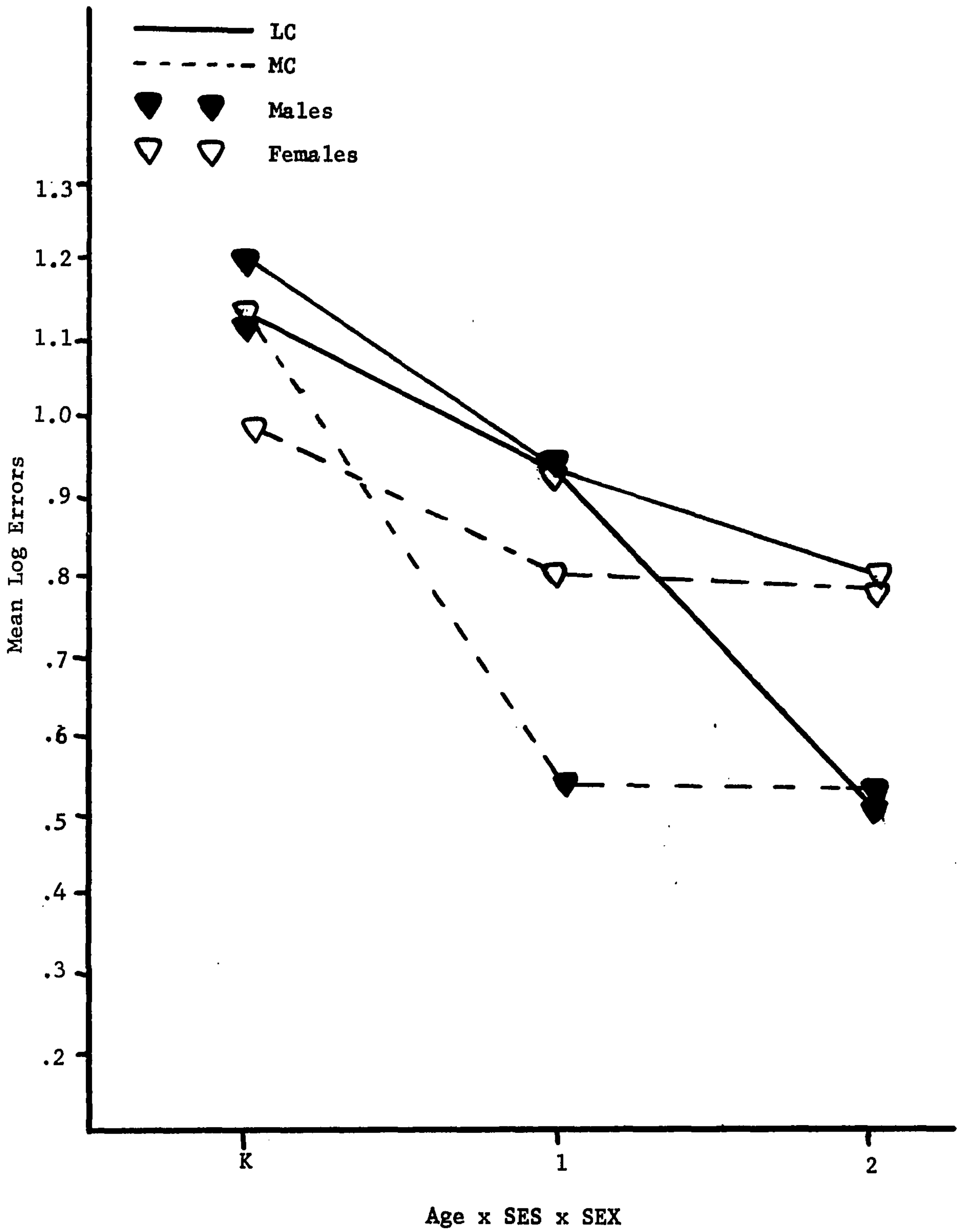

Figure 8. Mean log errors for each age, social-class, and sex group on the Bender Reinforced condition.

performed significantly better than MC and LC females (Figure 8). The significant sex differences under the BR condition indicates that reinforcement served to motivate the males more than the females at these two grade levels ($p < .05$). Hypothesis 4, which stated that reinforcement would serve to motivate LC Ss more than MC Ss, was partially supported when only second grade LC males performed slightly better than MC Ss under the reinforcement condition (Figure 8). Figures 8 and 9 show that at the first grade level MC Ss performed better with reinforcement than LC Ss and their performance was better than the B1 performance. At the kindergarten level MC females performed better than all other Ss, however, at the second grade level MC and LC females performed worse on BR than the males. Hypothesis 4 stated further that the second Bender reproductions of LC Ss would result in scores equal to or better than their first Bender reproductions. This was not supported in that a t test on the log error difference scores between BNR and B1 and log error difference scores between BR and B1 were both significant (BNR-B1 t=3.13 $p < .01$; BR-B1 t=3.29 $p < .01$) indicating greater errors, i.e., a higher score, on the second Bender reproductions. Finally, Hypothesis 4 stated that the second Bender reproductions of reinforced MC Ss would be worse when compared to their first reproductions. This was not supported since a t test on the log error difference scores did not reach significance (t=1.05 $p < .50$). As shown in Figure 9, the first grade MC Ss performed better on the second Bender but the second grade MC Ss performed considerably worse on the second Bender indicating that reinforcement may have been distracting for this group. Figure 9 presents the BNR and BR difference scores of MC and LC Ss. These two conditions elicited variable

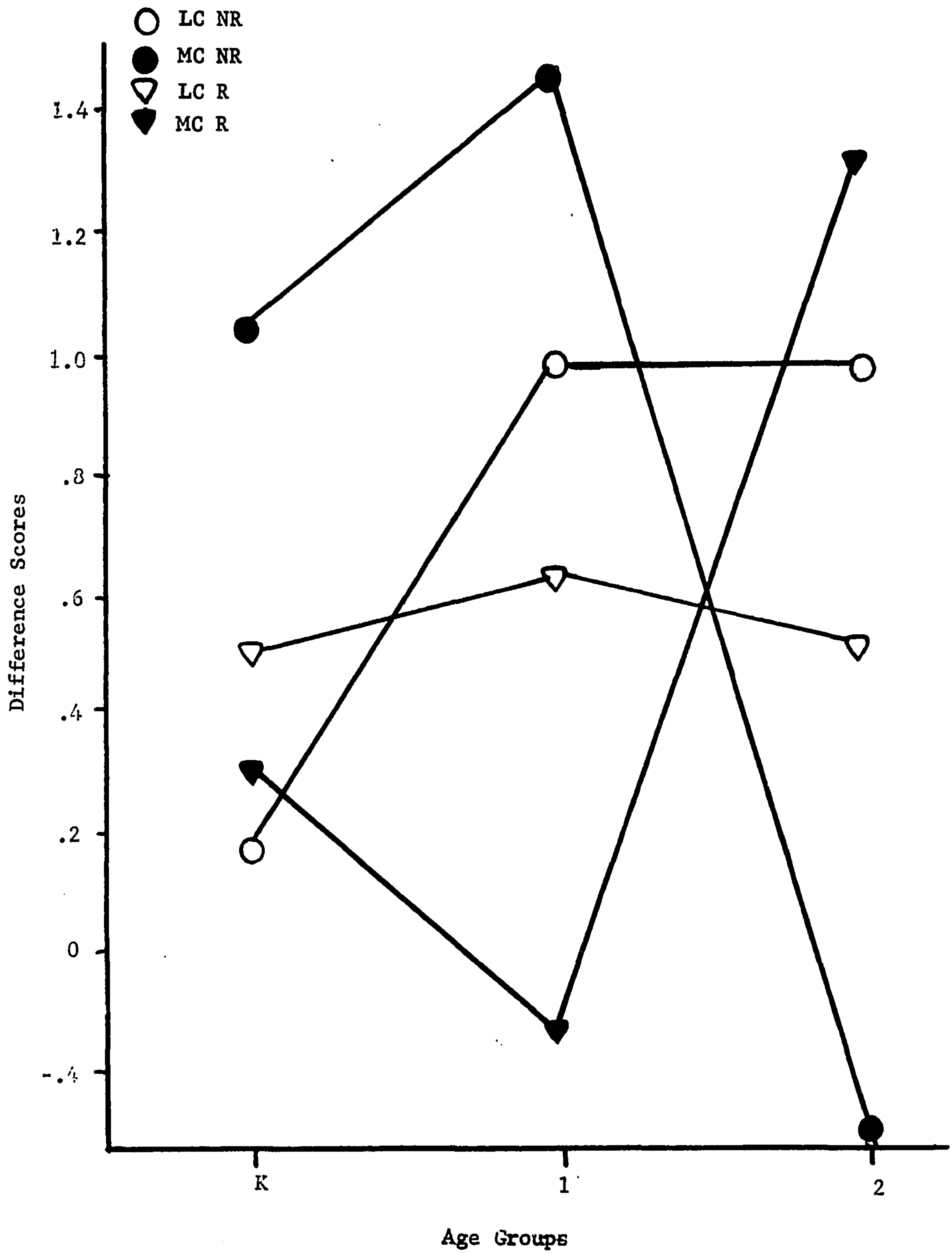

Figure 9. Difference scores for each age group of LC and MC subjects on BR and BNR.

results from both social-class groups at each grade level and no trends were observed from the results.

