A DEVELOPMENTAL STUDY: SOCIOECONOMIC STATUS, RACE, AND INCIDENTAL LEARNING

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ABSTRACT

A DEVELOPMENTAL STUDY:
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By

Janet D. Smith

Purpose of the Study

The purpose of this study was to question whether there were differences in incidental learning as a function of (1) grade - kindergarten, first and second; (2) socioeconomic status - middle and lower; (3) race - black and white; (4) familiarity - common and uncommon - of stimulus materials. The study also sought to investigate what effect the inclusion of incidental stimulus materials would have on the intentional learning task.

Procedures

Thirty two kindergarteners, first and second graders were randomly assigned to either the experimental (N = 16) or control condition (N = 16). The children at each grade level were systematically selected to include four black and four white children from both middle and lower socioeconomic home environments respectively. Each set of four systematically included two boys and two girls. One half of the subjects in each group were assigned to a white and the other half to a black experimenter for individual treatment and testing.

The experimental treatment consisted of reading a story to the

child while he viewed slides related to the story. Included at various locations in each of 16 slides were selected yet unrelated items. Eight items were classified as 'common' and the remaining eight as 'uncommon' to the children. The child was instructed to listen to the story and to attend to those pictures to which the story made reference. He was given no instructions concerning the unrelated items in the slides. The control subjects were told the same story and viewed a set of slides which did not include incidental and unrelated items.

Tests

Experimental subjects were subsequently tested for incidental learning by means of a recall procedure of the unrelated items followed by recognition of the same items from a set. Both groups were tested for intentional learning by questions related to the story.

Analysis

Five research questions were considered. These related to whether there were significant differences in incidental learning as a function of (1) grade level in school (kindergarten, first, and second); (2) middle versus lower socio economic home environment; (3) race (black versus white); (4) novelty (common versus uncommon) of the stimulus materials; and (5) the mode of response, i.e. recall versus recognition. A multivariate analysis of variance at an alpha level of .05 was used to test these hypotheses.

An additional hypothesis was designed to determine significant differences between groups on their intentional learning scores. A one

way analysis of variance was used to test this hypothesis at the .05 alpha level of significance.

While sex of the subject and race of the tester were not central variables in the experiment, an equal number of boys and girls were included within each cell. The design was also balanced between race of tester and race of subject. Additional hypotheses could therefore be related to these factors.

Metropolitan Readiness test scores for Kindergarten and Stanford Achievement test scores for first and second grades were obtained as possible sources for understanding the results. Pearson Product Moment correlation coefficients were also computed for incidental with intentional learning scores.

Conclusions

Analysis of the data supports the following conclusions:

(1) There were differences in favor of the higher grades as seen by recall and recognition of stimulus material.

(2) Considered in conjunction with grade or sex, and race of tester, children from middle socioeconomic home environments performed at a higher level on both recall and recognition of both common and uncommon objects.

(3) There were apparent sex differences in favor of female subjects on both recall and recognition of incidental items.

(4) Subjects assigned to black and white testers did not vary significantly in their incidental scores by racial identification. However, some variation associated with socioeconomic background was evident.

(5) There were no significant variations by grade, socioeconomic background, or race on the intentional learning scores of subjects who were simultaneously exposed to intentional and incidental stimuli and those who were exposed only to intentional stimulus items.

(6) Incidental scores were positive and significantly correlated with intentional scores for kindergarteners, and to a lesser extent for second graders. Correlations were low or negative for first graders.

A DEVELOPMENTAL STUDY:

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A THESIS

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DEDICATION

To my parents, Cheddena and Wilfred Smith, who have always had confidence in me. Their pride and encouragement has always been a source of inspiration.

To my brothers and sisters, June, Bennet, Berchel, Henry, and Wilbert who were always at a distance but who somehow helped to make a family to which I am proud to belong. Especially to my sister, Bernice, who by her presence, shared a little more of helping me get portions of the job done.

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CHAPTER I

STATEMENT OF THE PROBLEM

Introduction

The last decade has seen a rise in research and general interest in the educational problems of children from 'disadvantaged' home environments. The results of the heightened interest is the sobering statistic that the longer such children remain in school, the further behind they fall in relation to the norms for their ages and grades. Such progressive retardation is reported not only for measures of academic achievement (Hess and Shipman, 1965; Coleman, 1966; Deutch, 1960). but also for scores on tests of general intelligence (Deutch and Brown, 1964; Pettigrew, 1964). Yet, few areas of investigations to date have been concerned with those "process relevant" variables which affect the educational performance of these children.

Need for the Study

The importance of the primary years to subsequent performance of cognitive skill and academic achievement continues to grow. 'Early intervention' and 'follow-through' practices continue to be the concern of educators, government, and private citizens. The investigation of variables which appear to be useful in understanding the intrinsic learning behavior of such children, and factors which influence the gains they are expected to make during their succeeding school experiences is urgent.

While efforts at ameliorating the progressive retardation have in

the past been attempted, these seem largely to have incorporated instructional positions which consider the "content relevance" of the curriculum. The importance of language, and the identification of pictures in reading tests with the students for whom they are intended are examples of this approach. Current emphasis on teacher training for disadvantaged learners has also adopted a socio-psychological perspective to the problem. Compensatory education has operated largely within a framework of increased quantity of instruction starting during the more tender and malleable years.

In many American communities, the enlightened leadership - both black and white - and their supporters, even operate on the tacit assumption that once the black child finds himself in an integrated classroom with a qualified teacher and adequate materials, learning will take place; and with it the deficiencies of social and economic deprivation will be erased. Regretably, this is not the case. Such children must be able to profit from the educational situations in which they find themselves. This they cannot do if they lack important tools and strategies necessary for learning. The evidence indicates that many essentials are often conspicuously absent (Pettigrew, 1964).

Furthermore, it should be noted that many educational techniques and programs have been devised for use with middle class children, so that the exposition of the intellectual skills and educational needs of different socio economic groups has to be made to educators in terms of their framework of experience and theory. Recommendations for education of disadvantaged children can be made more understandable if they are described in terms of the departures they require from already established

modes of analysis and practice.

Thus, differential use of any learning strategy by children from different socio economic home environments, whether in manner or quantity, lends feasibility to utilizing such capacities to the advantage of the children. Incidental learning is one such strategy. That is to say, every item within the perceptual or auditory range of a child represents a potential source of learning independent of any formal or direct instruction. Therefore, even though a teacher does not bring many of the stimuli in a classroom to the attention of students, the stimuli may facilitate or interfere with the formal learning.

Knowledge pertaining to the beginnings of such processes of learning in the child, and points of development at which they appear to be important tools or obstacles during the primary as well as later years would provide information which may be useful in developing instructional procedures.

It is clear that many early intervention and special programs include lower class children, a majority of whom are black. The extent to which these children utilize specific learning strategies should be of specific importance. The effects on learning of social deprivation with physical overcrowding, though allegedly limited or non-exposure to many other experiential aspects of the wider society are of particular importance. This also deserves attention in investigations of the learning processes of this group.

Scope of the Problem

There are a number of advantages to studying black disadvantaged children in relation to characteristics of middle class black children

rather than middle class white children. The comparisons, for example, are based on differences in social class structure, thereby avoiding invidious racial comparisons. The advantages of comparing white lower class children with white middle class children also holds. However, and even more important, if the purpose of a comparative study of disadvantaged children is to compare the characteristics of the intellectual processes by which they acquire or process information with those which tend to prevail in the school, and with those about which most is known, then it becomes the white middle class children who serve as a reference point. The present study has followed this position.

Purpose of the Study

If research is to provide information which may be used to improve instructional procedures which help to ensure adequate participation in education by all those for whom it is intended, it is necessary to consider the external as well as internal factors which affect learning.

The following statements are derived from such a premise and form the basis of this study:

(1) Do children of different environmental backgrounds enter the current educational system with strategies related to learning which differ from those used by persons who participate more adequately in the mainstream of American life?

(2) Do such strategies change in their quality or frequency of use by children as they continue to participate in the formalized learning situation?

Statement of the Problem

This study is designed to examine whether or not differences in

amount of incidental learning with concurrent intentional learning varies in children as a function of their grade level, socioeconomic background, and racial grouping.

General Statement of Hypotheses

The following research questions are the basis of the twelve testable hypotheses of this study:

(1) Is incidental learning related in any significant manner to the economic or sub-cultural quality of the home environment in which the child finds himself?

(2) Does the amount of incidental learning accomplished by subjects indicate a developmental trend in this capacity?

(3) Are the learning scores of children on a directed task affected by the simultaneous inclusion in that task of information unrelated to the task, and to which their attention is not specifically directed?

Limitations of the Study

The following limitations are acknowledged as inherent in this study:

(1) The sample of this study was limited to children in select East Lansing and Lansing, Michigan public schools. Thus, generalization of the results is limited to populations similar in characteristics to the population used in the study, and only in relation to the specific mode of stimulus presentation and learning measures and tests used.

(2) The subjects of the sample from middle class home environments may well represent a select group of children since East Lansing is an academic community. Parents of these children were thus comprised largely of University affiliated personnel.

(3) As in all types of learning, the ultimate value of the incidental learning probably has its greatest utility in its retention and transfer effects to other tasks. The realm of the present study does not extend to either of these effects however, and immediate verbal and recognition responses are accepted as valid indicators of learning.

(4) The facilitating effects of verbalization during learning has been studied extensively and discussed by many writers (e.g. Kuntz, 1953). However, verbalization by the subjects during observation of the stimulus objects was not incorporated in this study.

(5) Race of the tester contributed significantly to the two higher order multivariate interactions related to incidental learning which were found in the study. It is important to remember, however, that only two testers (one black and one white) were engaged. Caution should therefore be exercised in drawing implications from findings concerning this influence.

Definition of Terms

Specific terms used in this study are defined as follows:

Incidental learning: The ability of a subject to respond to a stimulus when and even though his attention is not called to it.

Intentional learning: The ability of a subject to respond to a stimulus when his attention is called to it.

Lower socioeconomic background: The criteria used is the same as that used to determine a family as being eligible for Public Assistance by the Michigan State Department of Social Services. The amount consists for two

adults and two children of a total such that the cost of rent is $120.00 and of food and incidentals is $263.00 per month, i.e. $3,932.00 per annum. The amount of $50.00 is added to this amount with each addition of two persons. Children whose parents are Public Welfare recipients were automatically classified as coming from lower socio economic homes.

Middle socio-economic background: Children whose parents are employed in occupations classified as rendering an income of $4,000 or higher per annum. Children with one or both parents as graduate students at the University were classified as being of middle class backgrounds.

Kindergarten level: Children currently enrolled in a Lansing or East Lansing public school and designated as being a member of the Kindergarten level in that school.

First grade level: Children currently enrolled in a Lansing or East Lansing public school and designated as being a member of the first grade level in that school.

Second grade level: Children currently enrolled in a Lansing or East Lansing public school and designated as being a member of the second grade level in that school.

Common stimulus item: Such a designation refers to an item to which all the children were accustomed in the everyday pattern of their lives.

Uncommon stimulus item: An item is so for all children. It need not mean that a child has not previously seen or encountered the item. The frequency and nature of such an encounter, however, was considered minimal.

Recall: Ability of a subject to respond with the correct name or adequate description of an object such that one is able to recognize that about which he is speaking.

Recognition: Ability of a subject to correctly select an object (picture) previously encountered from a set of pictures in which it is included.

Theory and Rationale Related to the Study

Gagne (1962) defines 'sets' as "capabilities the student possesses at any given stage in the learning of a given task". DeCecco (1968) includes learning sets in his discussion of 'entering behaviors', i.e. qualities which the child brings with him to the learning situation and which affect, positively or negatively, the nature of those things which he is able to learn.

It has been well established that children do learn in a manner 'incidental' to that which is intended (Postman, 1946). As formal learning is influenced by implicit cues given to the learner as well as sets which the individual brings to novel situations, in a comparable manner incidental learning has been described as occuring in the absence of an

overt set to learn since no instructions are suggested or implied. In this regard, McGeoch (1942) has written:

> "....Much of the learning which goes on with no overt instruction is, nonetheless, influenced by implicit instructions and sets... Certainly it cannot be said with any conclusiveness that there are experiments in which implicit sets have not operated; but more than this, probability is on the side of the hypothesis that all of the results (in incidental learning) have been determined by sets." (page 304).

Considering the nature of what seems to occur in the process, two theoretical postulates seem tenable for discussion in this study. These are (1) the orienting response, and (2) distraction. These two phenomena are themselves sets which affect the nature and degree of response the child makes to stimuli in his surrounding. The two are included in the hope of providing a possible framework for understanding the nature of incidental learning and the child's response in such a situation.

(1) Orienting Response

The orienting response has been characterized in part by response(s) which habituate with repeated presentation of a stimulus and which reappear when the repeated event is altered (Sokolov, 1963). Sokolov further states that response decrement and recovery are mediated by some central process such as memory acquisition or neuronal model formation. Dodd (1969) further clarifies the process in stating that when an external event does not match an internal model, central excitation occurs and results in orienting behavior.

In the context of the present study, the incidental stimuli may thus be considered as an external event (the unrelated stimulus items) which fails to match the internal model (the intentional learning task).

In the same context, however, Kendler (1964) pleads that such observation or receptor orienting responses cannot be equated with attention. Although they are functionally equivalent in that they both operate to 'select out' from the total pattern of stimulation those components that will become associated, it may be that principles governing their operation are different. Observing, or receptor orienting responses will determine what part of the environment will strike the organism's sensorium. Attention, on the other hand, decides what stimulus component of a pattern of stimuli falling within the 'receptor gaze' will stand out and become associated. In short, both observing and attending will influence the stimuli that are to be associated, but their influence may operate through different mechanisms - the former through principles governing the learning and performance of responses, the latter through principles governing perceptual organization.

Within the boundaries of this frame of reference, Farley and Maske (1969), using heart rate as a dependent variable, noted that learning on a paired associate task was related to orienting-reflex classification among children showing low and medium orienting males and females respectively performing more satisfactorily.

(2) Distraction

Following Broadbent (1958), it appears that there is a limit to the amount of information an individual can handle at one time. When the available information in the stimulus complex exceeds this limit, the individual must select part of the information and reject part. The maintenance of efficiency on a task over a period of time can only be accomplished through some such 'focusing of attention' on task-relevant stimuli.

Observation suggests that young children are less able to shut out extraneous sights and sounds in the interest of maintaining a task orientation (Maccoby and Hagan, 1969).

But in fact, incidental learning does seem to occur at all ages. It would certainly not be reasonable to label all incidental learning as inefficiency in attention focusing. Perhaps, for some age levels at least, the same cues which allow for "incidental learning" also facilitate central task performance. Support is offered in the positive correlation obtained between the two response measures at younger age levels (Learner, 1967; Vaughn, 1968). The negative correlations found between central and incidental task scores at the older age levels supports a hypothesis that older children are able to ignore more task-irrelevant information than younger children, perhaps in order to perform better on the central task.

Overview

This study is divided into five chapters. A frame of reference for the study is established in Chapter I. Included are the introduction, need for the study, scope of the problem, purpose of the study and its limitations, as well as definitions of some specific terms used. The final section briefly discusses two theoretical concepts which are considered related to the study. They are the orienting response and the effects of distraction on the learning of children.

In chapter II, a review of selected related literature is presented. The review is divided into five sections: (1) Experimental designs used in incidental learning studies; (2) incidental learning studies which are further subdivided into (a) early studies, (b) studies of the mentally

retarded, (c) development and incidental learning, (d) race and social class differences, and (e) studies of incidental learning in the preschool child.

The design of the study and procedures followed are reported in Chapter III. Included are sources of data, the research instrument, a statement of the testable hypotheses, and treatment of the data.

In Chapter IV, an examination and analysis of data pertinent to the relationship between incidental learning, grade level, socioeconomic background, race, and mode of response as it relates to each of these variables is presented. Whether or not the inclusion of non-related peripheral materials as incidental stimuli in a defined learning task has identifiable effects is also examined. Effects due to race of tester and the effect of grouping by sex are also looked at.

A summary of the study, findings, discussion, conclusions, implications, and recommendations for further research are presented in Chapter V.

CHAPTER II

REVIEW OF RELATED LITERATURE

This chapter provides a review of related literature. It is divided into three main sections.

The first section briefly explains the experimental designs which have generally been used in studies of incidental learning. The second section presents a thorough review of the research in incidental learning. This is further divided into (a) early studies; (b) those related to developmental trends; (c) the effect of race and social class; and (d) studies which consider the preschool child. The remaining section provides background information related to the two most important variables in the study, namely (a) developmental trends in learning and (b) the effect of socioeconomic and ethno-cultural factors on achievement and learning.

It is hoped that such a background to the study will provide a framework within which to consider the present investigation and its findings.