Hypothesis 5 stated that comparisons made between LC and MC Ss receiving no reinforcement would result in poorer Bender reproductions, i.e., higher scores, for LC over MC Ss when compared to their first Bender reproductions and that Bender performance of both social-class groups would be worse under the no reinforcement condition. This latter statement was partially supported since a t test performed on the combined log error difference scores for BNR and B1 (t=2.83 $p < .01$) and BR and B1 (t=2.24 $p < .05$), indicated a greater difference, i.e., more errors, between BNR and B1 than BR and B1. LC Ss and MC Ss, as a group, received higher Bender scores (i.e., had poorer performance on BNR) with no one social-class group being unduly penalized under the BNR condition, however, one age group, the second grade MC Ss performed better on the BNR than BR or B1 conditions. A t test on log error differences scores between BNR and B1 for MC Ss also approached significance (t=1.56 $p < .20$) in that BNR reproductions as a group were worse than B1 reproductions. Figures 10 and 11 illustrate the mean log scores of MC and LC Ss on B1-BNR and BI-BR and show the consistently poorer performance of LC Ss regardless of conditions.

Scoring: Vane Kindergarten Test

All subtests were scored by the present investigator and three independent scorers. Where disagreement in scoring occurred, the present investigator made the final decision as to the score. Two of the independent scorers, both females, were unaware of the social-class distinction inherent in the study and naive as to the purpose of the study. In

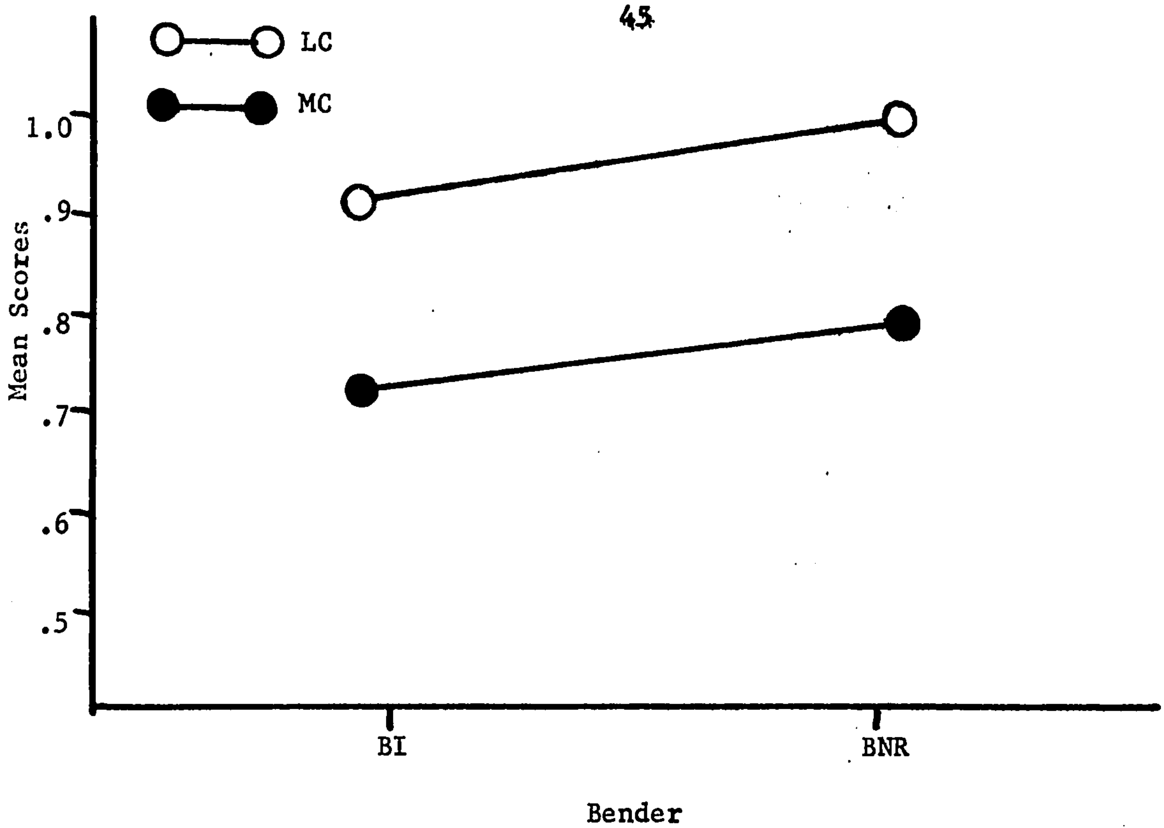

Figure 10. Comparison of mean scores of subjects on BI and BNR.

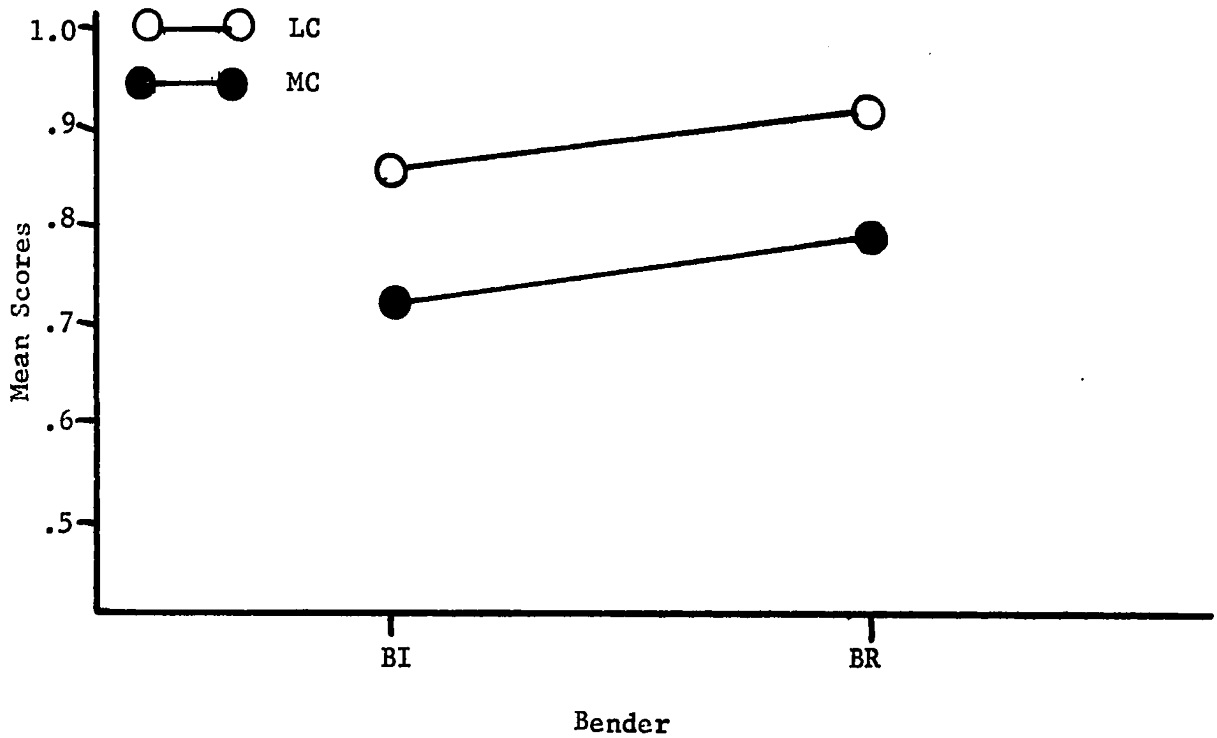

Figure 11. Comparison of mean scores of subjects on BI and BR.

accordance with Vane's scoring procedure, the higher the score obtained by S the better the performance, the lower the score the worse the performance.