Experimental Designs Used in Incidental Learning Studies

McGeoch's earlier reference (page 9) points out that it is hazardous ever to assert that learning is incidental in an absolute sense. This point can be accepted without abandoning the substantive position implied in the distinction between incidental and intentional learning. Instead of seeking to demonstrate a dichotomy, the concern is more appropriately shifted to the functional relation between the instructional

stimulus on the one hand and measures of learning and retention on the other. The instructional stimulus is an integral part of the conditions which must be specified in any investigation of learning. It can also be manipulated systematically, and one of the dimensions along which it can vary is the amount of information given the subjects about the test of performance which he is to expect.

When the instructions do not prepare the subject for a test on a given type of material, it is convenient to designate the learning of these materials as incidental. This designation should not imply that such learning occured in the absence of any incipient or transitory sets. Whether or not such sets are likely to have been aroused becomes a matter of theoretical interpretation. Operationally, incidental and intentional learning are distinguished by the use of different classes of instructional stimuli - those which do, and those which do not prepare the subject for a test of retention. In practice, manipulation of the instructional stimulus is often supplemented by a post-experimental inquiry which ascertains the subject's response to the instructions.

Two types of incidental learning situations have been distinguished in the literature. In Type I, the subject is exposed to the stimulus materials but given no instructions to learn. Following the exposure, his retention is tested unexpectedly. The choice of the test is determined by the criteria of incidental learning in the experiment. Criteria are based on the kind and amount of learning required for successful performance. Retention may be tested by recognition, free-recall, or transfer to a new task. Interpretation are specific to the method of measurement employed.

In Type II desings of incidental learning, the subject is given a specific learning task but during practice is also exposed to materials or cues which are not covered by the learning instructions. His retention of those features of the situation which are not relevant to the task specified in the original instructions define the amount of incidental learning, and the measure obtained will again be a function of the test.

Type II situations may be further subdivided into two classes on the basis of the relationship between the relevant and irrelevant components of the total learning situation. The irrelevant component may be features or attributes of the material which the subject has been instructed to learn but which are irrelevant in the sense that their discrimination and retention are not required for the performance of the task defined by the experiment. For example, if verbal items which the subject has been instructed to learn are printed in different colours, the colours are a feature of the learning material which is irrelevant to the explicit task. On the other hand, the irrelevant component may be materials or cues which bear no direct relation to the learning task, e.g. when the instructions are to learn a series of words but such additional items as digits or geometric forms are exposed along with the words. Thus, these two classes which are distinguished within the Type II situation refer respectively to the incidental learning of intrinsic components of the experimenter defined task.

Some, though few, researchers have also used a Mixed Model featuring aspects of both the Type I and Type II designs.

Related Research - A Review of Findings

A. Early Studies

The phenomenon of incidental learning has been of theoretical

interest since the 1930s. Early studies investigated its existence. Once established, the main interest was the influence of differential orienting tasks, i.e. the procedure used to ensure the exposure of subjects to the learning materials (Saltzman, 1953; Postman and Adams, 1956) concluding generally that intent per se is not a significant variable in learning, but the instructional stimulus does influence its amount and character by determining the differential cue producing responses.

The relationship of meaningfulness and recall were also studied (Postman and Adams, 1956; Postman and Phillips, 1961; Mechanic, 1962; Winnick, 1959). Results indicated that the difference between incidental and intentional learning are smaller when meaningfulness is high than when it is low. Sequential dependencies and serial order in recall indicate that the incidental learning is selective in the sense that the uninstructed subject responds to fewer of the learning materials than does the instructed subject. With such selectivity, the incidental learner will be less sensitive to the sequential relation between successive items than will the intentional learner (Postman and Adams, 1960; Postman, Adams and Bohn, 1956).

The relation of frequency of stimulus and exposure interval to incidental learning found more frequent stimuli to be more effective and incidental learning more pronounced at the beginning and at the end of an incidental task when an intentional task is also involved (Gleitman, 1957; Rosenberg, 1959; Miller, 1967; Siegel, 1966). The effect of reinforcement of responses has indicated an increase in incidental learning under positive as compared to absence or negative reinforcement (Bahrick, 1952; Bonsfield, 1953).

The phenomenon has occasionally been discussed from the standpoint of attention deployment (Klein, 1963; Fennel, 1970).

These studies of basic influences were largely conducted among adolescents and college students. Only recently have investigators shown revised interest in the phenomenon among children.

B. The Mentally Retarded Child

The majority of these early studies of young children were initially related to comparison of mentally retarded and gifted children (Hetherington and Banta, 1962; Goldstein and Kass, 1962; Baumeister, 1963) revealing children of higher intelligence more responsive to incidental learning. Such a finding has been verified even more recently (Brown, 1968; Lawrence, 1969; Cegelka, 1970).

Gordine (1967) found supportive comments provided better intentional and more efficient incidental learning on a serial task for this group.

It is noteworthy, however, that this derth of research concerned with trainable children has primarily involved institutionalized populations, an observation which presents multiple sources of the expressed deficiencies.

C. Developmental Studies

A number of researchers have focused on developmental trends among children with regard to incidental learning. The findings have, however, been contradictory.

A series of experiments on the development of attention (Maccoby and Hagan, 1965; Hagan, 1967; Hagan and Sabo, 1967; Bruckner, 1965) showed a trend for recall of information central to a task to increase with age while recall of task irrelevant (or incidental) information remained about

the same or even decreased with increasing age. Hagan and Sabo (1968) studied the effect of labeling pictorial stimuli among children aged 7-9, 10-11, and 12-14 in learning to discriminate either content or position of presented pictures as central information. They found content recall scores also increased with age, with more ambiguous items leading to selectivity and labeling depressing incidental scores at all ages.

Learner (1967) investigated the effects of IQ for 180 males in grades 3, 6, and 9 and the number of exposures (one versus three) to the material to be learned. The learning materials consisted of 15 slides on which the intentional material, 15 words, and the incidental material, 15 pictures, occured concurrently. In accord with the Type II incidental learning design, the subjects were told only to learn the words but were then tested for recall of both the words and the pictures. He found intentional recall increased significantly with increased IQ, grade, and multiple presentation of the material, while amount of incidental material recalled increased significantly only with grade. This latter finding supported the previous studies and was subsequently supported by Siegel (1969) who found faster responding associated with higher incidental scores. Using recall of a film content, Hale, Miller and Stevenson (1966) found girls superior to boys at all grade levels and a tendency for a curvilinear relation between age and correct response for verbal than for visual questions.

A majority of these studies suggested an inhibition of attention to irrelevant stimuli with increasing age hypothesis - an explanation supported particularly by Hale, Miller and Stevenson's finding of an

eventual decrease at grade seven for normal children, and Fraas' (1967) finding of increase only until grade 11 for mentally retarded subjects. Learner also noted that high IQ subjects may have learned significantly more intentional material than the low IQ subjects only at the expense of a narrowing of their range of cue utilization and an inability to respond effectively to the incidental material.

Vaughn (1968) investigated the taxonomic clustering of intentional and incidental free recall of first, fourth, and seventh grade children Two separate groups of seventh grade subjects were tested to determine the influence of the orienting task on performance. She found recall greater for clustered than for non-clustered lists, and total recall increased linearly with age for both lists. A positive linear relation was found between age and incidental as well as intentional learning. The supplementary group results indicated that performing an orienting task lessens recall and clustering scores.

Harpenau (1967) however, failed to support a hypothesis that incidental learning increased regularly with age in grade school children in her study of 120 third, fifth, and seventh to eight grade children who studied geometric figures and were tested for coloured bands around the figures. Hers was supported by the findings of Phye (1970) who found no difference between sixth, eight, tenth, twelfth graders and college sophomores, though a linear relation with age when the stimuli was equated across ages on the variable of verbal meaningfulness of adjectives and nonsense syllables. He used responses to a paired associate or response-stimulus learning task as the measure of incidental learning.

D. Race and Social Class

Race and social class have so far received only minimal attention when considering incidental learning. Wilson (1968) investigated the immediate and retained incidental and intentional performance of educable mentally retarded and normal adolescents, and found a non-significant positive relationship between these and scores on the Warner Index of Social Status.

Brown (1968), in a similar study of 96 subjects - 32 retarded, 32 white normal, and 32 negro normal children - aged 6 to 14 - found white normal boys as a group systematically lower than negro normals and the retarded groups on learning and retention of meaningful (but no differences on non-meaningful) material under both incidental and intentional learning conditions. Brown's instrument consisted of 8 categories of toys, presented visually and tactually with instructions to recall those toys appropriately marked as meaningful stimuli. Oriental names (8 pairs of geometric figures presented in perpendicular double boxes and practiced four times each, with instruction to remember the first name (last for half the subjects) served as nonmeaningful stimuli.

In a pilot study of concept attainment and incidental social learning of integrated and all white kindergarten children, Colton (1970) demonstrated that although gains were made in attaining some concepts, there was no pre-post change in the choices of "preferred companions" by integrated or all white kindergarten children as a result of viewing either unknown, same, or opposite colour children portraying 'teachers' in videotaped sequences. Naylor (1971) investigated the differences in learning styles (information demand, impulsivity-reflectivity, field

independence-dependence and originality) of disadvantaged Mexican American six year old children in grade one, but found no significant difference between groups on the impulsivity measure when white children made more errors than did Mexican-Americans. It would appear from this study that with the control of socioeconomic status, age, and other intervening variables, the cultural differences of the groups are less influential upon learning style than those determinants common to both cultures.

E. The Preshcool Child

An even fewer number of studies are available in which the performance of preschool children is considered. Wilson (1958) concluded that in his preschool children performance on imitative responses in an appropriate set in the absence of a model is essentially that of learning an incidental cue. Mussan (1965) found preschool girls of nurturant mothers showed more incidental imitative learning; and Ron (1966) showed a positive relation with dependence.

A recent unpublished study (Smith, Lezotte, and Schmidt, 1972 - See Appendix B) involving 32 children aged 3 1/2 to 4 years, questioned whether preschool children acquire learning incidentally, whether there is variation by race, socioeconomic level, and familiar versus unfamiliar stimulus items. The experiment obtained a measure of incidental learning by exposing subjects to a room containing the items but giving them no instructions to attend. A comparison group was also placed in the same room but instructed to attend to the stimuli. Recall and recognition were used in the tests. The findings indicated a significant interaction between race and learning type with white children performing substantially better than black children on the recognition of unfamiliar objects.

Black children, however, performed substantially better than the white youngsters on the recognition of unfamiliar objects in the intentional learning condition. Lower socio-economic level children performed substantially poorer than the middle socio-economic group on recognition of unfamiliar objects.

Summary

That such a phenomenon as incidental learning is a variable characteristic found in children which is affected by many internal and external factors is indicated by the many studies of the effects of normal versus retarded youngsters, as well as the findings of those studies which consider the number of presentations of stimulus material, reinforcement, and nature of the task. While such basic premises can be assumed, many inconsistencies still appear to exist concerning variations by age and grade for example.

As an internal set which may affect classroom learning behavior, the paucity of current data indicate further needed research on the variations in incidental learning as a function of socioeconomic level and factors such as experiential deprivation and language learning known to influence the behaviors of such groups. Effects of background experiences for socio-economic groups on the one hand, and race of the tester on the other were entertained as possible sources of variation in the results of a previous study co-authored by the writer. The present study again investigates the former, and exposes the latter to further investigation. It is hoped that the present study which considers some of the seemingly important factors will extend the boundaries of

one of the many classroom entering behaviors possibly used by the young child.

Cognitive Development of the Child

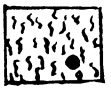
> "Cognition refers to the 'higher mental processes', that is, to the functions involved in understanding and dealing with the world about us - perception, language, concept formation, abstraction, problem solving, intelligence, and thinking." (Mussen, 1965, page 31).

This section attempts to discuss briefly some of the important trends in perception, intelligence, and general cognitive development which have been found to occur as the child develops during the early and middle years of life.

A. Perception

A developmental trend in perception is generally acknowledged (Carmichael, 1954; Gessell, 1949). A neonate's perception are, compared with that of an adult, diffuse and disorganized. With neurological maturity and increased perceptual learning, his global perception becomes more precise and differentiated. For only through experience do the various components and aspects of the world become related to one another in new ways and new integrations. As Piaget (1954) points out, understanding the world involves active exploration of the environment and continual organization and re-organization of sense impressions derived therefrom.

Young children do not ordinarily differentiate the parts of what they perceive, especially if stimuli are unfamiliar or have no meaning to them. They perceive largely in terms of context. The ability to extract or differentiate parts from an originally undifferentiated

global perception develops gradually with increasing age. Such an increased differentiation of stimuli with age is illustrated by Mussen, Conger, and Kagan (1963) who illustrate that if a four year old child is shown a  and asked to describe what he sees, he is apt to say "A box with lines" or a "design". A seven year old is more likely to mention the black circle. "There is a black circle and some lines", or "There is a design with a black hole in the bottom."

The gradual development of the ability to extract details or parts from a whole has also been demonstrated experimentally in studies involving familiar embedded figures which children, compared with adults, find difficult to locate. Mussen (1956) notes an increase in performance on this task from five and one half years with marked increase between ten and thirteen years. Differential performance was also noted in relation to intelligence. Changes in capacity toward perceptual constancies (i.e. for the characteristics of objects to remain constant in spite of variation in conditions under which they are perceived) is also well known.

B. Intelligence

Although there exists a variety of definitions of intelligence, most of them stress the ability to think in abstract terms, to reason, and to use these functions for adaptive purposes. Almost all tests of intelligence contain items of perceptual discrimination, problem solving, reasoning, and abstract thinking. The relationship between verbal ability and measured intelligence is also most striking.

Like perception, the literature also contains extensive supportive data to reveal developmental trends in intelligence (Bayley, 1943).

Although infant intelligence tests are known to exist, for example, it is well known that they cannot predict a child's later intelligence. This is so since different kinds of abilities are tapped at different ages. As a child's language becomes more highly developed and cognitive abilities improve, items evaluating these functions predominate in the tests.

Honzik (1948) for example, illustrates increased correlation between intelligence test scores at various ages and at ten and eighteen years (young adulthood). Such correlations make it clear that the predictive efficiency of test scores increases as a child matures since the correlations between childhood and adult intelligence improves as children grow older with some sixty percent of children changing 20 or more points in IQ between the ages of six and eighteen, as a result of such factors as psychological adjustment, home environment conditions, motivation, and similar factors.

C. Cognition

If one were to characterize the period of middle childhood in terms of developmental tasks, one might call it the period of rapid academic growth.

Erickson (1963) refers to this time as a period of resolving the anti-thesis of 'industry and inferiority'. He also makes a distinction between the motor and perceptual play of the younger child and the work of the school age child. He writes:

> "The child must forget past homes and wishes while his exhuberant imagination is tamed and harnessed to the laws of impersonal things....even the three R's..... He becomes ready to apply himself to the given skills and tasks which go far beyond mere playful expression of his organ modes." (page 258)

The emergence of symbolic activity occurs during what Piaget describes as the second broad period of intellectual development - the stage of concrete operations. During the first part of this period, the child begins to regard stimuli as representative of other objects. Imagery, or symbolic function develops as the child acquires more facility in language. During the second part of the stage, the period of intuitive thought (age 4 - 7 approximately), the child conceptualizes more, elaborates his concepts, and constructs more complex thoughts and images. Moreover, he becomes able to group objects together into classes according to his own perceptions of similarity. This is undoubtedly due to improvement in his language ability, which is of paramount importance in verbal mediation, concept formation, abstraction and problem solving. According to the Russian data (Vygotsky, 1962), children of this age construct and direct themselves largely by means of covert speech.

As academic work is one of the chief tasks of middle childhood, corresponding cognitive growth is therefore one of the major developmental changes. The years from six or seven to approximately eleven is the period of concrete operations during which the child largely overcomes his egocentricity of language and thought and can take on the perceptual and cognitive point of view of another. Nor does he center on only one aspect of a situation, but can consider several facets of a problem simultaneously. This decentering and socialization of thought allows for the objectivity which is essential to the learning of such subjects as mathematics and reading, for instance.

Race and Social Class Differences Related to Achievement

The concept of social class, not with-standing some major

difficulties encountered in its use, has been used to predict behaviors of grossly differentiated groups. Such behaviors as child rearing and achievement have been argued to be consequences of placement in the social stratification system. Weber (1958) defined a social class as a collectivity

> "...having in common a specific causal component of their life changes, insofar as this component is represented exclusively by economic interests in the possession of goods and opportunities for income.." (page 181)

Traditional indices of family income, education attained, or some measure of occupational position have reflected Weber's definition. It is such a definition that has been used in this and most studies when achievement, cognitive development, motivation and similar variables which relate to ahcievement are investigated.

This section summarizes some trends in the literature on social class and school achievement. Briefly presented are also some postulates and arguments which have evolved surrounding the alleged differences where these are claimed to exist.