Analysis of VKT Data

The VKT was administered to all Ss in order to evaluate the effectiveness and utility of the test in differentiating perceptual performance of different age groups of children. Hypothesis 7 which stated that the VKT would significantly differentiate between social-class groups and between age groups was supported with the exception of the Perceptual-Motor subtest at grade two. Results of an ANOVA revealed that the Age and Ses main effects were highly significant for all three subtests (Perceptual-Motor, Vocabulary, Man $p < .01$) and the Age x Ses interaction was significant for the three subtests (all $p < .05$). All other main effects and interactions were non-significant on all the subtests (Tables 8, 9, and 10). In analyzing the main effect for Age the Perceptual-Motor subtest was the only one that did not yield a significant difference between the first and second grade Ss (t=.917, NS). The Vocabulary and Man subtests both differentiated significantly between these two grades (Vocabulary t=2.49 $p < .02$; Man t=2.28 $p < .05$) as illustrated in Figure 12. In every instance a significant difference was found between the kindergarten and first, kindergarten and second grade Ss (All $p < .01$).

The main effect for Ses found the MC Ss performing significantly better than the LC Ss on the three subtests. The Age x Ses group interaction (Figures 13, 14, and 15) favored the MC Ss on the three subtests with the LC Ss obtaining significantly poorer scores. By and large, performance on the three subtests improved significantly with increases

TABLE 8

PERCEPTUAL-MOTOR SUBTEST OF VANE KINDERGARTEN TEST: ANALYSIS OF VARIANCE ON SCORES OBTAINED BY SUBJECTS

Source	df	MS	F	p
Sex	1	.67	.31	NS
Age	2	110.01	50.93	.01
Socio-Economic Status (Ses)	1	46.87	21.70	.01
Age x Sex	2	3.33	1.54	NS
Age x Ses	2	23.28	10.78	.01
Ses x Sex	1	.42	.19	NS
Age x Ses x Sex	2	.02	.01	NS
Error	108	2.16		

TABLE 9

VOCABULARY SUBTEST OF VANE KINDERGARTEN TEST: ANALYSIS OF VARIANCE ON SCORES OBTAINED BY SUBJECTS

Source	df	MS	F	p
Sex	1	.21	.06	NS
Age	2	183.11	54.02	.01
Socio-Economic Status (Ses)	1	134.41	39.65	.01
Age x Sex	2	4.91	1.45	NS
Age x Ses	2	12.71	3.75	.05
Ses x Sex	1	3.00	.89	NS
Age x Sex x Ses	2	0.62	.18	NS
Error	108	3.39		

in age levels and the performance of LC Ss was below that of MC Ss. However, as illustrated by mean scores LC Ss performance improved considerably on the Perceptual-Motor and Man subtests after kindergarten experience while improvement in language areas (Vocabulary subtest) was slight.

TABLE 10

MAN SUBTEST OF VANE KINDERGARTEN TEST: ANALYSIS OF VARIANCE ON SCORES OBTAINED BY SUBJECTS

Source	df	MS	F	p
Sex	1	3.33	.21	NS
Age	2	443.78	27.77	.01
Socio-Economic Status (Ses)	1	140.83	8.81	.01
Age x Sex	2	1.51	.09	NS
Sex x Ses	1	.54	.03	NS
Age x Ses	2	59.30	3.71	.05
Age x Sex x Ses	2	7.06	.44	NS
Error	108	15.98		

The Perceptual-Motor and Man subtests approached significance in differentiating between the first grade MC and LC Ss (P-M $t=1.34$ $p < .20$; Man $t=1.40$ $p < .20$) but did not approach significance in differentiating the second grade MC and LC Ss (Figure 14). All subtests were significant in differentiating MC and LC Ss at the kindergarten level with the MC Ss performing better.

Hypothesis 8, which stated that the Perceptual-Motor subtest scores of the VKT would correlate with Bender scores across groups, was supported in that the Pearson r between Perceptual-Motor and B1 for the LC Ss was $r=-.828$ ($p < .01$) and for MC Ss $r=-.547$ ($p < .01$) (Table 11).

While the Peabody Picture Vocabulary Test (PPVT) (Form B) was administered as a screening test, the IQ scores show that at each age level MC Ss obtained higher mean IQ scores than LC Ss (Table 12). Since the PPVT is a vocabulary test not requiring verbal responses by Ss, Pearson product-moment correlations were obtained on the Vocabulary sub-

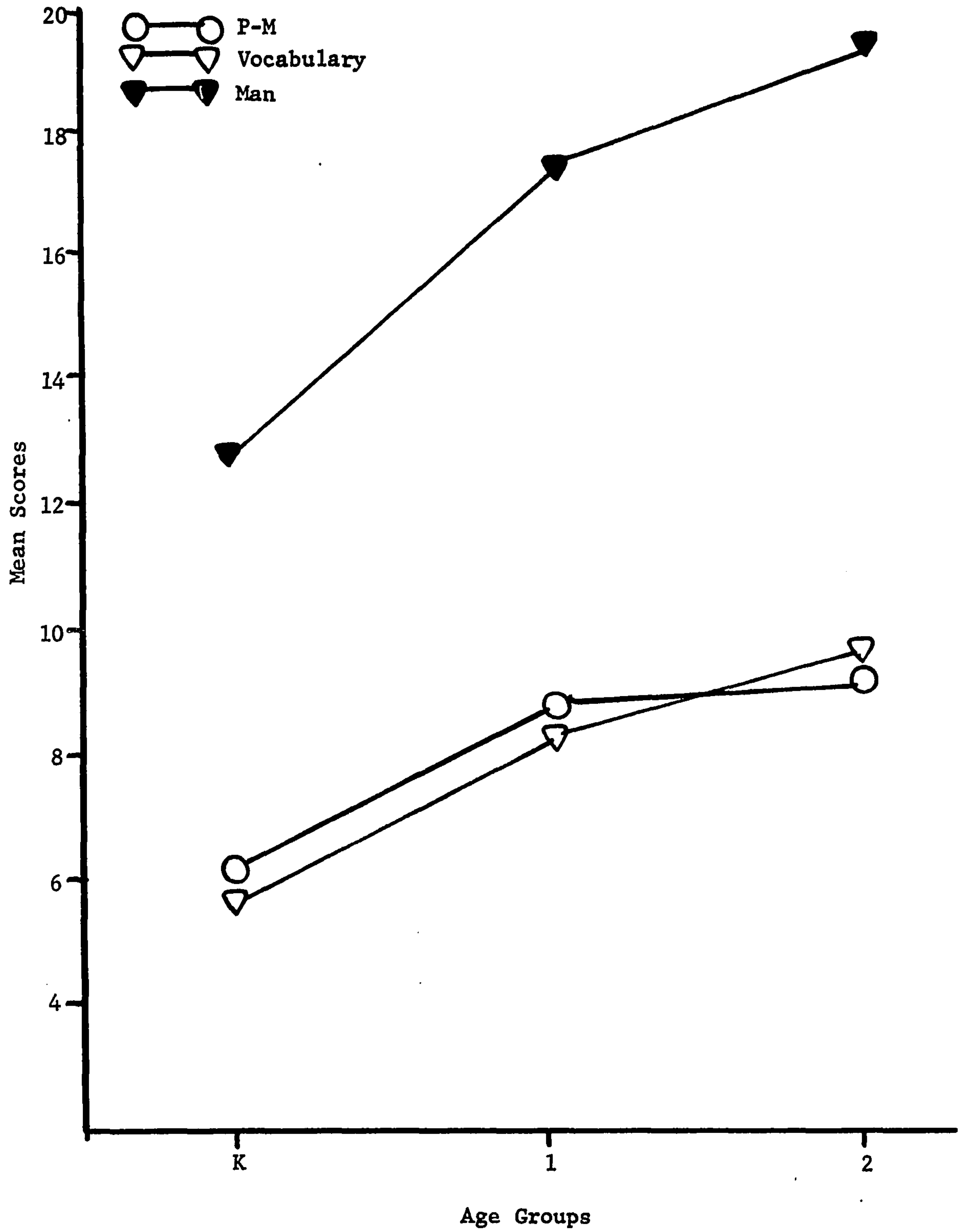

Figure 12. Mean scores of each age group on the Perceptual-Motor, Vocabulary, and Man subtests of the VKT.