At virtually every grade level, differences in the degree of school success attained vary with a number of student characteristics such as ethnicity, socioeconomic status, and IQ., i.e. school success depends on a variety of factors other than ability to learn.

It has been claimed that white children are more successful in school than black children, and high socioeconomic children succeed more often than children from low socioeconomic backgrounds (Terman, 1916; Rohwer, 1971). Comparing first through fifth graders by race and socio-economic background using an IQ test of pictorial and numerical pairings, classification etc., Deutch and Brown (1964) failed to find significant

grade differences in IQ for either race, but did find differences between black and white socioeconomic levels and IQ in favor of higher socioeconomic levels. The study confirms those which indicate high correlations within ethnic groups and socioeconomic level in the patterns of abilities across verbal reasoning, number, and spatial abilities (Lesser, Fifer and Clark, 1965; Stodolsky and Lesser, 1967). Similarly, Wilson (1963), Montague (1964), and Seller (1958) found sixth graders from middle and higher socioeconomic backgrounds superior to low socio-economic children in reading, arithmetic concepts, and verbal conceptual ability respectively.

Some studies comparing socioeconomic and motivational variables show similar patterns - inferring, for example, a positive relation between low socioeconomic level and anxiety (Fledhuser and Klausmeir,1962); attitude toward educational and occupational success (Hieronymous, 1951) - such expectations correlating only to a lesser extent with ability.

Epps (1969), however, investigating three aspects of Atkinson's model of achievement motivation (fear of failure, perceived probability of success, and incentive value of success), found a negligible relation with student grades and only a significant socioeconomic relation for southern males, though there was a stronger relation between socioeconomic level and expected education. He also found socioeconomic status negligibly related to test anxiety and self esteem, but more strongly related to perception of limited opportunity and conformity (negatively). Similarly,Bloom , Whiteman and Deutch (1963) found that all socioeconomic levels of black parents had higher occupational and educational aspirations for their children than did white parents; as well as black children for themselves.

Cognitive growth occurs in the development of language, particularly perceptual training, memory training and verbal mediation which serves to increase learning efficiency. The development of attention is involved in perceptual learning. Deutch (1964) suggests that disadvantaged children may have more trouble hearing than seeing, and may fail to distinguish and recognize speech sounds as a function of 'tuning out' excessive stimulation in a noisy environment with little organized sustained conversation. Such a child fails to learn to pay attention to others' talking and fails to learn any auditory dependent skills.

John and Goldstein (1964), illustrating the use of labels as mediators in a grouping task, found black children from high socioeconomic levels in first and fifth grade producing appropriate labels, while similar lower class children attended to non-essential details. Words and labels are generally learned by repeated association of touch, sight, and hearing of names. Deutch (1964) concluded that the preliminary evidence would indicate that perceptual learning of the disadvantaged child is lacking or seriously under-developed, thus he might be hampered in more advanced learning.

In language development, it has also been written that the language of the disadvantaged child does not provide him with adequate basis for (abstract or other) thinking (Bernstein, 1961; Blank and Solomon, 1968), and he does not use language properly (Breiter and Engleman, 1966). Houston (1970) points out that such language research has generally used a school register which

> "....is neither the whole of the children's linguistic performance nor in any way representative of their linguistic competence....The non-school register shows a complete set of the expected syntactic patterns characteristic of children this age, insofar as these are known" (page 953).

She further draws attention to the fact that direction of dependence between language and cognition is still undetermined; nor is it any longer considered possible to extrapolate cognitive patterns directly from specific linguistic patterns. In addition, hers and the work of Lennenberg, she notes, summarizes that a lack of lexical items on the part of the disadvantaged child does not necessarily imply a lack of sophisticated cognition, nor does failure to use abstract terms necessarily imply inability to conceptualize in this manner.

The work of Bernstein (1961), a British researcher, has been used extensively in this country. His is an intriguing analysis of the language of the lower class' use of a "restricted" code (or language) as contrasted with an "elaborated" code for individuals of higher socioeconomic levels. Such an analysis, however, derived in a different culture and from lower working class children in London deserves cautious cross application to 'disadvantaged' Americans with largely different origins and styles of life.

Still another influence of language on achievement is related to teacher perceptions. Cohn (1966) writes:

> "...It would seem that a moralistic depreciation of lower class english mirrors an undesirable ethnocentric depreciation of lower class values. Class antagonism on the part of the middle class teacher toward lower class children is one of the most contributing factors in the alienation of lower classes from our public schools. Individuals in authority who disparage this language endanger the emotional security of lower class children in their charge." (page 331)

Several possible explanations have emerged to explain what appears to be group differences related to achievement. An IQ explanation for example, has been a simple one: high IQ children are more proficient learners than low IQ children, therefore high IQ children perform better

in school than low IQ children. The average IQ of white children is higher than the average IQ of black children; therefore, white children attain higher degrees of school success than black children (Jensen, 1968; 1969).

However, refutations of this genetic IQ argument have been numerous (Pettigrew, 1964; Kagan, 1969; Gottesman, 1968; Hunt, 1969). Such rebuttals are largely related to the measurement distribution, development, and nature of intelligence; the nature of emphasis on biological versus psychological and social factors in behavioral development; and implications drawn for the relatively fixed nature of the existing norms for intelligence, and the implications drawn for class and race differences from the measures of heritability of the IQ in European and American caucasians.

Attention has also been called to the culture laden and middle class nature of tests of mental ability (Green, 1969; Davis, 1948). Studies of children from lower class homes, for example, indicate the nature of motivation and self concept as more appropriate predictors of achievement for this group (Green and Farquar, 1965).

A proposed two level model of learning ability (Associated or Level I and Conceptual or Level II) has also been offered (Jensen, 1969). Level I involves the neural registration and consolidation of stimulus imputs and the formation of associations, while Level II abilities involve self initiated elaboration requiring transformation of the stimulus imput before it eventuates in an overt response. Despite its popularity, this analysis has been described as inadequate and has also met with its share of rebuttals largely because their singular nature is inconsistent with the plural nature of learning processes (Crombach, 1969); and the biased

nature of paired associate tasks (from which the argument is derived) for middle class children (Rohwer, 1971).

Deutch and Brown (1964) have offered a 'participation' hypothesis which has to do with

> "....increased participation in the cultural mainstream... since the weight of colour and resulting minority status results in much less participation by the Negro, while the lowest class status operates similarly for the white as well as for the Negro" (page 27).

Studies by Deutch (1960), Bloom, Davis, and Hess (1965), and Keller (1963), indicate that lower class homes are barren of objects (books, newspapers, games etc.) or coherrent social interaction. Bruner(1961) believes that such a child lacks both the richness of environment for developing models and strategies of thought and the corrective feedback necessary for their maintenance.

Rohwer and Edmonson (1960), and Frazier (1957) have attributed a portion of the difficulty to the alternatively repressive and indulgent pattern of upbringing found in lower class families. The effect of such negative reinforcement, they assert, is to discourage early initiative, curiousity, and exploration. Pasamanick and Knoblock (1958) as well as Kawi and Pasamanick (1969) have also commented on the inadequate nutrition and pre-natal care received by millions of low socioeconomic (particularly black) mothers as compared with other mothers which result in neurological damage, and consequent impaired intellectual functioning and behavioral disturbances including hyperactivity, distractability, and low attention span.

The picture is altogether a complicated one and effect has itself become an issue. Research has recently begun to look at some nonacademic

arguments as well. These are represented when educators have written in one form or another to the effect that

> "..The major barrier to improving quality of the educational environment for the black and poor child is covert and often unconscious racism in educational personnel.... Racism is inculcated in black and white Americans through the socialization process and how it is reflected in teacher attitudes, expectations, behavior, and interpretations of educational theory". (Hogan in Green, Ed.), 1969, page 159-160).

Indeed, as Haubrick (1969) writes:

> "..What seems to be emerging from mountains of literature is that one cannot, with any degree of assurance, write about the characteristics of the disadvantaged. Instead, it is necessary to look at other factors which seem to cause learning problems for children in individual situations....It is necessary to examine the kinds of problems that exist in learning, schooling, and teaching to see what these mean for individual children in particular contexts". (page 129).

Summary

As children develop, they gradually develop capacities which enable them to organize their worlds in a manner which permits them to function adequately in a complex society. Yet, internal as well as external characteristics result in individual and group similarities and differences. Education continually searches for these similarities and differences in order to enable all students to benefit from its instructional procedures. This represents one such study which attempts to consider these many variables in seeking further means of improving educational instruction.

CHAPTER III

METHODOLOGY AND DESIGN OF THE STUDY

This study was designed to determine whether and in what manner children from the kindergarten, first, and second grade levels and from lower and middle socioeconomic home environments performed on an incidental learning task. A control group is used to assess the effect of inclusion of such incidental stimuli on an intentional learning task. The subjects, and the data collection instrument are described in this chapter. The specific procedure, experimental design, method of data analysis, and the research hypotheses are also reported.

The Sample

The subjects participating in this study were ninety-six boys and girls in the East Lansing and Lansing, Michigan public schools. Table 3.1 provides a breakdown of the sample by size and average age distribution. The sample was selected from Kindergarten, first, and second grades (N = 32).

Middle class children at all three grade levels (N = 16) were selected from elementary schools in East Lansing. Because of the exclusive middle class nature of this community, it was necessary to obtain a similar size and distribution of the sample of children from lower class home backgrounds from neighbouring Lansing schools.

The parents of children from middle class schools largely included professional and University personnel, public school teachers, and Michigan State University graduate students. The schools from which the lower

Table 3.1

Sample Size and Average Ages in Months for Sample

			Kinder-garten	First	Second	Average Sex (N = 12)	Average Race/SES (N = 24)	Average SES (N = 48)
Middle SES	Black	Males	73.0	83.0	90.5	82.2		
		Females	72.5	85.5	89.0	82.3		
							82.2	
	White	Males	71.5	85.0	93.5	83.3		
		Females	71.0	83.0	97.0	83.7		
							83.5	
	Average Middle SES/Grade (N = 16)		72.0	84.1	92.5			92.9
Lower SES		Males	72.0	87.5	96.5	85.3		
		Females	71.5	84.0	95.0	83.5		
							86.0	
		Males	76.5	86.0	103.5	86.7		
		Females	70.0	86.5	100.0	85.5		
							86.1	
	Average Lower SES/Grade (N = 16)		72.5	86.0	98.8			85.5
	Average Grade (N = 32)		72.3	85.1	95.7			
	Average Total (N = 96)							84.3

socioeconomic samples were drawn were schools which met the financial and federal requirements for ESEA Title III support. The majority of children in these schools came from homes partially or entirely supported by Public Welfare aid.

As can be observed in Table 3.1, the average age of children from middle socioeconomic homes was 82.9 months. That for their lower socio-economic level counterparts was 85.8 months. The ages of kindergarten, first, and second graders averaged 72.3, 81.5, and 95.7 months respec-tively. Averages by grade on sex and race are also indicated.

Instrumentation

(See Appendix A - 1, 2, 3, 4, and 5)

A. Instructional Material

Story telling in the classroom is instituted from nursery school to at least the middle grades of elementary school. Thus, such a medium seemed appropriate for use. A story called Making Friends was used.

A slide presentation was developed accompanied by narration. The child could thus listen to the story and view the projected slides simultaneously.

There were sixteen such slides in the presentation. Two sets were developed. One set was used with the Experimental group of subjects while the second set was used in working with the control group. The content of the story for both groups was identical in nature in that both sets were identically illustrative of the story being narrated.

Pre-practice was conducted to ensure that the two experimenters read the story at approximately the same rate of speed, emphasis, and intonation.

B. Instrument

Two factors required consideration in development of the instrument. First, that it would meet the requirements for applicability and interest of the age range being investigated; Secondly, that the nature of the problem and degree of difficulty would be such that the older children were unlikely to reach a ceiling in their performance; or that the younger group of children would become unnecessarily overwhelmed by the task.

Care was also necessary to ensure that differential reading rate among grade levels, or among individuals within the same grade level was not a factor which would unduly interfere with the results obtained.

The story, written by the author, was read by two professional persons in the area of Children's Literature in order to assess its appropriateness, i.e. style, content, interest, etc.

Classification of the items into common and uncommon was made with the assistance of a number of fellow graduate students in the Teacher Education department. Assistance of six children not otherwise used in the study were also sought. The children were asked of each item, "What is this?" "Tell me what you know about it." "When was the last time you saw one?" Such questions helped in the decision concerning the quality of an item for appropriate inclusion as an incidental stimulus item.

Two methods were selected for testing of incidental learning - recall and recognition. While recognition is illustrative of simple visual memory, recall was considered as indicative of a higher level of cognitive processing of the stimulus information. Intentional learning was tested

by asking for single word or single sentence responses to questions, the answers to which were told in the story.

The instrument was pre-tested on a group of twelve children, four each from kindergarten, first, and second grades respectively. Concern especially existed for those aspects mentioned earlier -- difficulty of test questions and maintenance of interest in the task by all the children. The results of the pretest were highly satisfactory. The children averaged between forty and sixty percent correct on the intentional test items, thirty and fifty percent on the incidental recognition task, and twenty percent on the incidental recall task. A ceiling effect was not evident on the tests of incidental or intentional learning, nor were the questions particularly difficult for any single group. A high level of interest in the story was maintained by all children. The task as a whole seemed enjoyable as well as challenging. Several children asked to view the slides a second time.

Reliability

The tests used as measures of (a) incidental and (b) intentional learning were also analyzed for their reliability using the Hoyt procedure. Responses on each item for each individual were divided into correct responses, incorrect responses, and unattempted. According to Hoyt's formulations, variation in the performance of an individual from item to item represents a real (non-error) difference, i.e. an intra-individual difference which should not be involved in the estimation of reliability. That is to say, observed variation consists of three components - true inter-individual differences, intra-individual differences (measured by item variances) and error inter-individual differences. The method

Table 3.2

Reliability Coefficients for Instrument

Items Comprising Test	No. of Subjects	No. of Items	Mean	Variance	Standard Deviation	Hoyt's Coefficient	Standard Error
INCIDENTAL LEARNING:							
Overall (Recall & Recog.)	48	32	10.77	16.39	4.05	.74 (.85)	2.04
Common (Recall)	48	8	.75	.87	.93	.27 (.42)	.74
Common (Recognition)	48	8	4.98	3.13	1.77	.53 (.70)	1.13
Uncommon (Recall)	48	8	.58	.67	.82	.30 (.46)	.64
Uncommon (Recognition)	48	8	4.46	4.00	2.00	.61 (.76)	1.17
Common + Uncommon (Recall)	48	16	1.33	2.10	1.45	.47 (.64)	1.02
Common + Uncommon (Recog.)	48	16	9.44	10.68	3.27	.71 (.83)	1.69
INTENTIONAL Learning							
Overall	96	10	6.20	4.31	2.08	.62 (.77)	1.21

( ) Indicates the reliability coefficients calculated for each subtest twice its original length using the Spearmen-Brown Prophecy Formula.

employs an analysis of variance procedure (Ebel, 1965).

The reliability coefficients obtained by this procedure are given in Table 3.2. The low reliability coefficients obtained on incidental recall of common and uncommon items may be accounted for in part by two factors. First, an interaction of the nature of the kind of learning being investigated (involving an absence of instructions) and the manner of testing (recall). The two dimensions may well be viewed as a kind of difficulty inherent in the task. (Note, recognition of the same items yield higher reliability coefficients). Second, each subtest included only eight items. Altogether, the test of incidental learning consisted of sixteen items while the test of intentional learning consisted of ten items. Difficulty, homogeneity, and discrimination of the items, speed of administration, and ability range of the group considered, the reliability of a test is also affected by the number of individual items of which it consists (Ebel, 1965). Estimation of reliability coefficients of tests twice as long as those given by application of the Spearman-Brown Prophecy formula to the existing coefficients indicate substantial increases in the reliability estimate of each test.

Procedure

Figure 3.1 is a description of the procedures used in the experiment. Within each racial group, sex, socio-economic level and grade level, subjects were assigned to experimental or control groups. Within each of these in a similar manner, assignments were made to a black or to a white experimenter.

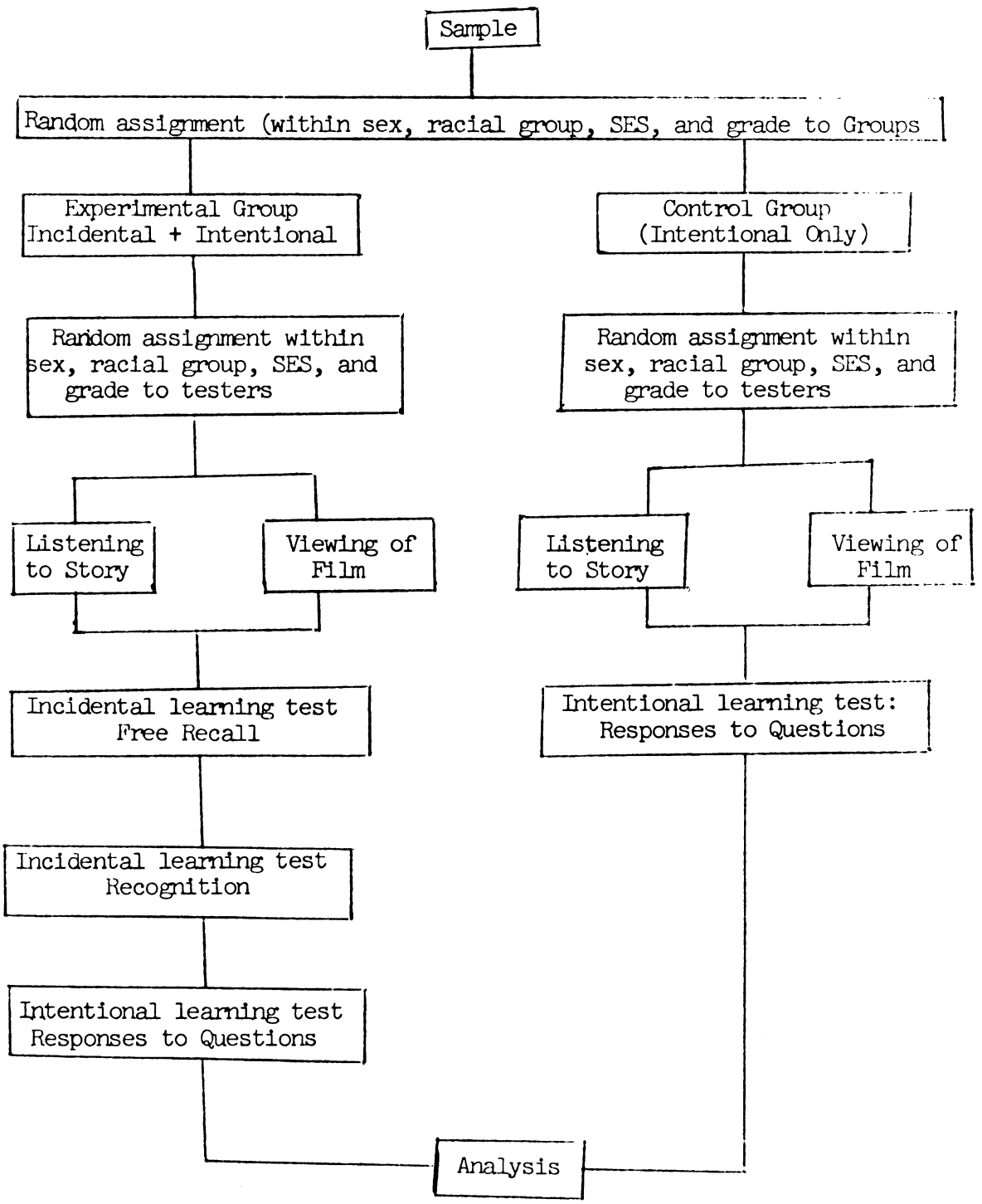


Fig. 3.1

Procedure Used in the Study

A. Instructional Task

Each child was tested individually by the experimenter to whom he was assigned. The rooms used were located at each site and were highly congenial. They were generally small, virtually empty rooms which were in all cases used for individual instruction such as remedial reading, individual testing etc. The apparatus was set up prior to the child's arrival to the room.

As the session began, each child was told by the experimenter, "You are going to be told a story, and you will also watch some pictures about the story. Then you will be asked some questions bout the story." After sufficient rapport had been established, the story and film were begun by an introduction to the name of the story prior to presentation of the first slide. As the story progressed, each slide was changed at designated intervals and in accordance with the content of the story. At some points, special features of the story were pointed to or questioned of the child to ensure that he was attending sufficiently. For example, the child might be asked, "Can you see Amy and Danny? They are bringing something home with them". (Such features, however, were unrelated to test items.) Reading and viewing of the story was completed in approximately eight minutes for each child. This procedure was followed for children in both the experimental and control groups. Having listened to the story and having viewed the accompanying slides, the child was now considered ready for testing.

B. Testing

(1) Incidental Learning: For children in the experimental group, the first test was one of his incidental learning. He was told,

"Now, there were some pictures in the story, some extra pictures, which had nothing to do with what the story was about. What were some of these pictures?" He was told at some early point (after he had completed the listing of several items and stopped, or if he hesitated to begin), "You can tell me what something looked like, you can try to describe it to me if you do not know what it is called." This constituted the instructions aimed at eliciting the child's recall of incidental stimulus items. An adequate description such that the experimenter was sure the child was describing one of the items included represented a correct answer.

The child received a score of '1' (i.e. correct) for each item recalled. For items wrongly recalled (i.e. not present as a stimulus item), the child received a score of 'X' (i.e. wrong). For all other items not mentioned, the child was given a '0'. There were instances in which children give the names of items present in the picture but related to the story. Such items were not counted in any manner. In such an instance, the investigator attempted to draw attention to the 'extra' pictures which were not a part of the story.

Directly following, the child was presented the sixteen foils of three pictures each, one of which was a replica of each of the incidental stimulus items. He was asked, "Which of these did you see, point to it with your finger." (The directions were worded in this manner to discourage many less talkative children from responding negatively to 'Did you see any of these items?"). As a response was elicited (by pointing or by responding verbally), the page was turned to the next foil set and the instructions repeated. These instructions were aimed at eliciting

the child's 'recognition' of the incidental stimulus items (See Appendix A-4).

He received a score of '1' for each correct response, a score of 'X' for an improperly selected item , and a score of '0' if he responded that none of the items were present in the picture. Where a child made an initial choice, then quickly corrected himself by choosing a second item, the instructions were repeated and his response on the second trial considered his true response.

On both recall and recognition, a score of eight on common and eight on uncommon items was possible, thus making for a total possible score of items correct on each mode of response of sixteen.

(2) Intentional Learning: Both the experimental and the control subjects were given identical tests on intentional learning. These were comprised of ten questions which related directly to the content of the story. The questions were asked of each child in a pre-determined sequence (related to the progression of the story). (See Appendix A-5).

The child was given a score of '1' for each correct response, 'X' for an incorrect response, and '0' for no response or a response that he did not know the answer A total score ot items correct on this test was ten.

In the case of the experimental group, administration of the incidental learning test always preceeded administration of the intentional learning test, and within the former, administration of the recall portion always preceeded administration of the recognition portion of the incidental learning test.

Experience in the previous study (Smith, Lezotte, and Schmidt,1972) had indicated that subjects were not necessarily able to correctly

recognize items they had previously recalled, hence the recognition test included all items, i.e. even those previously recalled.

Summary of Instructions to Subjects

The following is a brief summary of the instructions given to each subject during the individual treatment and testing session.

A. Instructional Task (Experimental and Control Groups)

As each child was brought to the room, he was told,

"You are going to be told a story, and you will also watch some pictures about the story. Then you will be asked some questions about the story."

B. Testing

(1) Incidental Learning

(a) Recall: Directly after the child had heard the story and viewed the slides, he was told,

"Now, there were some pictures in the story, some extra pictures, which had nothing to do with what the story was about. What were some of these pictures?"

A few minutes later, after he had named some items, then stopped; or if he hesitated to begin, he was told,

" You can tell me what something looked like, you can try to describe it to me if you do not know what it is called."

(b) Recognition: Directly following the recall test, the child was presented a foil of four pictures including an incidental item. As each foil was presented, he was asked, "Which of these did you see, point to it with your finger."

(2) Intentional Learning

Both the experimental and control groups were tested on intentional learning. Instructions were identical. The experimental group was given the intentional test directly following the incidental recognition test. The control group was given the same test directly after listening to the story and viewing the slides. (See Appendix A-5)

Supplementary Data

For each child was collected the most recent standardized Achievement test scores. During the Spring of the year, 1972, and at all schools included in the sample, the Metropolitan Readiness Test and the Stanford Achievement test had been administered to the kindergarten and to the first and second grades respectively. The writer was permitted access to the test score sheets or test booklets themselves in order to obtain the scores for all children who participated in the study.

Experimental Design

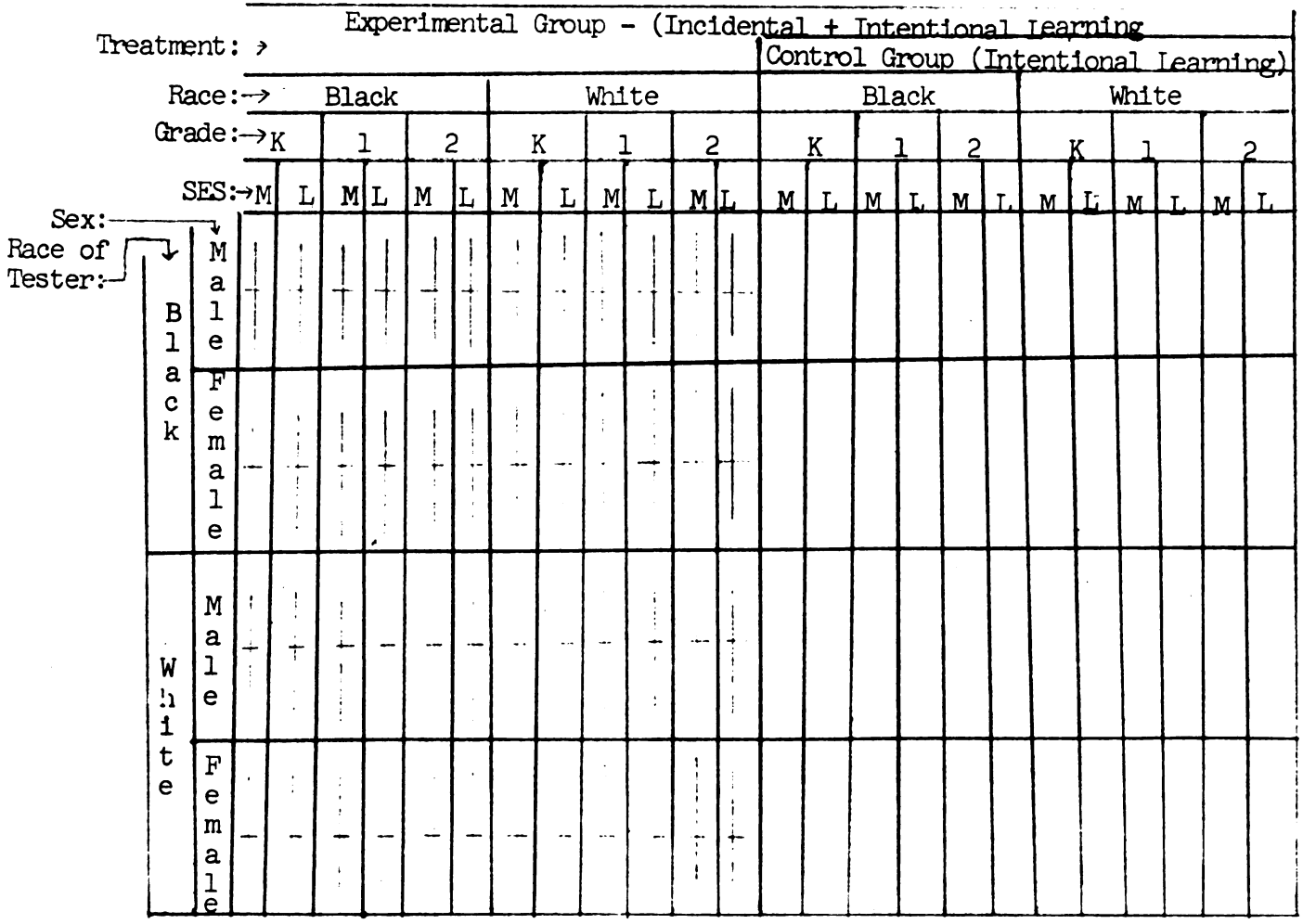
(See Fig. 3.2)

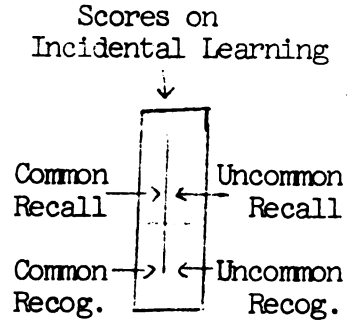
The design used in this study was a modification of Campbell and Stanley's Post Test Only Control Group Design (Campbell and Stanley, 1963).

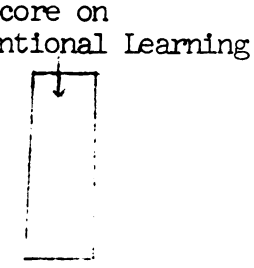
While the variable sex of subject was not of primary interest in the study, care was taken to control any effect which might be contributed by this source. Subjects were assigned therefore, within sex, and grade levels, to the experimental and control groups. They were subsequently assigned in a similar manner to a black or a white experimenter who read the story and administered the appropriate test. The present study

Fig. 3.2

Experimental Design Used in the Study







represents a continuation of, and improvement upon a previous study (See Appendix B). The latter control is a result of this effort to lend the present study to a greater degree of appropriate interpretation.

The result was therefore a 2 X 3 X 2 X 2 X 2 X 2 (Group X Grade X Socioeconomic Level X Race X Sex X Race of Tester) design which was also completely crossed.

Testable Hypotheses

Two sets of hypotheses were generated and tested. The first set was tested to determine the variation in quantity and quality of incidental learning among children as a function of grade placement, socioeconomic background, and racial grouping. The possible effects of the two control procedures - race of the tester, and sex of subjects were also tested. The second set concerned the effect of inclusion of incidental stimuli while at the same time conducting an intentional task. All hypotheses are stated here in a non-directional null form.

SET I

H_1: There will be no significant differences between the recall and recognition scores of children in the kindergarten, first and second grades.

H_2: There will be no significant difference between the incidental learning recall and recognition scores for children from lower versus middle socioeconomic home environments.

H_3: There will be no significant difference between the incidental recall and recognition scores of black and white children.

H_4: There will be no significant difference between the incidental recall and recognition scores of black and white children from lower versus middle socioeconomic home environments.

H_5: There will be no significant difference between the common versus uncommon incidental learning scores of children from lower and middle socioeconomic home environments.

H_6: There will be no significant difference between recall versus recognition scores of common versus uncommon items for children from lower and middle socioeconomic home environments.

H_7: There will be no significant difference between the recall versus recognition incidental scores for female versus male subjects.

H_8: There will be no significant difference between the incidental learning scores of black versus white children assigned to black and white testers.

H_9: There will be no significant difference between the incidental learning scores of children from lower versus middle socioeconomic home environments when assigned to black and white testers.

SET 2

H_1: There will be no significant differences in the intentional learning scores of kindergarten, first, and second grade children who were simultaneously exposed to intentional and incidental stimuli versus those who were exposed only to intentional stimulus material.

H_2: There will be no significant difference between the intentional learning scores of children from lower and middle socioeconomic home environments who were simultaneously exposed to intentional and incidental stimuli versus those who were exposed only to intentional stimulus materials.

H_3: There will be no significant difference between the intentional learning scores of black and white children who were simultaneously exposed to intentional and incidental stimuli versus those who were exposed only to intentional stimulus materials.

Analysis

A multivariate analysis of variance with repeated measures was used in analyzing the scores obtained on incidental learning. Total scores on recall and recognition for common and uncommon objects were the dependent variables. Grade, socioeconomic level, race, sex of subjects, and race of tester formed the independent variables.

To assess the effect on the scores of subjects on the intentional learning task when incidental learning material was also included, the intentional learning scores of the experimental and control groups were compared using an analysis of variance procedure. The dependent variable was the total score on response to the intentional task for each of the two treatment groups. The independent variables were the same as those in the previous analysis.

For the analysis of the incidental learning scores, recall and recognition of common and uncommon items; and achievement test scores were punched on computer cards in addition to the designation of each

subject by grade level, socioeconomic level, race, sex, and an individual identification number. Race of the tester to whom he had been assigned was also indicated.

The multivariate analysis of variance procedure programmed by Jeremy Finn of the State University of New York at Buffalo was selected. The analysis would indicate variations in the dependent variables as a function of the independent variables used in that portion of the study. An alpha level of .05 was selected as the point at which the null hypothesis would be rejected.

For the comparison of intentional test scores between the experimental and control groups, a simple analysis of variance computer routine was selected for use. This enabled the experimenter to detect variations in the dependent measures as a function of the independent measures used.

Pearson Product Moment correlation procedures were used to detect existing relationships between the incidental and intentional learning scores of subjects in the experimental group. This procedure was also used to detect correlations between the incidental and standardized achievement test scores for the same group of subjects.

All statistical analyses were computed on a Control Data Corporation 3600 computer at Michigan State University.

Summary

The sample for this study consisted of ninety six children equally divided by lower and middle socioeconomic backgrounds, black and white racial grouping, and sex across kindergarten, first, and second grade levels in public schools of the Lansing and East Lansing, Michigan school districts. These children were divided into an experimental and

control group of forty eight subjects each, and further assigned in equal proportions to black and white experimenters.