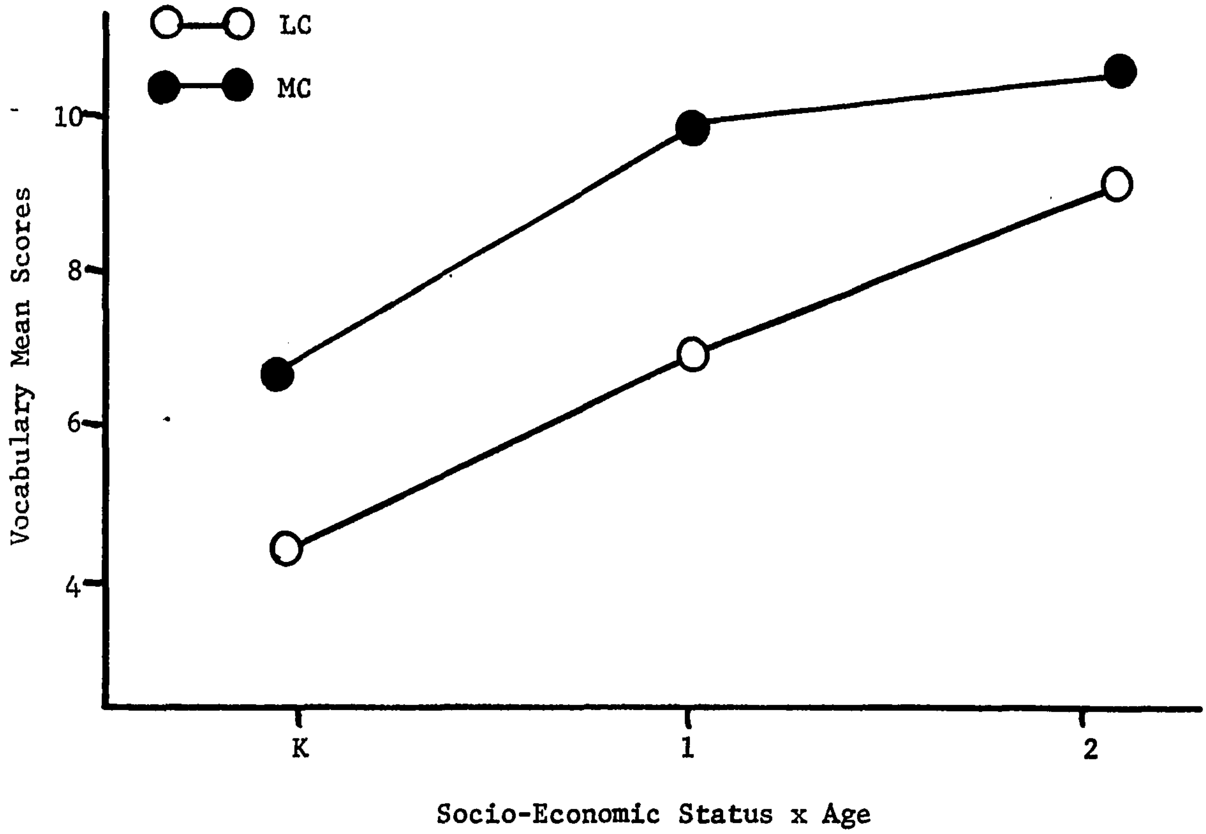

Figure 13. Mean scores for each social-class and age group on the Vocabulary subtest of the VKT.

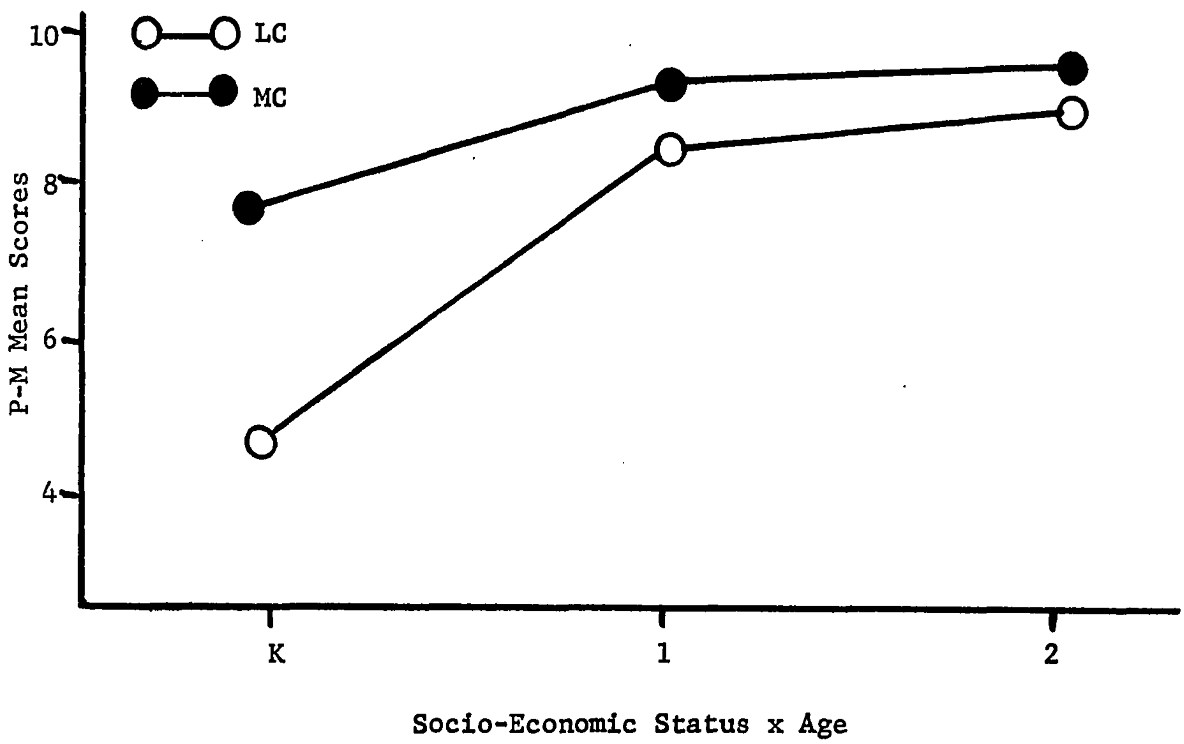

Figure 14. Mean scores for each social-class and age group on the Perceptual-Motor subtest of the VKT.