Incidental learning scores were obtained by having the children individually listen to a story while at the same time viewing a slide presentation related to the story, but which also contained pictures of common and uncommon 'incidental' stimulus items which were unrelated to the task, i.e. the story. The resultant measures were acquired separately by recall, followed by recognition from a set which included the incidental stimulus material. Intentional scores were obtained from questions which related directly to the story.

A multivariate repeated measures design was used to compare subjects in the experimental group. A univariate analysis of variance procedure assessed the effect of inclusion of stimuli peripheral but unrelated to an intended learning task by comparing the intentional learning scores of the control and experimental groups.

The effect of race of tester and sex of the subjects were controlled in the study, with hypotheses subsequently built around these. All hypotheses were tested at the .05 alpha level of significance with appropriate degrees of freedom.

CHAPTER IV

ANALYSES AND RESULTS

Introduction

The results of the study are presented in this chapter in four major sections. They are:

(1) Analysis of the differences in incidental learning (recall and recognition of common and uncommon items) among children, and its relation to grade, socioeconomic background, and race. The effect of sex of subject and race of tester are also considered in the analysis of incidental learning scores.

(2) Analysis of the effect of the presence of incidental stimuli on intentional learning.

(3) Correlations between the incidental and intentional learning scores.

(4) Correlations between the results of standardized achievement test scores (Metropolitan Readiness for kindergarten, and Stanford Achievement for first and second grades) and incidental learning scores.

Research hypotheses related to incidental learning were tested using a multivariate analysis of variance procedure. A univariate analysis of variance procedure was used to test the research hypotheses pertaining to intentional learning. Pearson Product Moment correlation methods were used for the correlations between incidental and (a) intentional, and (b) achievement scores.

Results

Section I - Incidental Learning

The results of the multivariate analysis of variance is presented in Table 4.1 along with Table 4.2 which gives the associated scores.

Table 4.1

Multivariate Analysis of Variance
of Incidental Learning Scores

Type of Variance Tested	F test for MANOVA in Incidental Learning		
	F	d.f.	Significance Level
Ts (Race of Tester)	1.69	1	.24
Ses (Socioeconomic level)	.32	1	.81
Sx (Sex)	1.75	1	.23
R (Race)	.30	1	.83
G (Grade)	1.29	2	.31
Ts X Ses	.68	1	.59
Ts X Sx	.88	1	.49
Ts X R	.41	1	.75
Ts X G	.62	1	.71
Ses X Sx	2.67	1	.11
Ses X R	.65	1	.60
Ses X G	.71	2	.65
Sx X R	3.28	1	.07
Sx X G	2.38	2	.07
R X G	1.93	2	.13
Ts X Ses X Sx	5.58	1	.02**

Table 4.1 contd.

Type of Variance Tested	F test for MANOVA in Incidental Learning		
	F	d.f.	Significance Level
Ts X Ses X R	.56	1	.65
Ts X Ses X G	2.65	2	.05**
Ts X R X Sx	2.36	1	.14
Ts X Sx X G	.76	2	.61
Ts X R X G	1.03	2	.44
Ses X Sx X R	.03	1	.99
Ses X R X G	1.27	2	.31
Ses X Sx X G	.90	2	.52
Sx X R X G	2.26	2	.08
Error		11	$\alpha = .05$

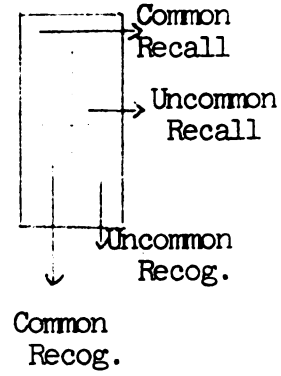
Examination of Table 4.1 reveals a significant interaction among race of tester, socioeconomic background, and grade level of subjects. A multivariate F ratio of 2.65 with 2 and 11 degrees of freedom with a probability of .05 was computed. A significant interaction was also found among race of tester, socioeconomic background and sex of subject. Here the multivariate F ratio of 5.58 with 1 and 11 degrees of freedom with a probability of .02 was computed. These three way interactions prevent interpretation of the hypothesized multivariate lower order interactions or main effects.

In order to locate the source of the three way interactions among the four dependent variables, the Step Down F tests associated with each

Table 4.2

Incidental Learning Scores (one per cell) N = 48

Race:		Black						White					
Grade:		K		1		2		K		1			
SES :		M	L	M	L	M	L	M	L	M	L	M	L
Sex: / Race of Tester:													
Black	Male	0 | 1 3 | 5	1 | 1 6 | 7	0 | 0 2 | 3	1 | 1 4 | 1	1 | 0 5 | 2	1 | 0 5 | 6	1 | 0 6 | 6	0 | 0 3 | 3	0 | 0 4 | 4	0 | 0 6 | 4	0 | 0 8 | 3	0 | 0 1 | 1
	Female	1 | 0 3 | 1	0 | 0 3 | 2	0 | 0 5 | 5	0 | 0 4 | 1	1 | 2 4 | 4	1 | 1 8 | 7	2 | 0 0 | 5	0 | 1 3 | 5	2 | 1 6 | 3	2 | 1 4 | 2	1 | 2 5 | 5	0 | 2 6 | 6
White	Male	1 | 1 3 | 7	0 | 0 3 | 5	2 | 0 7 | 1	1 | 0 5 | 3	4 | 1 5 | 5	0 | 0 2 | 2	1 | 0 4 | 3	0 | 1 5 | 6	1 | 1 6 | 6	0 | 1 3 | 6	0 | 0 5 | 7	0 | 0 5 | 6
	Female	0 | 1 4 | 4	2 | 0 7 | 6	1 | 2 7 | 5	0 | 0 7 | 8	1 | 1 8 | 7	0 | 0 6 | 4	1 | 0 7 | 6	1 | 0 4 | 0	3 | 4 8 | 8	3 | 0 7 | 5	1 | 2 6 | 7	0 | 1 5 | 5



dependent variable must be considered. Such procedure allows for examination of interactions within each dependent variable. The results for each of the dependent variables in this interaction are presented in Table 4.3.

Table 4.3

"Step Down F" Analysis of Variance for the Effect of Race of Tester X Socioeconomic Level X Grade for each Dependent Variable

Dependent Variable	Between Mean Squares	d.f.	Step Down F	Significance Level
Novelty	1.89	1	1.99	.18
Mode of Response	2.33	1	.97	.41
Novelty X Mode of Response	4.65	1	5.32	.03

The interaction of the two dependent variables (novelty and mode of response) with race of the tester, socioeconomic background and grade of the subject accounts for the significant interaction. The Step Down F ratio associated with the interaction of novelty of the incidental stimulus item and mode of response used by the subject was found to be 5.32, which, with 1 and 11 degrees of freedom, was significant at the .03 level of probability. Table 4.4 contains the mean values for each cell associated with the dependent variables. Fig. 4.1 is a graphic presentation and description of the associated cell means.

The second significant interaction found was that of race of tester, socioeconomic background, and sex of the subject (See Table 4.1). Examination of the Step Down F test for each of the dependent variables

Table 4.4

Kindergarten, First and Second Grades
Table of Means - Incidental Learning
Race of Tester X SES X Grade X (Novelty X Mode of Response)

	Black Tester				White Tester			
	Lower		Middle		Lower		Middle	
	Com	Uncom	Com	Uncom	Com	Uncom	Com	Uncom
Kindergarten Recall	.25	.50	.00	.25	.75	.00	.75	.50
Kindergarten Recog.	3.75	4.25	5.00	4.25	4.75	4.75	4.50	5.00
First Grade Recall	.75	.50	.50	.25	1.00	.00	1.75	1.75
First Grade Recog.	4.50	2.00	4.25	3.75	5.50	5.50	7.00	5.00
Second Grade Recall	.50	.75	.75	1.00	.00	.25	1.50	1.00
Second Grade Recog.	5.00	5.00	5.50	3.50	4.50	4.25	6.00	6.50

in this interaction will similarly be used to examine the main effects of the dependent variables. The results of the Step Down F tests for each of the dependent variables as these are affected by the interaction are presented in Table 4.5.

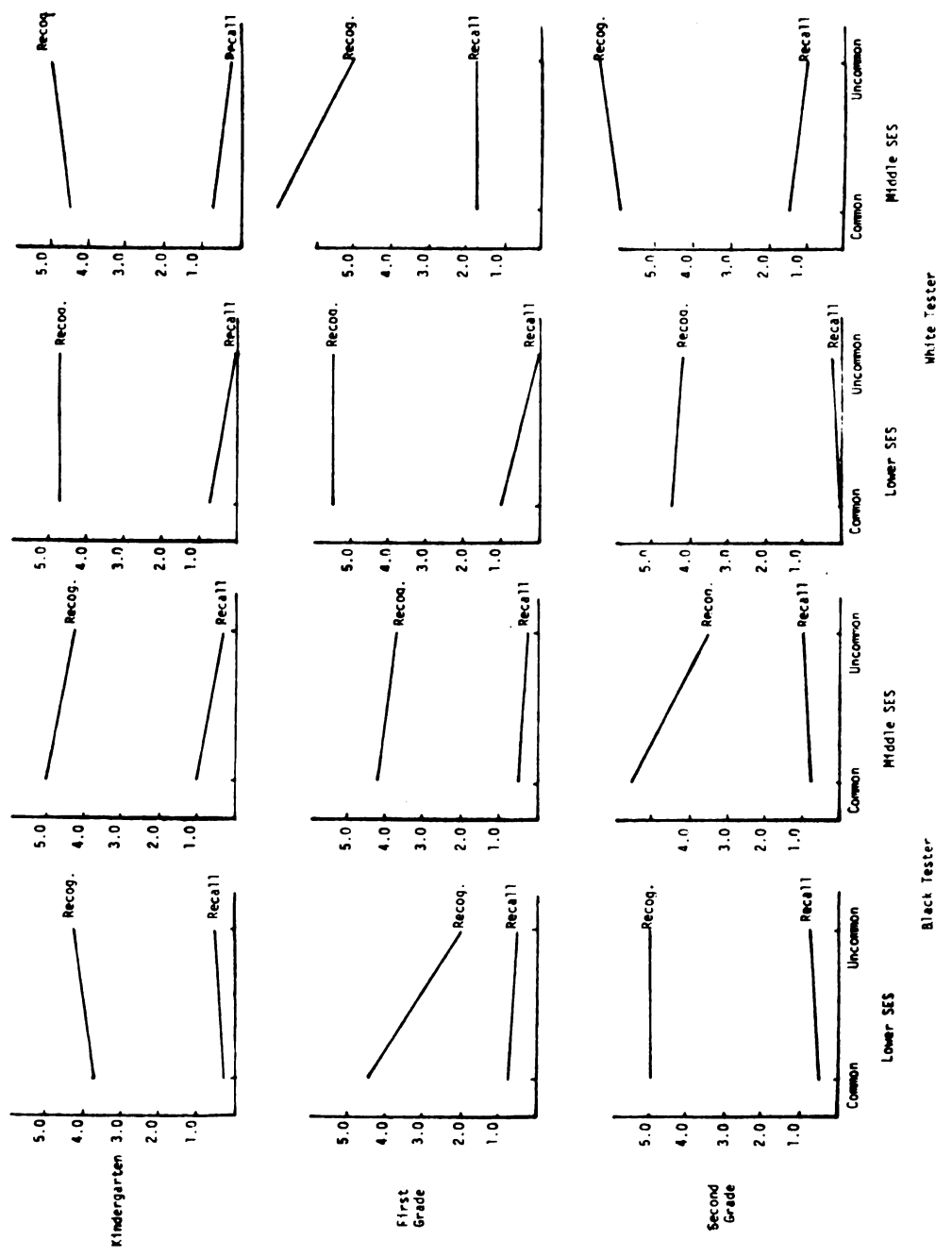
Table 4.5

"Step Down F" Analysis of Variance for the Effect of
Race of Tester X Socioeconomic level X Sex for each Dependent Variable

Dependent Variable	Between Mean Squares	d.f.	Step Down F	Significance Level
Novelty	3.80	1	3.99	.07
Mode of Response	,88	1	,65	.44
Novelty X Mode of Response	.42	1	8.74	.02

Fig. 4.1

Interaction of Race of Tester, SES, and Grade Level of Subject on Mode of Response and Novelty of Incidental Stimulus Material



The interaction of the two dependent variables (novelty and mode of response) with race of tester, socioeconomic background, and sex contributes most to the significant interaction. The Step Down F ratio associated with the interaction of novelty of the incidental stimulus item and mode of response of subject was found to be 8.74, which, with 1 and 11 degrees of freedom, was significant at the .01 level of probability. The mean values of the cells associated with the interaction are presented in Table 4.6. Fig. 4,2 is a graphic presentation of these results.

Table 4.6

Kindergarten, First and Second Grades
Table of Means - Incidental Learning
Race of Tester X SES X Grade X (Novelty X Mode of Response)

		Black Tester				White Tester			
		Lower		Middle		Lower		Middle	
		Com	Uncom	Com	Uncom	Com	Uncom	Com	Uncom
Males	Recall	.50	.33	.30	.16	.33	.16	1.50	.50
	Recog.	4.16	3.67	4.67	3.83	3.83	4.50	5.00	4.83
Females	Recall	.50	.83	.83	.83	1.00	.16	1.16	1.66
	Recog.	4.50	3.83	3.83	3.83	6,00	5.00	6.66	6.66

While the multivariate main effects of the independent variables grade, socioeconomic background, race, sex, and race of tester could not be interpreted because of the higher order interactions, some insight into the contribution of each can be gained from an examination of Table 4.7. This display represents the results of a univariate test

Fig. 4.2

Interaction of Race of Tester, SES, and Sex of Subject on Mode of Response and Novelty of Incidental Stimulus Material

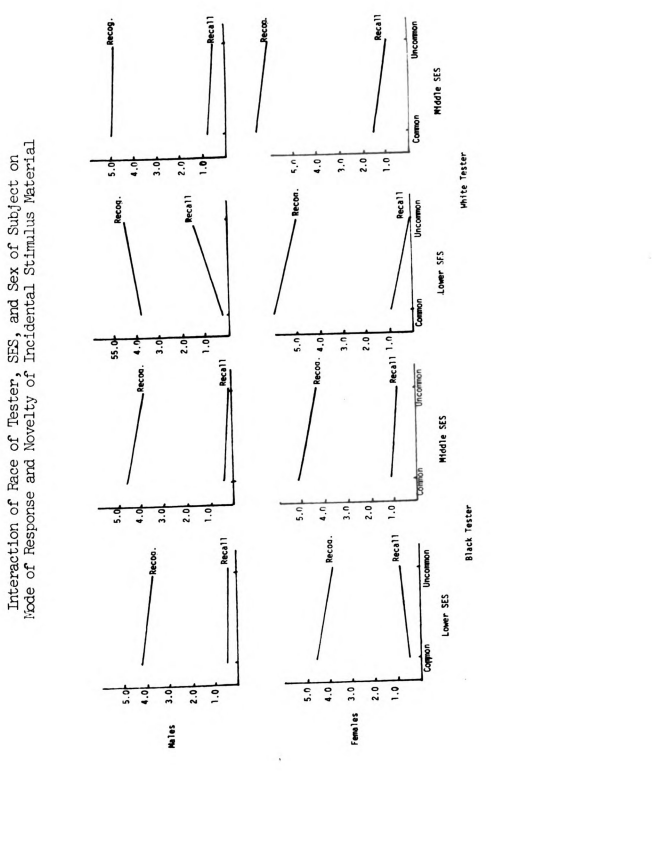


Table 4.7

Univariate Analysis of Variance of Incidental Learning Scores

	F Test for Analysis of Variance of Incidental Learning Scores			
	Mean Squares	d.f.	F	Significance
Ts (Race of Tester)	18.13	1	4.66	.05**
Ses (Socioeconomic level)	10.55	1	2.71	.13
Sx (Sex)	18.13	1	4.66	.05**
R (Race)	3.80	1	.98	.34
G (Grade)	1.65	2	.42	.67
Ts X Ses	3.80	1	.98	.34
T X Sx	3.26	1	.84	.38
T X R	.13	1	.03	.86
T X G	6.40	2	1.64	.24
Ses X Sx	.03	1	.16	.70
Ses X R	9.63	1	2.48	.14
Ses X G	1.00	2	.26	.78
Sx X R	1.50	1	.39	.55
Sx X G	6.02	2	1.54	.26
R X G	4.56	2	1.17	.35
T X Ses X Sx	.005	1	.001	.97
T X Ses X R	3.80	1	.98	.34
T X Ses X G	4.56	2	1.17	.35
T X Sx X R	4.38	1	1.13	.31
T X Sx X G	3.58	2	.92	.43
T X R X G	2.27	2	.58	.57

Table 4.7 contd.

	F Test for Analysis of Variance of Incidental Learning Scores			
	Mean Squares	d.f.	F	Significance
Ses X Sx X R	1.51	1	.39	.55
Ses X R X G	1.40	2	.36	.71
Ses X Sx X G	2.77	2	.71	.51
Sx X R X G	1.08	2	.28	.76
Error		11		= .05

of the independent variables with a single dependent measure resulting from a pooling of the dependent measures, recall and recognition across common and uncommon items.

While these become merely gross indicators of effects of the variables on incidental learning, cursory examination reveals that considered across all dependent measures, race of tester and sex of subject account significantly for variation in the scores; irrespective of socioeconomic background, grade placement, and race. Race of the tester resulted in a univariate F value of 4.66 which is found to be significant at $p = .05$ when evaluated with 1 and 11 degrees of freedom. Sex of the subject, also with a univariate F value of 4.66 evaluated with 1 and 11 degrees of freedom is also found to be significant at the .05 level of probability.

With the foregoing results in mind, the results of tests of the hypotheses of interest in the study are presented. The hypotheses will be examined in the context of the significant interactions, or in the context of the univariate table (Table 4.7). The results will be

discussed in terms of differences found between mean values on the independent variables. Because of the significant interactions, levels of significance cannot be attached to these differences.

Incidental Learning Research Hypotheses

H_1: There will be no significant differences between the recall and recognition scores of children in the kindergarten, first, and second grades.

The hypothesis of no difference between grades on recall and recognition of the stimulus items was rejected. Examination of Table 4.8 and Fig. 4.3 presents the recall and recognition mean scores of each grade averaging the common and uncommon items scores.

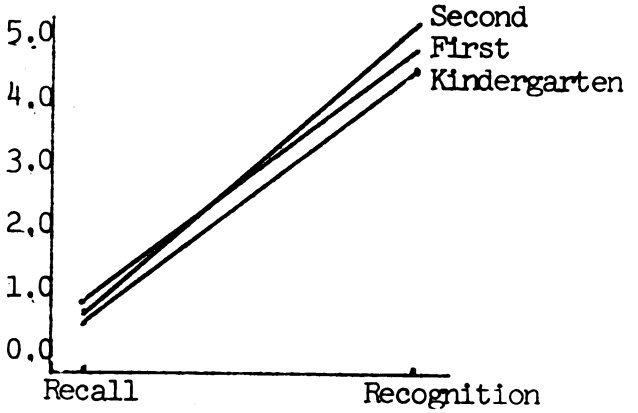
Table 4.8

Table of Means for Grades on Recall and Recognition

	Recall	Recog.
Kindergarten	.50	4.53
First Grade	.81	4.68
Second Grade	.72	5.09

Fig. 4.3

Interaction of Grade on Recall and Recognition



The difference between the average recall and recognition mean scores for kindergarten ($\bar{X}$ = .50 and 4.53) and first grade ($\bar{X}$ = .81 and 4.68) is .31 and .15 respectively with first graders scoring higher. The difference between first grade ($\bar{X}$ = .81 and 4.68) and second grade ($\bar{X}$ = .72 and 5.09) was -.09 for recall and .41 for recognition. In comparing the recall scores between first and second grades, however,

the difference was .08 in favor of first grade but .41 in favor of the second grade.

H_2: There will be no significant difference between the incidental learning recall and recognition scores for children from lower versus middle socioeconomic home environments.

As can be seen in both Figs. 4.1 and 4.2, irrespective of grade level and tester, children from middle socioeconomic homes performed better on recall of common and uncommon objects than children from lower socioeconomic home environments. This was also true for their recognition scores of common as well as uncommon objects. Table 4.9 and Fig. 4.4 illustrate this difference.

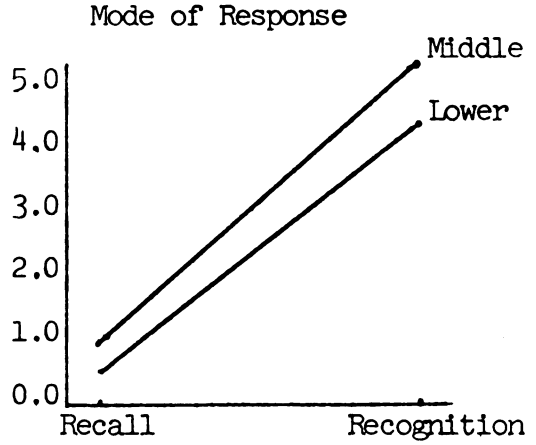
Table 4.9

Table of Means for SES level on Mode of Response

	Recall	Recog.
Lower SES	.44	4.24
Middle SES	.92	5.06

Fig. 4.4

Interaction of SES level on Mode of Response



The mean difference between recall scores for the lower ($\bar{X}$ = .44) and middle ($\bar{X}$ = .92) socioeconomic levels was .48 in favor of middle socioeconomic level children, while respective mean scores on recognition were 4.24 and 5.06, resulting in a mean difference of .82,

also in favor of middle class children.

H_5: There will be no significant difference between the common versus uncommon incidental learning scores of children from lower and middle socioeconomic home environments.

Table 4.10 and Fig. 4.5 gives the means and diagramatic presentation of the mean scores relative to this hypothesis.

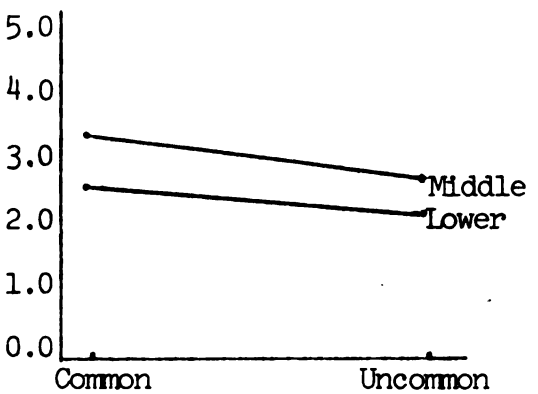
Table 4.10

Table of Means for SES level on Novelty of Items

	Common	Uncommon
Lower SES	2.60	2.32
Middle SES	3.20	2.77

Fig. 4.5

Interaction of SES level and Novelty of Items



As can be seen, children from middle socioeconomic home environments performed at a higher level on response to both common and uncommon items than did their lower socioeconomic counterparts. While scores on common items were higher for both groups, and those on uncommon were somewhat lower, the mean difference between scores on common items for lower ($\bar{X}$ = 2.60) and middle ($\bar{X}$ = 3.20) correct responses was .40. Both differences were in favor of the children from middle socioeconomic homes.

H_6: There will be no significant differences between recall versus recognition scores of commom versus uncommon items for children from lower and middle socioeconomic home environments.

Table 4.11 and Fig. 4.6 present the effects for the cells associated with the recall and recognition of common and uncommon items by children from lower and those from middle socioeconomic backgrounds.

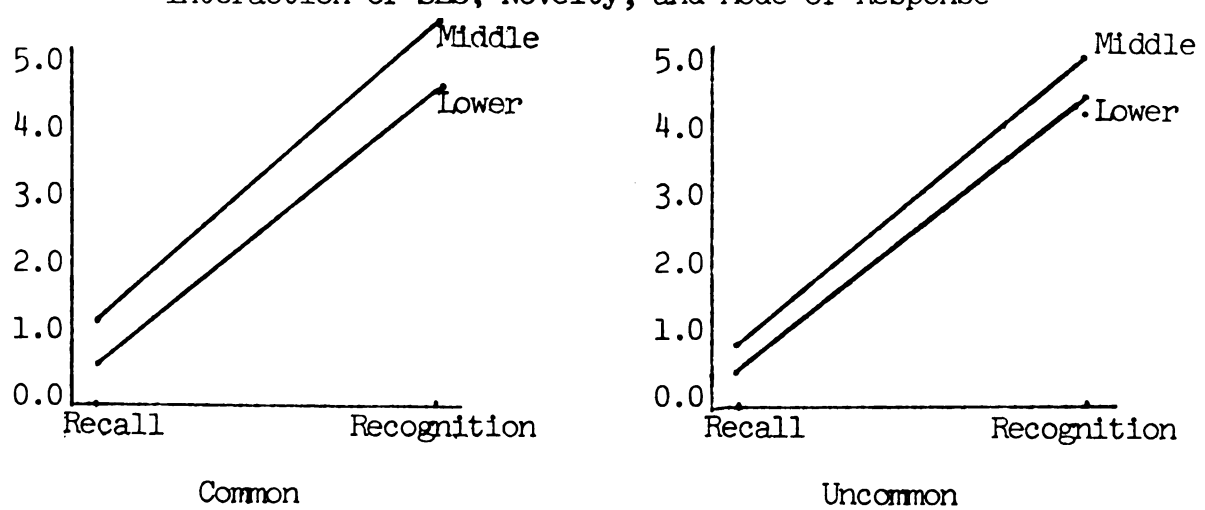
Table 4.11

Effects Associated with SES Differences on Recall and Recognition of Common and Uncommon Items

	Recall		Recognition	
	Common	Uncommon	Common	Uncommon
Lower SES	.60	.37	4.62	4.25
Middle SES	1.12	.79	5.37	4.79

Fig. 4.6

Interaction of SES, Novelty, and Mode of Response



As indicated in Fig. 4.6, while all scores on common items fall somewhat above those for uncommon items when mean scores are compared

between recall of common items, middle socioeconomic children ($\bar{X}$ = 1.12) score .52 points above that for lower socioeconomic children ($\bar{X}$ = .60). A slightly lower difference, that of .42,is obtained in favor of the same group when scores for uncommon items are being considered. When subjects are required instead to recognize the items, the corresponding mean difference, also in favor of middle socioeconomic children are .75 and .54 respectively.

H_7: There will be no significant difference between the recall versus recognition incidental scores for female versus male subjects.

There are apparent sex differences between males and females on their scores in incidental learning as obtained by both recall and recognition. The univariate test of incidental learning also supports such a finding when mode of response is not a consideration (See Table 4.7). At F = 4.66, and with 1 and 11 degrees of freedom, the hypothesis of no difference due to sex of the subject across all dependent measures was rejected at a probability level of .05.

As can be observed in Table 4.12 and Fig. 4.7, the mean recall

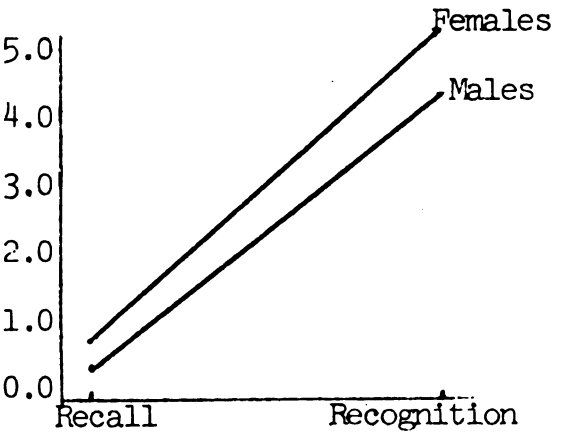
Table 4.12

Table of Means for Sex and Mode of Response

	Recall	Recog.
Males	.49	4.10
Females	.91	5.21

Fig. 4.7

Interaction of Sex and Mode of Response



score for girls ($\bar{X}$ = .91) was almost twice as much as that for boys ($\bar{X}$ = .49). There was an even more marked difference in their mean recognition scores. The average for girls ($\bar{X}$ = 5.21) surpassed that for boys ($\bar{X}$ = 4.10) by 1.11 points.

H_8 : There will be no significant difference between the incidental learning scores of black versus white children assigned to black and white testers.

On the univariate test of incidental learning scores, the F ratio for this interaction was .86, which, with 1 and 11 degrees of freedom, was not significant. The null hypothesis of no significant interaction between race of tester and race of subject was not rejected.

H_9: There will be no significant difference between the incidental learning scores of children from lower versus middle socioeconomic home environments when assigned to black and white testers.

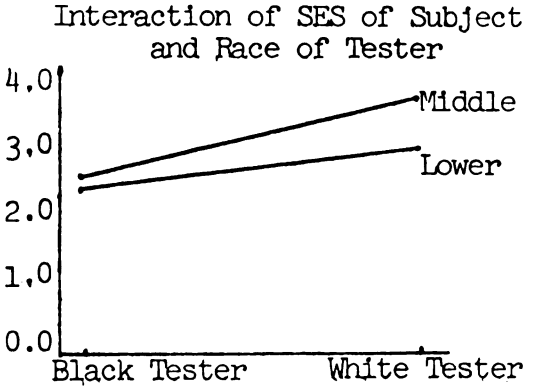
The mean scores associated with incidental learning of lower and middle socioeconomic children as these are related to race of tester are given in Table 4.13, and graphed in Fig. 4.8.

Table 4.13

Table of Means for SES and Race of Tester

	Black Tester	White Tester
Lower SES	2.31	2.60
Middle SES	2.50	3.44

Fig. 4.8



As can be observed in Fig. 4.8, lower ($\bar{X}$ = 2.31) and middle ($\bar{X}$ = 2.49) socioeconomic level subjects had almost identical mean scores when assigned to a black tester. But when assigned to a white tester, middle class subjects ($\bar{X}$ = 3.44) had considerably higher mean scores than did lower class subjects ($\bar{X}$ = 2.60).

Section II - Intentional Learning

The second group of hypotheses pertained to a comparison of the intentional scores of the experimental group whose instructional material also contained incidental material, and the control group whose instructional material did not contain incidental material. A univariate analysis of variance was used to analyze this data.

Partial results of this univariate analysis of variance is presented in Table 4.14. (See Appendix C for complete Table of results). The corresponding mean intentional learning scores from which the results were obtained are also presented in Table 4.15. Below are presented the results of the tests as they reflect the hypotheses of interest in this portion of the study.

Intentional Learning Research Hypotheses

H_1: There will be no significant differences in the intentional learning scores of kindergarten, first, and second grade children who were simultaneously exposed to intentional and incidental stimuli versus those who were exposed only to intentional stimulus material.

A univariate F ratio of 1.01 was computed and found not to be significant at the .05 probability level with 2 and 13 degrees of freedom.

Table 4.14

Partial Univariate Analysis of Variance of Intentional Learning Scores to Show Effect of Inclusion of Incidental Stimulus Material

Type of Variance Tested	F Test for Analysis of Variance of Intentional Learning				
	Sums of Squares	d.f.	Mean Squares	F	Significance Level
T	.51	1	.51	.18	.67
T X Ts	7.59	1	7.59	2.75	.12
T X Ses	.01	1	.01	.003	.95
T X Sx	.26	1	.26	.09	.76
T X R	1.76	1	1.76	.64	.44
T X G	5.58	2	2.79	1.01	.39
T X Ts X Ses	.09	1	.09	.03	.86
T X Ts X R	.51	1	.51	.18	.67
T X Ses X Sx	.09	1	.09	.03	.86
T X R X Sx	8.76	1	8.76	3.17	.10
T X R X G	5.58	2	2.79	1.01	.39
S: T X Ts X Ses X R X Sx X G	35.93	13	2.76	α = .05	

T = Treatment Grous
Ts = Tester
Ses = Socioeconomic background
Sx = Sex
R =Race
G = Grade level

Table 4.15

Intentional Learning Scores (one per cell)

N = 96

Treatment:		Intentional + Incidental												Intentional Only											
Race:		Black						White						Black						White					
Grade:		K		1		2		K		1		2		K		1		2		K		1		2	
SES:		M	L	M	L	M	L	M	L	M	L	M	L	M	L	M	L	M	L	M	L	M	L	M	L
Race of Tester:	Sex																								
Black	Male	6	6	4	6	8	6	8	0	7	7	8	5	5	3	7	3	7	9	6	1	8	4	6	8
	Female	4	5	7	5	5	7	9	6	9	6	10	9	7	6	7	5	7	4	4	3	9	8	8	10
White	Male	6	5	7	5	6	5	3	5	9	5	8	5	6	5	7	3	9	7	8	2	8	8	9	10
	Female	5	4	6	6	8	6	7	2	5	7	8	7	7	6	8	6	7	8	5	1	4	7	8	7

Therefore, the null hypothesis of no significant interaction between treatment conditions and grade level was not rejected. Table 4.16 presents the mean intentional learning scores for experimental and control groups within each grade level along with a graphic presentation of the results in Fig. 4.9.