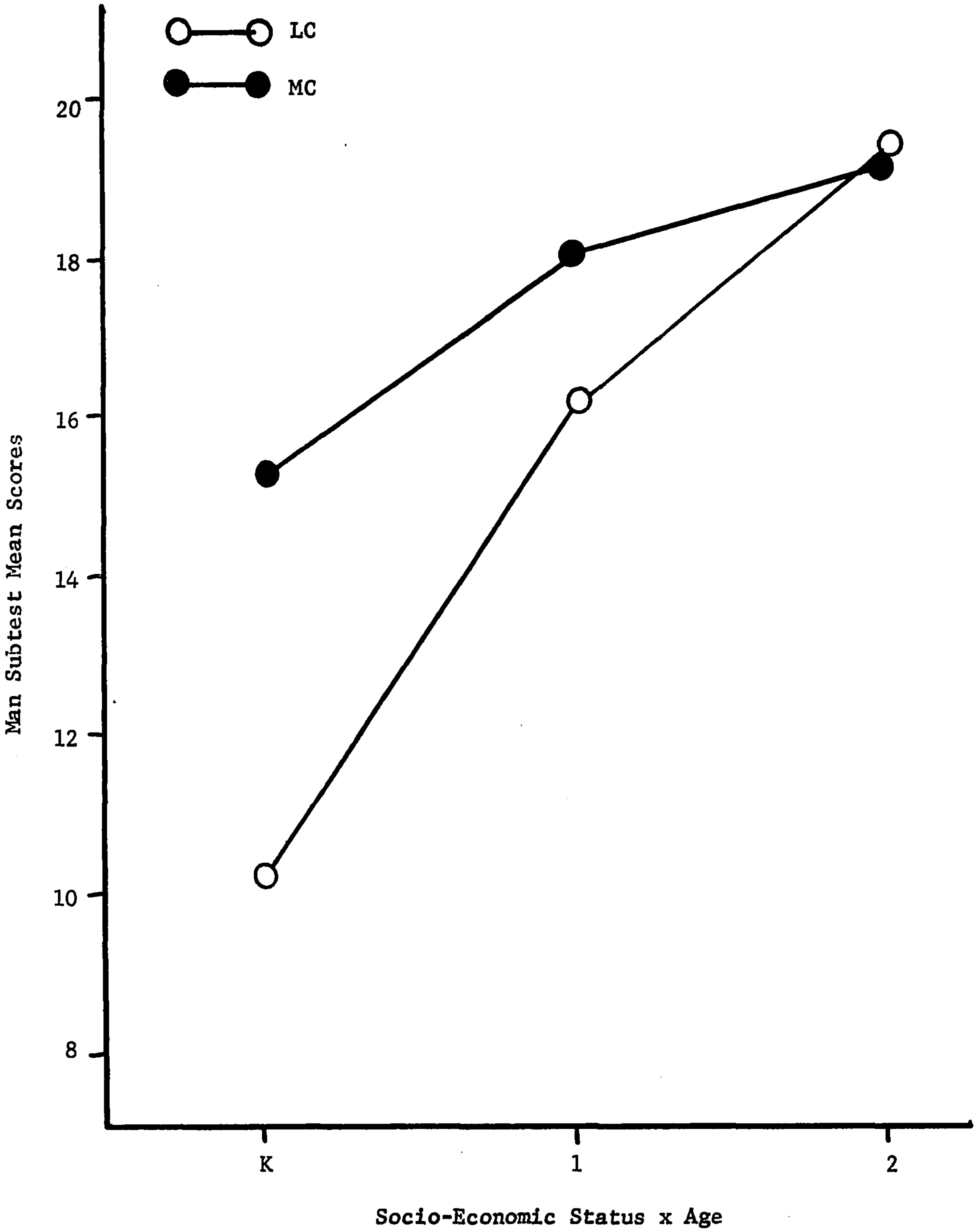

Figure 15. Mean scores for each social-class and age group on the Man subtest of the VKT.

TABLE 11

MEAN SCORES OF LC AND MC SUBJECTS ON THE VANE KINDERGARTEN TEST

Subtests	$\bar{X}$LC	$\bar{X}$MC
Perceptual-Motor		
K	4.55	7.55
1	8.50	9.05
2	8.95	9.15
Vocabulary		
K	4.30	6.50
1	6.70	9.90
2	9.00	10.50
Man		
K	10.35	15.10
1	16.15	18.10
2	19.30	19.15

TABLE 12

MEAN PPVT SCORES OF MC AND LC SUBJECTS AT EACH AGE LEVEL

	Middle-Class		Lower-Class	
	Males	Females	Males	Females
K	111.0	102.9	98.0	90.1
1	116.4	115.0	97.8	96.5
2	110.1	105.4	100.0	100.9

test of the VKT and the PPVT for each social-class group. The LC Ss r=.546 ($p < .01$) and MC Ss r=.465 ($p < .01$) indicate a correlation between the two tests.

Finally, scores on the various tests were correlated (Table 13) and a cluster analysis (Fruchter, 1954) was performed to study the re-

TABLE 13

TABLE OF INTERCORRELATIONS

Variables	(1 CI)	(2 BI)	(3 BNB)	(4 BR)	(5 PM)	(6 Vocab.)	(7 Man)
1. CI	( )	.11	.21	.14	.06	.00	.01
2. BI	.11	( )	.88	.73	.73	.64	.58
3. BNR	.21	.88	( )	.58	.65	.62	.64
4. BR	.14	.73	.58	( )	.74	.62	.53
5. PM	.06	.73	.65	.74	( )	.57	.63
6. Vocab.	.00	.64	.62	.62	.57	( )	.57
7. Man	.01	.58	.64	.53	.63	.57	( )
	.53	3.67	3.58	3.34	3.38	3.02	2.96

lationship among the variables listed in Table 13. Table 14 lists the r's in order of size.

A B coefficient greater than 1.00 was obtained for variables 2 through 7, however, variable 1 (CI) yielded a B coefficient less than 1.00 indicating that variable 1 is apparently tapping an entirely different trait from variables 2 through 7. As shown in Table 14, variables 2 (BI) and 3 (BNR) had the highest intercorrelation. The next highest correlations were between variables 2, 4, and 5. Variables 2 through 7 did not correlate with variable 1, indicating the perceptual tasks form one cluster and the conceptual task a separate cluster (Table 15).

TABLE 14

CORRELATION COEFFICIENTS FOR EACH VARIABLE LISTED IN ORDER OF SIZE

Variable	.00 .06	.07 .13	.14 .20	.21 .27	.28 .34	.35 .41	.42 .48	.49 .55	.56 .62	.63 .69	.70 .76	.77 .83	.84 .90
1. CI	5,6,7	2	4	3									
2. BI		1							7	6	4,5		3
3. BNR				1					4,6	5,7			2
4. BR			1					7	4,6		2,5		
5. PM	1								6	3,7	2,4		
6. Vocab.	1								3,4,5,7	2			
7. Man	1							4	2,6	3,5			

TABLE 15

B-COEFFICIENTS IN CLUSTER ANALYSIS*

1	2	3	4	5	6	7	8	9	10	B
(2,3)	7.25	.88	.88	5.49	2	1	10	.880	.549	1.60
(2,3,4)	3.34	1.31	2.19	6.21	3	3	12	.730	.518	1.41
(2,3,4,5)	3.38	2.12	4.31	5.35	4	6	12	.718	.446	1.61
(2,3,4,5,7)	2.96	2.38	6.69	3.55	5	10	10	.669	.355	2.00
(2,3,4,5,7,6)	3.02	3.02	9.71	.53	6	15	6	.646	.088	7.34
(2,3,4,5,7,6,1)	.53	.53	10.24	00	7	21	0	.489	000	.489

*Fruchter, B. pp 12-17

CHAPTER V

DISCUSSION

The major purposes of the present study were fourfold: first, to investigate the conceptual abilities of disadvantaged children on a task requiring minimal linguistic abilities; second, to study the influence of motivation and attention on perceptual functioning and to obtain empirical data regarding the correlation of social class on Bender reproductions; third, to further evaluate the effectiveness of a screening test (VKT) designed to detect children likely to have school-learning problems and to obtain comparative data between the performance level of disadvantaged and advantaged children; and last, to interrelate the CI, Bender, and VKT.

The conceptual task employed was a concept identification task fashioned after the Wisconsin Card Sorting Test and utilized by Pishkin and his co-workers. The CI task was primarily a categorization task in which subjects were required to sort geometric figures according to certain predetermined criteria. It was assumed that informational feedback (i.e., E's verbal response Right or Wrong) and corrective feedback would enhance attentiveness and memory for this task and, since the task required minimal linguistic abilities, LC children would not be penalized. It was predicted that, under the conditions stated, LC children would function as well as MC children and that a linear decrease in errors would occur with age progression. These predictions were presented in a series of hypotheses. The original hypotheses will be re-stated and discussed in relation to the results obtained.

Hypothesis 1. The use of a conceptual task requiring minimal linguistic skills, consisting of stimuli equally familiar to both social-class groups, and using informational and corrective feedback to enhance attentiveness and memory would result in LC children performing as well as MC children.

Hypothesis 2. Performance on the concept identification task would improve with grade level, resulting in a linear decrease in errors.

Hypothesis 1 was supported in that no significant differences were found between the CI errors of LC and MC children. In fact, examination of the total mean errors revealed that LC children performed more efficiently, i.e., had fewer errors, than MC children. An important explanation for the overall comparability of performance between social-class and age groups is that the particular CI dimensions used were not sufficiently difficult to differentiate performance levels between the groups. However, the results obtained in this study supported those found earlier by Rasmussen and Pishkin (1969). At one grade level in the present study (kindergarten), LC children performed significantly better than MC children. A possible explanation for the kindergarten *S*s better performance, apart from a lack of task complexity, is that irrelevant dimensions, such as size, may not be salient for them at all; thus, distraction by the size dimension would be minimal.

Rasmussen and Pishkin (1969) found that disadvantaged children performed better on a CI task when form rather than color was the relevant dimension. The significant differences in performance on the color or form relevant problem held only in a no cues available condition much like the present investigation. The differences were attributed to initial subject biases toward a particular relevant dimension.