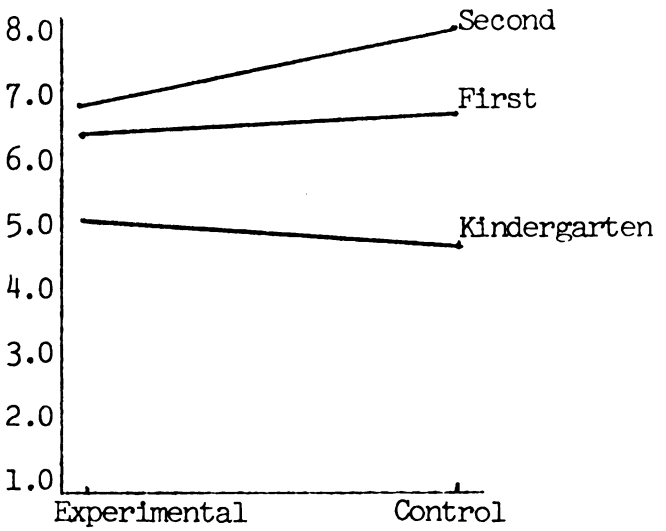
Table 4.16

Table of Means for Grade and Treatment Group

	Experimental	Control
Kinder-garten	5.06	4.69
First grade	6.31	6.37
Second grade	6.94	7.75

Fig. 4.9

Interaction of Grade Level and Treatment Group



H_2: There will be no significant difference between the intentional learning scores of children from lower and middle socioeconomic home environments who were simultaneously exposed to intentional and incidental stimuli versus those who were exposed only to intentional stimulus materials.

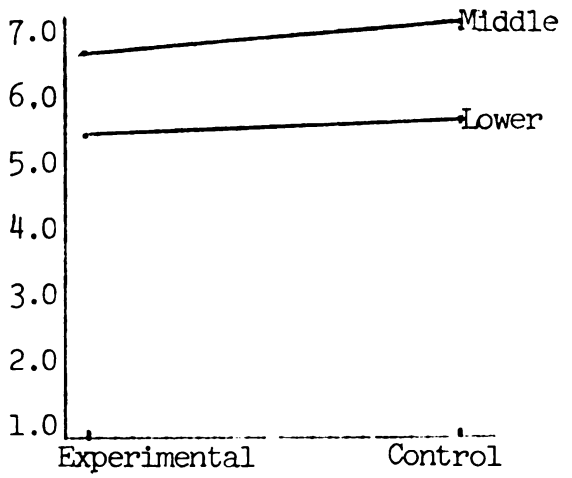
The hypothesis of no significant difference was not rejected since the interaction of socioeconomic level and treatment group yielded an F value of .003 and was not significant at the .05 probability level with 1 and 13 degrees of freedom.

Fig. 4.10

Table of Means for SES and Treatment Group

	Experimental	Control
Lower SES	5.42	5.58
Middle SES	6.79	6.96

Interaction of SES and Treatment Group



Looking at Fig. 4.10 and the associated Table 4.17, it can be seen that the overall mean for middle socioeconomic level children exceeded that of the means for children from lower socioeconomic homes. However, the differences between the lower socioeconomic level experimental group ($\bar{X}$ = 5.42) and control group ($\bar{X}$ = 5.58) was only .16. The corresponding scores for children from middle socioeconomic homes was $\bar{X}$ = 6.79 and $\bar{X}$ = 6.96, yielding an almost identical difference as that for the lower socioeconomic group of .17.

H_3: There will be no significant difference between the intentional learning scores of black and white children who were simultaneously exposed to intentional and incidental stimuli versus those who were exposed only to intentional stimulus materials.

There was not a statistically significant difference (F = .64, d.f. = 1 and 13) between black and white children in their intentional

learning scores, therefore the null hypothesis of no difference was not rejected. As observed in Table 4.18 and Fig. 4.11, while white subjects

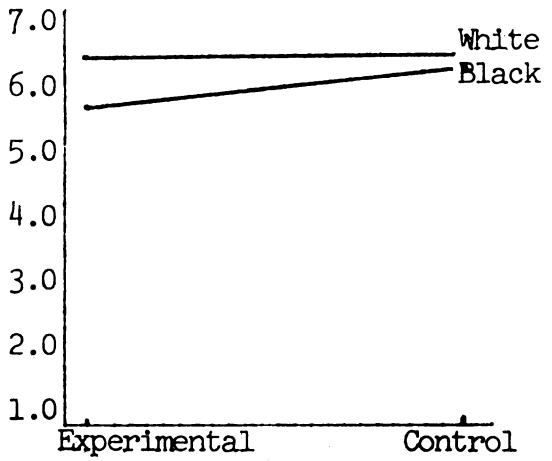
Table 4.18

Table of Means for Race and Treatment Group

	Experimental	Control
Black	5.75	6.20
White	6.45	6.30

Fig. 4.11

Interaction of Race and Treatment Group



scored slightly higher than blacks in both the experimental and control groups, the difference between the scores of white children in the Experimental ($\bar{X}$ = 6.45) and Control ($\bar{X}$ = 6.30) groups was not significantly different from the scores of black children ($\bar{X}$ = 5.75 and 6.20) in the two respective groups.

Section III--Relation of Incidental to Intentional Learning

Pearson Product Moment correlation coefficients were computed between intentional learning scores obtained on the test and corresponding incidental scores as obtained by recall and recognition of common and uncommon items and combinations of these were calculated within each grade. (See Appendix D for all inter-test correlations). Examination of Table 4.19 reveals that all correlations for incidental (except for common recall which is not significant) with intentional scores are of a magnitude

Table 4.19

Correlation of Intentional with Incidental Learning Scores for Kindergarten, First, and Second Grades in Order of Magnitude

Kindergarten		First Grade		Second Grade	
Total incidental	.66**	Common Recog	.34	Common Recog	.39*
Com + Uncom Recog	.64**	Com Rcl + Recog.	.29	Com + Uncom Recog	.38*
Uncom Recog.	.62**	Common Recall	.13	Total Incidental	.37*
Com + Uncom Recall	.56**	Com + Uncom Recog.	.10	Uncom Recall	.33
Common Recog.	.50**	Total Incidental	.06	Com + Uncom Recall	.33
Uncom Recall	.47**	Com + Uncom Recall	-.02	Com Rcl + Recog.	.32
Uncom Rcl + Recog	.47**	Uncommon Recog	-.09	Uncom Recog.	.29
Com Rcl + Recog	.47	Uncommon Recall	-.17	Com + Uncom Recall	.14
Common Recall	.29	Uncom Rcl + Recog	-.17	Common Recall	-.04

** α = .01

* α = .05

acceptable at a probability level of .01 for kindergarten subjects. During the first grade, correlations are low or negative, but not significant At the second grade level, the coefficients again begin to increase. However, only common recognition, common and uncommon recognition, and total incidental scores are significantly correlated with intentional learning scores, and these at a level of significance of .05. The order of magnitude of the correlations are also not consistent across or between grades.

Section IV - Relation of Incidental Learning to Achievement

The usual relation between intelligence, intentional learning, and standardized achievement test scores would lead one to expect a possible relationship between incidental learning and achievement.

In presenting the results of this portion of the analysis, incidental learning of common and uncommon materials as responded to by tests of recall and recognition of the items are each treated separately as dependent variables. Intentional learning as a dependent variable is also considered. The Metropolitan Readiness test scores for Kindergarten and the Stanford Achievement test scores for first and second grades were used as the independent variables. The Pearson Product Moment correlation coefficients for these tests with the four measures of incidental learning and one for intentional learning are presented in Table 4.20.

Metropolitan Readiness test scores were available for all but a single child of middle socioeconomic background. Stanford Achievement test scores were available for all children in first and second grades from lower socioeconomic homes (N= 16) respectively. Correlation coefficients must therefore be interpreted with such considerations.

Only three of the correlations were found to be significant. Recognition of uncommon incidental stimulus materials was positively (.42, $p = .05$) correlated with Metropolitan Readiness scores for kindergarten children. Also, recognition of common incidental stimulus material was negatively (-.65, p. = .01), and recall of uncommon stimulus material was positively (.52, $p = .05$) correlated with Stanford Achievement test scores for first grade subjects. None of the remaining correlations for the first grade or kindergarten and none for the second grade were significant; nor was an overall trend evident in the pattern of correlations.

Table 4.20

Correlation of Incidental and Intentional with Achievement Test Scores for Kindergarten, First, and Second Grades in Order of Magnitude

Metropolitan Readiness		Stanford Achievement			
Kindergarten (N = 31)		First Grade (N = 17)		Second Grade (N = 19)	
Uncom Recog	.42	Uncom Recall	.52*	Com Recall	.38
Uncom Recall	.22	Uncom Recog.	-.20	Common Recog	.04
Common Recog.	.22	Intentional	-.35	Uncom Recog.	-.12
Intentional	-.01	Common Recall	-.36	Uncom Recall	-.39
Common Recall	-.03	Common Recog.	-.65*	Intentional	-.40

The number of cases on which these correlation coefficients are based varies due to missing data for some subjects. Stanford Achievement test data were available only for all children comprising the lower class samples. For kindergarteners, coefficients of .35 and .45 are needed for $p < .50$ and $p < .01$ respectively; for first graders, coefficients of .46 and .58 are needed for $p < .05$ and $p < .01$ respectively. For second graders, coefficients of .43 and .55 are needed for $p < .05$ and $p < .01$ respectively. The maximum number of cases possible in each group was kindergarten, 32; first grade, 32; and second grade, 32.

Summary of Results

The major findings can be summarized as follows:

A. Incidental Learning

Significant multivariate higher order interactions between (a) race of tester, socioeconomic level and grade; and (b) race of tester, socioeconomic level and sex of subject prevented a direct interpretation of any of the hypothesized multivariate main effects or lower order interactions of the incidental learning scores. Instead, for all

but the tests using overall incidental scores as the dependent variable and which utilized a univariate test; and for tests which included race as a variable, the univariate tests of the subhypotheses were considered. The means were used to indicate variations in scores on the independent variables. Race of the subject did not contribute to any of the higher order interactions, thus hypotheses which included this variable could not be interpreted in any fashion.

The findings concerning incidental learning can be summarized as follows:

(1) There were differences across grades seen by recall and recognition of stimulus material. Such differences were generally in favor of the higher grades.

(2) Considered in conjunction with grade level, or sex and race of tester, children from middle socioeconomic home environments performed at a higher level on both recall and recognition of both common and uncommon objects.

(3) There are apparent sex differences on both recall and recognition of incidental items. The differences were consistently in favor of female subjects.

(4) Subjects assigned to black and white testers did not vary significantly in their incidental scores by racial identification. However, some variation associated with socioeconomic background was indicated in favor of children from middle socioeconomic homes assigned to a white tester, and children from lower socioeconomic backgrounds assigned to a black tester.

B. Intentional Learning

In the analysis of intentional learning scores between the experimental and control groups to grasp the effect of inclusion of incidental stimuli on an intentional task, hypothesis of no significant differences among grades, between socioeconomic backgrounds and race were all supported.

C. Relation of Incidental to Intentional Learning

In analyzing the relationship between incidental and intentional learning scores for all subjects divided by grades, the over-riding trend was found to be that of a significant positive correlation for kindergarteners; a low and often negative but non-significant correlation for first graders; with subsequent return to low (3 of 9 significant) but positive correlations for second graders.

C. Relation of Incidental Learning to Achievement

Metropolitan Readiness scores for kindergarten, and Stanford Achievement test scores for first and second graders were correlated with recall and recognition of common and uncommon incidental scores; and with intentional learning scores. Three correlations were found to be significant. For kindergarteners, recognition of uncommon items was positively ($p = .05$) correlated with Metropolitan Readiness scores. Recognition of common items was negatively ($p = .01$), and recall of uncommon items positively ($p = .05$) correlated with Stanford Achievement test scores for first graders. Stanford Achievement test scores for first and second graders were obtained almost entirely from the lower socioeconomic portion of the sample.

CHAPTER V

SUMMARY AND CONCLUSIONS

Purpose of the Study

This study was conducted to investigate the effect on incidental learning of grade level, socioeconomic level, and race, along with sex of the subject and race of the tester. Also examined were the correlations between incidental and (a) intentional, (b) Achievement test scores.

Literature Review

Three areas of investigations were reviewed in Chapter II. They were (a) experimental designs and studies of incidental learning concerned with the mentally retarded, developmental trends, race, social class, and preschool learning; (b) cognitive development during childhood; and (c) studies of race and social class factors related to achievement.

The findings concerning developmental trends in incidental learning are many, but contradictory in their results. Race and social class factors have only been minimally investigated with inconclusive findings though a great deal of support is offered for social class differences in school achievement and other related factors.

The present study is warranted by the inadequate and subsequently inconclusive nature of these results and the urgent need for education to consider more specifically than in the past "process variables" which appear to derive from social and economic disadvantagement and which may affect the learning of children in largely middle class oriented schools.

Design and Analysis of the Study

Ninety six subjects, categorized on the basis of grade, socio-economic level, race, and sex viewed slide presentations with accompanying narrative. For one half of the subjects, peripheral items were included in each slide which were unrelated to the story. Instructed to attend to the story, this group was later tested in addition on the recall and recognition of the peripheral common and uncommon items. The remaining half of the subjects were controls who viewed slides not containing the incidental material. The intentional learning scores of this group permitted a test of the effects of inclusion of incidental stimuli concurrently in an intentional task. The study controlled for effect of race of the tester by assigning an equal number of subjects to a black and a white experimenter.

The incidental learning scores were analyzed by a multivariate analysis of variance with repeated measures procedure. Intentional scores of the experimental and control groups were analyzed using a univariate analysis of variance procedure. Pearson Product Moment correlation coefficients were obtained for incidental scores with intentional and with Metropolitan Readiness (for kindergarten) and Stanford Achievement (for first and second grades) test scores.

Results

The major findings can be summarized as follows:

A. Incidental Learning

Significant multivariate higher order interactions prevented direct interpretations of lower order interactions or main effects of the variables in incidental learning. Utilizing the univariate tests of

dependent variables and means for the significant interactions, the findings concerning incidental learning can be summarized as follows:

(1) There was no difference across grades seen by recall or recognition of stimulus material.

(2) Considered in conjunction with grade level or sex and race of tester, children from middle socioeconomic home environments performed at a higher level on both recall and recognition , regardless of the novelty of the objects.

(3) There were apparent sex differences on both recall and recognition of incidental stimulus items in favor of females.

(4) There were no significant differences in the performance of subjects assigned to black versus white testers as a function of grade or race. Some variation associated with socioeconomic background was evident, however, in favor of children from lower socioeconomic backgrounds assigned to a black tester and children from middle socioeconomic backgrounds assigned to a white tester.

B. Intentional Learning

There were no significant variations in grade, socioeconomic background, or race on the intentional learning scores of subjects who were simultaneously exposed to intentional and incidental stimuli and those who were exposed only to intentional stimulus items.

C. Relation of Incidental to Intentional and Achievement Test Scores

(1) Incidental scores were positive and significantly correlated

with intentional scores for kindergarteners, showed low or negative, though nonsignificant correlations for first graders, and positive but with fewer correlations of significance for second graders.

(2) Correlations between incidental learning scores and scores on standardized achievement tests were inconsistent and generally nonsignificant.

Discussion

A. The Effect of Grade Level on Incidental Learning

The hypothesis of no relation between incidental learning and grade level was not supported by this study. The analysis indicated that first graders performed at a higher level particularly on recall and to a lesser extent on recognition than kindergarteners. However, comparing the mean scores for first and second graders, higher performance on recall also favored first graders while considerable difference on recognition was in favor of second grade children.

The linear relation of the incidental recognition scores and grade level supports a number of other studies of a developmental trend in incidental learning (Learner, 1967; Siegel, 1966). Learner, who investigated the effects of multiple presentation of the stimulus materials at grades 3, 6, and 9, also utilized an instructional slide presentation of words in which were included pictures as the incidental stimuli.

Another relevant study which may serve to elucidate the interaction between recall scores and grade level is that by Phye (1970). His study found no significant differences across grade levels when his stimuli were equated for verbal meaningfulness in a paired associate task.

Considering the otherwise general trend of increased scores on both recall and recognition of items between kindergarten and first as well as second graders, one may explain these findings in terms of developmental trends in perception, whereby the younger child does not ordinarily differentiate the parts of what he perceives (Gessell, 1949; Carmichael, 1964). He perceives largely in terms of context. This ability to extract or differentiate parts from an originally undifferentiated global perception develops gradually with increasing age.

This is illustrated by the findings of Mussen, Conger, and Kagan (1963) who illustrated that a four year old child shown a  will only express seeing a "design" or a "box with lines" in contrast to a seven year old who will claim to see "a black circle and some lines".

Such a relation suggests that, particularly at the younger age levels, incidental learning may increase as perception becomes more fully field-independent.

An oft cited distraction hypothesis (Maccoby and Hagan, 1969) would also be supported by the linear relation found between the incidental learning scores and grades, particularly the recognition scores. Here as the child grows older he becomes less distractable and more able to ignore task-irrelevant information (Maccoby and Hagan, 1969). The analysis also indicates a linear relation between grade and intentional scores. Maccoby and Hagan suggest that it would certainly not be reasonable to label all incidental learning as inefficiency in attention focusing, since perhaps for some age levels at least, the same cues which allow for "incidental learning" also facilitate central task performance.