Hypothesis 2 was not supported. Rather than showing a decrease in errors with age progression, the opposite trend occurred to a minimal degree.

In discussing the direction of these results, it will be recalled that language was minimized, a task was presented that utilized stimulus dimensions equally familiar to all children, and informational feedback was used to enhance the relevant dimension. The fact that LC children performed as well as MC children on the CI task cannot be attributed easily to any single one of these three task requirements. There is sufficient evidence to support the assumption that form and color discrimination are among the first concepts attained by children (Brian & Goodenough, 1929; Long, 1940; Skeels, 1932). Size discrimination is considerably more variable and difficult for young children to attain. Long (1941) found that children were less successful in size discrimination when size remained constant but the forms varied. This would account for the less salient aspects of size in the present investigation. Thus, the simple geometric figures used in the CI task had the effect of making the stimulus dimensions equally familiar to all Ss. In this manner, other variables were manipulated in order to determine the speed with which children solved the problem.

Ad hoc observations associating verbalizations to Kendlers reversal non-reversal shift performance found that children responding with relevant verbalizations, i.e., who could verbalize the correct dimension in the shift paradigm produced significantly faster shifts than children responding with irrelevant verbalizations. The investigators concluded that verbal mediation appeared to facilitate problem-solving. While the CI task required minimal comprehension of language, Kendler's mediational hypothesis, i.e., that solutions to problems are facilitated by verbal mediation, cannot be adequately defended or refuted since the children were not asked to verbalize the relevant dimension. Formanek and Morine (1968) found that verbalizations were not relevant to categorization tasks with four- and five-year-old children. When the children were asked why they placed all circles in one pile and all squares into another, their responses ranged from "because I want to" and "they go there" to "because orange goes with orange and green goes with green" when in fact they were sorting blue with blue, and red with red. While kindergarten children have had experiences working with geometric figures, they may not be able to verbalize form concepts although they can recognize the perceptual differences. It was felt that the kindergarten aged children made their choices of the relevant dimension on the basis of perceptual qualities and that informational feedback served to enhance the relevant dimension and enabled them to remember this dimension better. This would partially support the hypotheses of Tighe and Tighe (1966) and Zeaman and House (1963) that perceptual and attentional factors are more important in problem-solving than mediation; and in accounting for the more efficient performance of the kindergarten group in this study.

The increase in errors which occurred on the CI task with increasing age, though not significant nor definitive, may mean that the younger children may have been tied to the perceptual qualities of the immediate stimulus field (Bruner, 1964). As the children progressed in age, however, they were more capable of making inferences via symbolic representation beyond that provided by the immediate stimulus field. The mediation approach could probably interpret the fact that older children performed less efficiently than younger children because they found the task more difficult because of the increasing number of hypotheses from which they could choose. In order to function equally as well as MC children, LC children had to appropriately select and attend to the relevant dimension and then remember that dimension. These two processes, stimulus selection (attending to and selecting particular variations or properties of a stimulus) and encoding or associating a response to a specific aspect of the relevant dimension, i.e., remembering the correct response, represent important processes in the mathematical model of concept identification offered by Bower and Trabasso (1964).

It was found in the present study that males as a group performed slightly better than females, thus supporting other evidence that males, at least on form relevant problems, are superior to females on problem-solving tasks (Rasmussen, 1969). Males obtained a significant reduction of errors over females at the kindergarten level and slightly fewer errors at the second grade level. The differences between males and females performance approached significance at the first grade level with the females obtaining fewer errors.

The sex differences discussed above may have been related to the sex of the E. While there is little evidence relative to the influence of E's sex upon the cognitive performance of Ss, there are at least two studies comparing Es of the opposite sex from the Ss (Kuhn, 1960; Stevenson & Allen, 1964). In these studies the data accorded higher efficiency to Ss opposite in sex from E than Ss the same sex as E. In the present study, the E was a female and the male Ss performed more efficiently than the female Ss on the CI task, thus supporting the results of the previously mentioned studies. This explanation, however, does not account for the better performance by females at the first grade level. Probably a combination of interpretations would best explain the results obtained, but it is evident that the effect of E's sex on the performance of subjects of both sexes should be studied, since important educational implications might be suggested from the data.

In conclusion, the present CI study did not vary task complexity nor were the children asked to verbalize the relevant dimension once the criterion of sixteen consecutively correct responses was reached. In order to relate certain hypotheses, e.g., Kendlers' mediational hypothesis, to cognitive functioning, all Ss should have been asked how they solved the CI problem. If in fact the children were able to correctly verbalize the dimension, then Kendlers' mediational hypothesis would explain the results and be supported. If children could not verbalize the dimension, then the theories of Tighe and Tighe (1966) or Bruner (1964) could offer explanations as to what was occurring in the problem-solving task.

Hypothesis 3. <u>The LC child's limited experiences, deprived background, inattentiveness, and possible lack of motivation would have detrimental effects on per-</u>

ceptual functioning. While it seems to be accepted that LC children perform poorer on perceptual tasks, definitive evidence corroborating the precise role socio-economic factors play in perceptual functioning is not clear. Thus, the present study compared social-class groups on a perceptual test (the Bender Visual-Motor Gestalt Test), with the hypothesis that the LC child's Bender reproductions would be worse than the MC child's.

This hypothesis was supported in that LC children performed significantly worse than MC children on the Bender test, thus supporting Carlson (1966) and Moseley's (1969) results. The results do not, however, determine why cultural and socio-economic factors are correlated on the Bender Gestalt, but the results do lend information concerning the degree to which these factors influence performance on a perceptual task. According to studies cited by Koppitz (1964), poor performance on the Bender test correlates with reading and mathematical achievement implying that children with high Bender scores would have difficulty in reading and arithmetic. It is a well-established fact that children from a LSES who attend school with MC children are generally one-to-two grades behind them in scholastic achievement (Deutsch, 1967). It would be premature, however, to explain LC children's educational retardation on perceptual factors alone, particularly when evidence for inattentiveness and lack of motivation could partially account for this retardation.

In order to determine the influence of inattentiveness and lack of motivation on children's Bender reproductions, a penny per drawing was rewarded to one-half the S population. The following hypotheses were tested.

Hypothesis 4. Reinforcement would serve to motivate LC children more than MC children because MC children tend to perform close to their maximum level with or without reward, while LC children respond at a higher level when promised a reward. Thus, the second Bender reproductions of LC children would result in performance equal to or better than their first Bender performance. In addition, the second Bender reproductions of reinforced MC children would be equal to or worse than their first reproductions, i.e., they would not necessarily be more attentive, thus, removal of the stimulus card would hinder their performance more than the LC child's performance.

Hypothesis 5. Comparisons made between LC and MC children receiving no reinforcement would result in poorer Bender performances for LC children when compared to their first Bender reproductions. LC children would perform worse because of poor motivation, hence, they would not attend as carefully to the task, however, both social-class groups would perform worse under the no reinforcement condition since decreased motivation would prevent them from being attentive to the stimulus card prior to its removal.

Hypothesis 6. Significant improvement in Bender Gestalt performance would occur as a function of increasing age.

Compared to B1 and BNR, reinforcement caused considerably more variability in performance, particularly with MC Ss. Reinforcement was particularly effective in improving the performance of second grade LC males in that they received fewer errors than the LC females or MC Ss. Thus, Hypothesis 4 was only partially supported. The second Bender reproductions of LC Ss, as a group, were significantly worse than the first Bender in that t tests on the difference scores were highly significant for both the BR and BNR conditions (the latter supporting Hypothesis 5).

Hypotheses 4 and 5 were supported for MC Ss in that, as a group, MC Ss performed worse on the BR and BNR conditions but the t test on the difference scores between BR and B1, BNR, and B1, did not reach significance. First grade MC Ss performed better with reinforcement than with nonreinforcement and their performance was better than the B1 performance. Thus, reinforcement served to motivate first grade MC Ss and kindergarten MC Ss but seemed to hinder or distract second grade MC Ss since they made considerably more errors on BR than B1. In addition, MC Ss at the kindergarten and first grade levels made more Bender errors under the NR condition but second grade MC Ss made fewer errors than BR or B1.

On the B1 and BNR conditions, the LC and MC Ss performed better, i.e., had fewer Bender errors, with age progression, thus supporting Hypothesis 6. The BR condition, however, did not show improvement for MC Ss at the second grade level.

A number of interpretations can be offered regarding the lack of improvement in LC Ss Bender performance under the reinforcement condition and the variability of performance of MC Ss under both Bender conditions. First, the removal of the stimulus card changed the task in that memory became a factor to consider. While the intent of reinforcement was to motivate Ss to better attend to the stimulus, the Ss then had to retain the stimulus long enough to reproduce it on paper. Attentiveness to the task may have increased with reinforcement but removal of the stimulus, in some cases, may have nullified the positive effects of reinforcement. Thus, short-term memory may have been the debilitating factor on performance. Inglis, Ankus, and Sykes (1968) reported that children between five- and ten-years-of-age showed a progressive improvement in selective attention, which can probably be attributed to the fact that as children increase in age, they can begin to effectively attend to and remember more and more information. By removing the stimulus card from view, the performance of both social-class groups of Ss, with the exception of first grade MC Ss, deteriorated when compared to their B1 performance.

In general, the less efficient performance level of younger Ss on BR and BNR is probably due to memory factors. In addition, it appears reinforcement had either a debilitating, facilitating, or no effect on Ss performance level. In other words, no consistent trends were evident from the data. For example, reinforcement (money) appeared to distract MC Ss at the second grade level in that their Bender performance did not improve over first grade MC Ss. However, the monetary reward facilitated LC males at the second grade level. Money as a reinforcer is probably more rewarding to older Ss and would account for the variability in their performance. Since individual differences were not studied, the inference that a monetary reward would be equally rewarding to all Ss was only an assumption made at the outset of the study and was unsupported by documented evidence. Clearly, further research is needed in this area.

A second interpretation of the results obtained is that LC children do in fact have perceptual difficulties. Klaus and Gray (1968) attributed the LC child's inadequate perceptual development to the spatially and temporally disorganized homes from which they come. Carlson (1966) attributed the differences to a possible lack of the LC Ss involvement in activities important for developing perceptual-motor skills. Bender (1938), in citing Nissen's, et al., (1935) study of American and African children's drawings, attributed the American children's better performance to more experience with paper and pencil tasks.

It is quite possible all these factors contribute to the LC child's less efficient performance on the Bender Gestalt Test, and these factors combined with poor short-term memory could account for the less efficient performance on the second Bender conditions. In conclusion, the Bender should be utilized again on the two social-class groups, but this time the second reinforced and non-reinforced Benders should be left in full view of Ss. This would eliminate the confounding memory variable present in this study and would yield more specific information regarding the effectiveness and role of reinforcement on perceptual functioning.

The Vane Kindergarten Test, administered as an additional perceptual and linguistic task, served to support the hypothesis that LC children perform worse on perceptual and linguistic tasks. The following hypotheses were made.

Hypothesis 7. The VKT would differentiate between social-class and between age groups. Performance on the three

<u>subtests would improve with increases in age levels and LC children would perform worse than MC children on all the subtests</u>.

Hypothesis 8. <u>The perceptual-motor subtest scores of the Vane test would correlate with Bender scores across age and population groups</u>.

These hypotheses were strongly supported with the exception of the perceptual-motor subtest differentiating between first and second grade Ss. In fact, all three subtests significantly differentiated grade, Ses, and Age x Ses (Tables 8, 9, 10; pages 47, and 48). The MC Ss performed significantly better than LC Ss at every grade level on the Vocabulary subtest. The differences between the social-class groups approached significance at the first grade level on the Perceptual-Motor and Man subtests but did not approach significance on these subtests at the second grade level. The fact that LC Ss performance improved considerably on the Perceptual-Motor and Man subtests after kindergarten suggests that the increased experience with paper-pencil tasks and the more structured spatial and temporal environment kindergarten experience provided these children facilitates perceptual-motor functioning.

As expected, the LC Ss continued to show improvement in language areas at the second grade level while their perceptual-motor performance seemed to level off after the first grade with only slight improvement at the second grade level. The mean Vocabulary score for LC Ss at all grade levels was below that of MC Ss. This lends support to those investigators who stated that LC children have deficits in linguistic development (Bernstein, 1960 & 1961; Deutsch, 1967; Raph, 1965; Ryckman, 1967).

The trend suggests that school-related experiences at the kindergarten and first grade levels do not have as great a facilitative effect on language development as it does on perceptual-motor functioning. The argument proposed for defining cultural deprivation as a language deprivation, postulated by Bereiter and Engleman (1966), would appear to be a sound argument which should be taken into account by educators as they plan programs of remediation for these children.

The fact that LC children were able to function as well as MC children on the concept identification task suggests that they are not particularly handicapped in discriminatory and categorical abilities. When tasks require considerable comprehension, or verbal expression of language on the part of LC children, as on the Vocabulary subtest of the VKT, then performance suffers and LC children perform less efficiently than MC children. This was also supported by the PPVT, a vocabulary test, on which LC children obtained lower IQ scores than MC children.

Finally, the high negative Pearson r obtained between the three subtests of the VKT and the Bender suggests that the VKT would be an effective screening test for use in schools. The short period of time required to administer the test would cut the testing time in half as compared to administering a Bender and a separate intelligence test. At the same time, the VKT provides a screening measure of intelligence and perceptual readiness for the first grade.

The effects of reinforcement, non-reinforcement on the Bender performance of MC and LC Ss yielded variable results probably because removal of the stimulus card prior to reproduction of the Bender design served to make the perceptual task more difficult by placing demands on memory. In addition, the effects of reinforcement served to either distract or facilitate performance on the Bender. Since the results of the VKT and Bender both indicate that LC Ss are immature in perceptual functioning it would be useful to correlate reading readiness scores of the Ss to the Perceptual-Motor subtest of the VKT. If perceptual immaturity is a factor associated with poor reading skills then the correlation should be high. If indeed LC children have considerable difficulty in learning to read then it would be all the more important to discover the underlying cause of perceptual immaturity in this group.

A study comprised of carefully selected and extensively studied LC children would do more to shed light on the specific origins or antecedents of differential patterns of perceptual and cognitive abilities. For example, are the LC Ss poor perceptual skills caused by poor pre- and post-natal nutritional problems which have effected the central nervous system, or is their poor performance due to a lack of experience, etc.? In addition, are LC Ss deficient in language areas because of the chaotic home condition from which they come or because of the mother-child interactions as Hess and Shipman (1965) postulate? It would appear the identification of the stimulation deficits in the LC child's environment, the areas of retardation created by this deficit, and stimuli, strategies and techniques designed to accelerate the development of these areas of retardation should be among the first to be investigated.

The final purpose of the present study was to correlate the CI task with the various perceptual tests administered. Fruchter's cluster analysis revealed separate clusters for those tasks involving perceptual and conceptual skills with the Bender I and BNR conditions both correlating higher than other tests. Due to the Ss variability in performance on the BR condition, possibly due to the distracting influence of a reward upon the performance of Ss, this condition clustered more with the Vane Test and less with other Bender performances. The finding that all Bender conditions and the Vane Test cluster together as a group indicates a relationship between these two tests. The fact that the CI task did not correlate with perceptual tests indicates that the two tasks are independent of each other and are apparently tapping different abilities. The perceptual tasks required of the Ss visual-motor-perceptual responses while the CI task required a discriminatory and categorical response. It is apparent that these tasks measure different abilities.

CHAPTER VI

SUMMARY

Past theorizing attributes cognitive and perceptual differences found between children from advantaged and disadvantaged background to environmental, nutritional, genetic, and experiental deficiencies. More recently, investigators have attributed the cognitive differences between the social-class groups to the disadvantaged child's limited linguistic abilities and lack of attentiveness and motivation toward tasks which do not promise direct and meaningful rewards. The social-class differences in perceptual functioning are less understood since traditionally certain perceptual tests, e.g., Bender Gestalt, were considered to be minimally influenced by cultural variables. Past reviews have concluded that no definitive conclusions could be made regarding the status of perceptual, i.e., Bender performance, and cultural variations. Evidence strongly suggests less mature visual-motor-perceptual functioning within lower-class populations but definitive evidence has not been reported.

The conceptual task employed in the present study, was a concept identification task fashioned after the Wisconsin Card Sorting Test and utilized by Pishkin and his co-workers. The CI task was primarily a categorization task in which subjects were required to sort geometric figures according to certain predetermined criteria. The perceptual task employed was the Bender Visual-Motor Gestalt Test and the Perceptual-Motor subtest of the Vane Kindergarten Test. Reinforcement (money) was utilized with one half the subject population to study the effects of increased motivation and attention on a second Bender reproduction. The remaining subjects received no reinforcement on the second Bender reproduction.

The overall purpose of the present study was fourfold: First, the conceptual abilities of lower-class children were studied by using a task requiring minimal linguistic skills, consisting of stimuli equally familiar to both social-class groups, and using informational and corrective feedback to enhance attentiveness and memory to the relevant dimension. The hypothesis that LC Ss would perform equally as well as MC Ss on the concept identification task was supported, although the hypothesis that performance on the task would improve as age increased was not supported. The comparability of performance between the two social-class groups on the CI task was attributed to the minimization of language inherent in task instructions, the reduced saliency of irrelevant dimensions, the feedback conditions, and while not definitive, it was postulated that the slight increase, rather than the expected decrease, in CI errors with age progression was due to the younger Ss dependency on the perceptual qualities of the stimulus field (Bruner, 1964), and the mediation approach was used to interpret the older Ss less efficient performance because of the increasing number of hypotheses from which they could choose.

Second, the influence of motivation and attention on perceptual functioning was studied. In addition, empirical data regarding the role of social-class on Bender reproductions were obtained. The hypothesis that LC Ss would perform worse than MC Ss on the Bender Gestalt Test and the hypothesis that Bender errors would decrease with age progression was supported on all three Bender conditions. LC Ss were less mature in visual-motor-perceptual areas of functioning. The hypothesis that reinforcement would improve the Bender performance of LC Ss more than MC Ss was supported only with second grade LC males. The Bender drawings of the reinforced and non-reinforced S groups were worse than the first Bender reproductions with reinforcement causing considerably more variability in performance, particularly with MC Ss. The hypothesis that reinforcement would serve to motivate Ss to be more attentive to the Bender figures was nullified due to the removal of the stimulus card. Short-term memory was postulated as the debilitating factor causing the poorer performance by the Ss on the second Bender reproductions.

Third, the VKT was used in order to evaluate the effectiveness of the test in detecting children likely to have school-learning problems. In addition, comparative data were obtained between the two social-class groups. The hypotheses that the VKT would differentiate between social-class and age groups was supported. Lower-class Ss performed significantly worse than MC Ss on all three subtests. Results of the data suggests that school-related experiences at the kindergarten and first grade level have a greater facilitative effect on perceptual-motor functioning than on language development, supporting those investigators who propose that cultural deprivation should be re-defined as a language deprivation, particularly for the sake of educators establishing programs of remediation for the population. Finally, the high negative Pearson r obtained between the three subtests of the VKT and the Bender suggested that the VKT would be an effective screening test for use in schools.

Fourth, the relationship between the CI and perceptual tasks was studied. The low correlations obtained suggested that the two tasks were independent of each other and were measuring different abilities.

In conclusion, this investigation failed to indicate that LC Ss are handicapped in discriminatory and categorical abilities and that on a concept identification task they perform comparable to MC Ss. Results of the Bender Gestalt data clearly demonstrate that LC Ss function less efficiently on visual-motor-perceptual tasks, though the results do not determine why cultural and socio-economic factors influence performance on the Bender. Last, results obtained on the VKT indicate this test to be effective in differentiating social-class groups.

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APPENDIX I

SUBJECT INSTRUCTIONS

VANE KINDERGARTEN TEST

Subject Instructions

Perceptual-Motor Subtest

Each child was expected to make three boxes, three crosses, and three hexagons.

Instructions for drawing of first box. See the box at the top of the paper. Put your finger on the box. I want you to make a box that looks just like that right next to it. Go ahead. Make a box.

Instructions for drawing of second and third boxes. Now we're going to make another box. Make another box just like the one on the paper.

Instructions for drawing of first cross. Do you see the cross on the paper. Put your finger on the cross. Make a cross just like it right next to it.

Instructions for drawing of second and third crosses. Now make another cross.

Instructions for drawing of first hexagon. Do you see the figure on the bottom of the paper? Make one just like that right next to it.

Instructions for drawing second and third hexagons. Now make another one.

Man Subtest

Draw a picture of a man. Draw the best man you know how. Make a whole man, from the top of his head to the bottom of his feet. Don't leave anything out.

Vocabulary Subtest

I am going to say some words and I want you to tell me what they mean. What is a fork? Tell me something about a fork.

APPENDIX II

VANE KINDERGARTEN TEST

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VANE KINDERGARTEN TEST

Name__________

Date__________

B/d:__________

Age__________

School__________

RH_____ LH_____

Fork__________

Wheel__________

B/d__________

Gift__________

Calendar__________

Alone__________

Short__________

Jolly__________

Silence__________

Wise__________

Straight__________

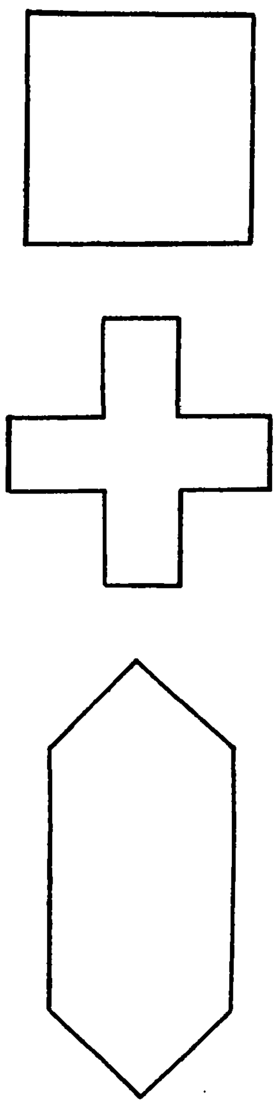
P-M IQ__________

Voc. IQ__________

Man IQ__________

Full IQ__________

Voc. Score__________



APPENDIX III

SUBJECT INSTRUCTIONS

PEABODY PICTURE VOCABULARY TEST--FORM B

Subject Instructions for Children Below 8 Years of Age

I want to play a picture game with you. See all the pictures on this page. I will say a word, then I want you to put your finger on the picture of the word I have said. Let us try one. Put your finger on "bed". That's fine. Now put your finger on "fish". Good! Show me "butterfly". Fine! Now I am going to show you some other pictures. Each time I say a word, you find the picture of it. When we get along further in the book you may not be sure you know the word, but I want you to look carefully at all of the pictures anyway and choose the one you think is right. Point to ________.

Subject Instructions for Children 8 Years and Above

I have some pictures to show you. See, there are four pictures on this page. Each of them is numbered. I will say a word, then I want you to tell me the number of (or point to) the picture which best tells me the meaning of the word. Let us try one. Tell me the number of (or point to) the picture which best tells the meaning of "crib". That's fine. Now, what number is "fin"? Good! What number is "butterfly"? Fine! Now I am going to show you some other pictures. Each time I say a word, you tell the number of (or point to) the picture which best tells the meaning of the word. As we advance through the book you may not be sure you know the meaning of some of the words, but I want you to look carefully at all of the pictures anyway and choose the one you think is right. What number is ________?

APPENDIX IV

SUBJECT INSTRUCTIONS

CONCEPT IDENTIFICATION TASK

Subject Instructions

Listen carefully to what I tell you. When I say "Begin", take out the first cards in this box one at a time and show me where you think each card should go: in this side (pointing to left) or this side (pointing to right). I will tell you when you are right, and if you are right, turn the card over. The times you are wrong, I will tell you and you should put the card in the other side from what you chose. Try to be right as many times as you can.

APPENDIX V

SUBJECT INSTRUCTIONS

BENDER VISUAL-MOTOR GESTALT TEST

Standard Instructions for Bender Number 1

I have nine cards here with designs on them for you to copy. Here is the first one. Now go ahead and make one just like it.

Non-Reinforced Group

I have nine cards here with designs on them for you to copy. Here is the first one. Now go ahead and make one just like it.

Now this time we will do this over, except a little differently. I want you to look at each card carefully because I will take it away and then tell you GO when I want you to draw the design. Do you understand? You must wait until I say GO before you can start drawing.

Reinforced Group

I have nine cards here with designs on them for you to copy. Here is the first one. Now go ahead and make one just like it.

Now this time we will do this over except a little differently. I want you to look at each card carefully because I will take it away and then tell you GO when I want you to draw the design. For every one you can draw like it is on the card, I will give you one penny. Do you understand? Remember, for every one you can draw like it is on the card, I will give you one of these pennies. Also, you must wait until I say GO before you can start drawing.