Correlation computations between incidental and intentional scores

also showed high positive correlations for first grade. The correlation was generally low and often negative for first graders with a return to positive but mostly non-significant correlations at the second grade level. On the other hand, significant differences in intentional learning scores were in favor of the higher grade levels. These findings, in terms of efficiency and distraction, may well be the result of a high level of distractability resulting in efficient learning for the lowest grade and unimpaired efficiency at the higher grade levels.

B. The Effects of Race and Socioeconomic Level on Incidental Learning

A number of studies have in the past indicated race as well as social class differences in school learning and achievement. The present study, however, while it indicates variation in scores as a function of socioeconomic background, considered in the context of grade or sex and race of tester, differences are not indicated on either incidental or intentional scores when race of the subject is considered.

The differences found were also unrelated to the novelty of the items, indicating that children from lower socioeconomic backgrounds did not seem to be at a notable disadvantage in incidental learning of items uncommon to them. This finding does not, however, support those of the previous study in which white children did perform somewhat better on the recognition of incidental unfamiliar objects, while black children performed to a slight advantage on intentional recall. That study (Smith, Lezotte, and Schmidt, 1972) obtained both incidental and intentional scores in a situation in which subjects were instructed (intentional) or not instructed (incidental) to attend to the contents of a room. The study also engaged only a black tester.

C. The Effect of Sex on Level of Incidental Learning

While sex of the subject was not of primary interest in the study, it was found to partially contribute to one of the significant interactions. Averaged across the dependent variables, sex was calculated to be significant at the .05 level of probability with girls in all cases (irrespective of the race, socioeconomic background, novelty of the stimulus or mode of response) performing at a higher level than boys.

The findings support those of Hale, Miller and Stevenson (1968) over grades three, six, and seven. No studies of incidental learning in which sex, per se, had been a variable could be located.

The literature, however, strongly attests to sex differences in school achievement. These findings may be explained by two aspects in the present study which have also been given to explain such differences in school achievement. They include (a) females excell in the perception of details which require frequent shifts of attention, and (b) females have a better rote memory than males (Gari and Scheinfeld,1968).

In this regard, Caukins (1970), reviewing the literature on sex differences in learning characteristics of boys and girls, suggests that kinesthetic methods appear to be more appropriate for boys than a visual auditory approach. The present findings, in light of the task employed, lends support to such a position as well.

D. The Effect of Mode of Response on Incidental Learning

It appears to be generally accepted in the literature on learning that recall and recognition represent different forms or levels of abilities. Mode of response and novelty of the items interacted to

contribute significantly to both of the significant multivariate interactions involving both grade level and socioeconomic level and sex and socioeconomic level. This suggests that different modes of response may in fact be more difficult or affect the performance of some groups (i.e. as contrasted by (a) socioeconomic level, (b) sex) to a greater extent than others.

Recommendations for Education

The most important obvious implication derived from the present study is that it provides further support for the fact that children, in their early growth stages, may profit from their well known ability to attend to extraneous information.

Traditionally, the schools, and especially the elementary grades, have emphasized the focusing of the child's attention on a central task to the exculsion of all other information. While the former is desirable, during the early years in particular, the latter is essentially impossible to achieve.

Such under-development in span of attention and level of inquisitiveness may instead, be utilized to provide instructions which may serve as an introduction to future areas of instruction for example, working essentially as a preparative device.

The task performed by the subjects in the study utilized recall and recognition tests. The data indicated substantial differences in the ability of all the children to respond more appropriately by recognition. This indicates that most children may, in fact, particularly in relation to information learned incidentally, respond more favorably when such a method is used. Consequently, teachers should be aware of their students'

modal response levels and patterns so as to ensure that the method used in the attempt to achieve a desired change in the child is in fact congruent with the child's mode and level of information processing or information delivery appropriate to the task.

The correlations between incidental and intentional learning as well as incidental and achievement test scores resulted in part in generally non-significant results except for first graders. This may be indicative, in part, of incidental learning as an intellectual process which differs in some respects from that which determines learning as it is generally conceived of. It would appear (since one does not generally appear to predict the other) that incidental learning may well represent an unharnessed instructional imput. This being the case, one curricular implication which may be suggested is that educators consider the utilization of this type of learning in attempting to bridge the gap in providing instructions for groups in which other types of learning processes appear to be different.

Recommendations for Future Research

The present study raises some important questions which are suggested here for future research.

1. Race of Tester

While it is difficult to draw conclusive statements from significant contributions of race of tester in the interaction which also includes socioeconomic background of the subject, further investigation is suggested concerning

(a) the extent and nature of the relation between race of tester and socioeconomic background of the child.

Assuming the findings in this study not the result of differential personality factors between the two testers, a testable hypothesis may also be developed concerning

(b) methods of communication between lower socioeconomic adults and children, and teacher personality variables, e.g. warm and elaborating versus brief and directing.

The question is raised from consideration of literature concerning the didactic nature of communication in lower socioeconomic, and more specifically, communication patterns among members of black ethnocultural groups.

Also in this regard, and since much has been written concerning the effect on test performance of the tester; and since no information could be extracted which was related directly to that portion of the subject-experimenter encounter which was the source of the significant interaction, a study may be designed to investigate

(c) the source of the variation in the interaction between race of tester and subject, e.g. (1)instructional period, (b) testing period.

2. Inclusion of Incidental Stimuli in an Intentional Task

No significant effects were evidenced in the present study on intentional learning when incidental material was simultaneously included in the task. Three questions in this regard which appear to be appropriate for further investigation in an effort to assess the benefits which may be forthcoming from this mode of learning, however, are

(a) What is the nature of intentional learning tasks in which incidental learning material may be simultaneously presented without undesirable effects to the intentional task?

The human organism is capable of responding to limited imputs from more than a single source. One would speculate that while the present amount and quality of incidental material used in this study was not sufficient to produce negative effects on the intentional learning scores of subjects exposed to both intentional and incidental material, some optimum amount of incidental stimuli might be appropriate, beyond which a decline in intentional learning may be expected. A relevant question then becomes

(b) What is the optimum amount of incidental stimuli which may be presented simultaneously with an intentional task before undesirable (e.g. distracting) effects are evidenced on intentional learning?

A third question may also be related to

(c) What medium of sense perception is most responsive to incidental stimulation?

From an entirely different perspective, it appears that the concepts of both curiosity and cognitive dissonance may well be two factors which are at least peripherally related to an incidental learning capacity. Unrelated stimuli in an intentional task may be viewed as producing cognitive dissonance when the child attempts to process information related to an intentional task. Also considering the physical environment of children of different socioeconomic environments, two questions of interest become

(d) What, if any relationship exists between socioeconomic background and cognitive dissonance?

(e) What, if any, relationship exists between socioeconomic background and level of curiosity?

Such indicators of suitable tasks for simultaneous inclusion of incidental material, the optimum quantity of such stimuli, medium of presentation most appropriate, and other factors which may influence incidental learning would be most helpful to educators in enhancing such a learning process.

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APPENDICES

Appendix A

1. Story Used (Making Friends) in Experiment

2. Slides Viewed by Control Group
   (Intentional Learning Only)

3. Slides Viewed by Experimental Group
   (Intentional + Incidental Learning)

4. Test Foils of Incidental Learning

5. Test Questions for Intentional Learning

MAKING FRIENDS

(Slide 1/A)

Amy and Danny were two children who lived in another country. Some people had farms, but there were no cities.

(Slide 2/B)

Their father hunted for much of the food which they ate.

The children enjoyed going into the woods when their father hunted. It was always so pretty there.

(Slide 3/C)

They always brought back something different with them; and they always hoped they would find something new - something they had never seen before.

They would look and look until it was time for them to go home.

(Slide 4/D)

One day, they both became very

surprised when they thought they heard a strange sound.

They listened carefully.

(Slide 5/F)

They heard something which sounded like a whistle.

But what could it be? they wondered.

They could see nothing.

(Slide 6/G)

They heard the sound again..... They looked around and around.

They were even a little afraid, but they did not run away.

They kept very still.

(Slide 7/H)

Amy and Danny hid behind a tree and listened carefully.

They both kept very quiet.

It was really a whistle, and it sounded even closer than before.

(Slide 8/H)

Then right at the end of a little pathway, they saw someone.

He was little; and ragged; and looked frightened.....

He carried a monkey in his arms!

(Slide 9/I)

The children came out of their hiding place.

They were no longer afraid.

They were very friendly, and went over to talk with the little boy.

(Slide 10/J)

He was tired and hungry, and so was his little friend.

He had been blowing his whistle hoping someone would hear him.

(Slide 11/K)

He was lost from his parents who travelled from place to place with a circus.

The little boy's name was Chip.

(Slide 12/L)

The children took Chip home with them.

Amy and Danny's parents were glad they had been so kind.

(Slide 13/M)

It was not long before Chip was clean and wearing some dry clothes.

While the mother fixed something for the children to eat, the father went to the nearest town to try to find Chip's parents.

(Slide 14/N)

Chip felt better. He was no longer alone.

He had found friends who would help him find his own parents.

(Slide 15/O)

Soon the father called.

He had found Chip's parents. Chip was very happy!

He played with Amy and Danny until his parents came to get him.

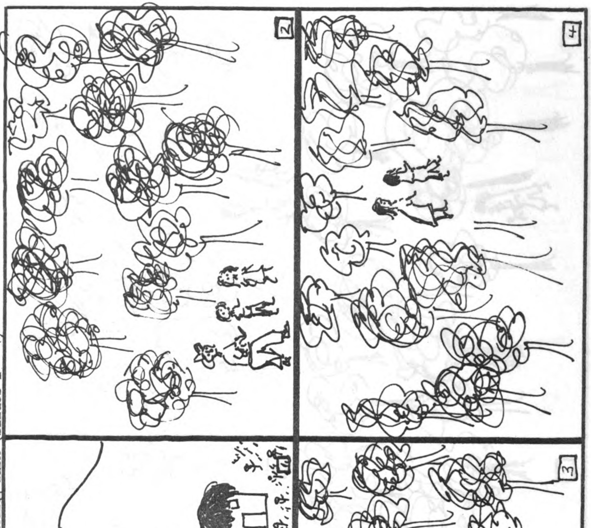
(Slide 16/P)

Chip's parents invited Amy and Dannv to visit Chip's home during their next holiday.

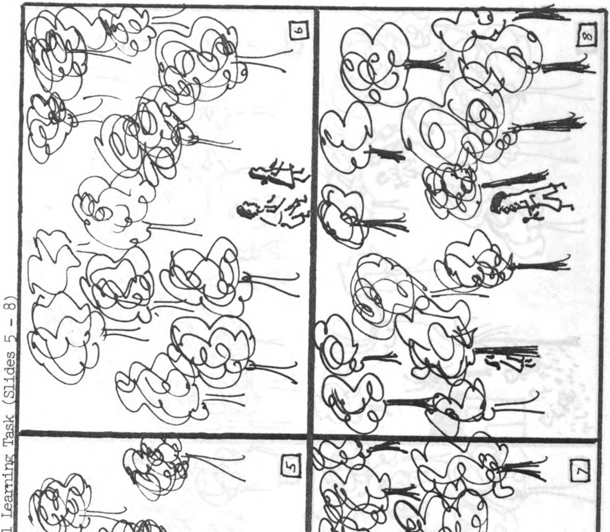
Amy and Danny were very happy.

End.

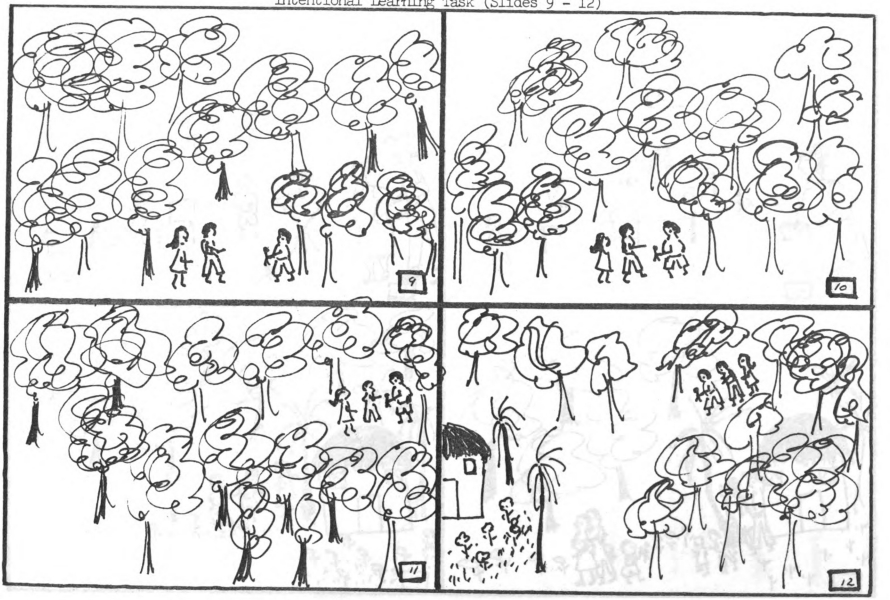
Intentional Learning Task (Slides 1 - 4)



Intentional Learning Task (Slides 5 - 8)

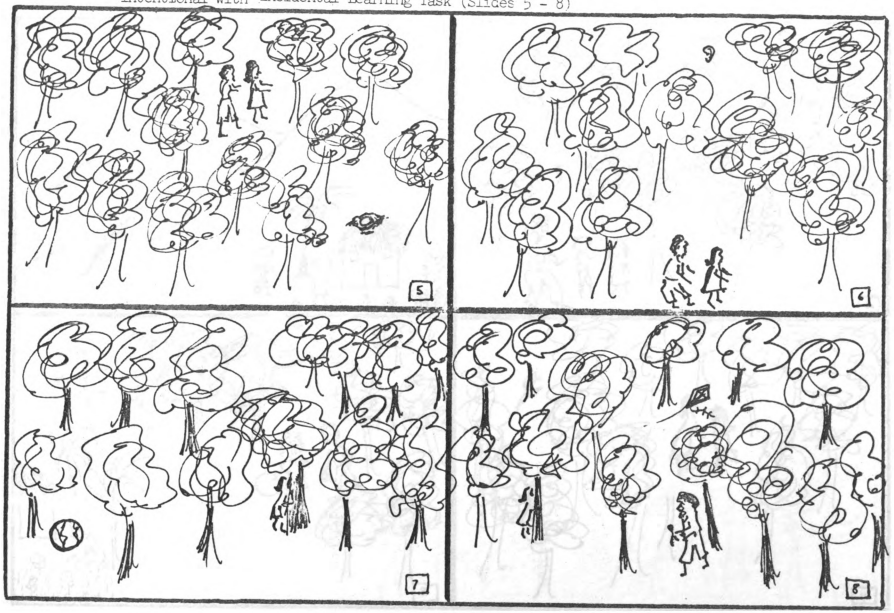


Intentional Learning Task (Slides 9 - 12)

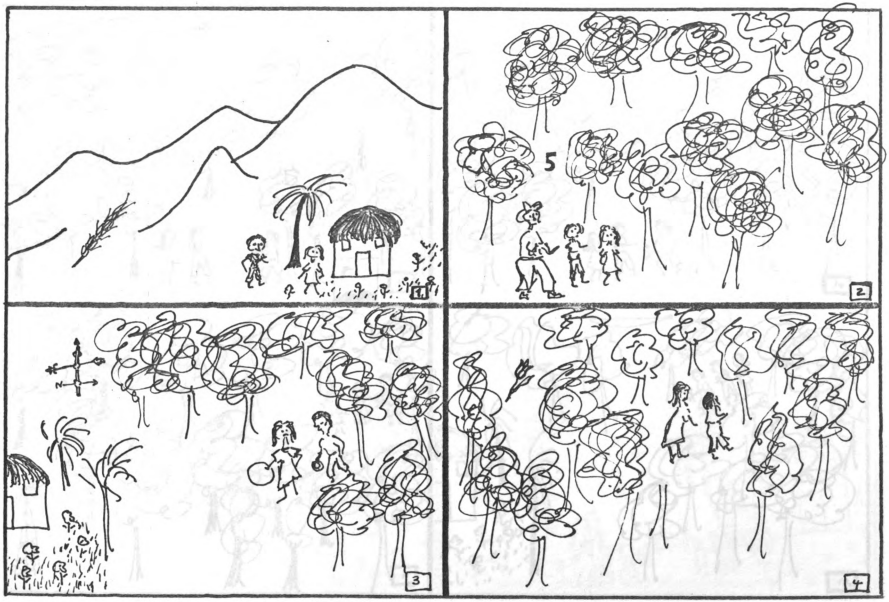


Intentional Learning Task (Slides 13 - 16)

Intentional with Incidental Learning Task (Slides 5 - 8)



Intentional with Incidental Learning Task (Slides 1-4)



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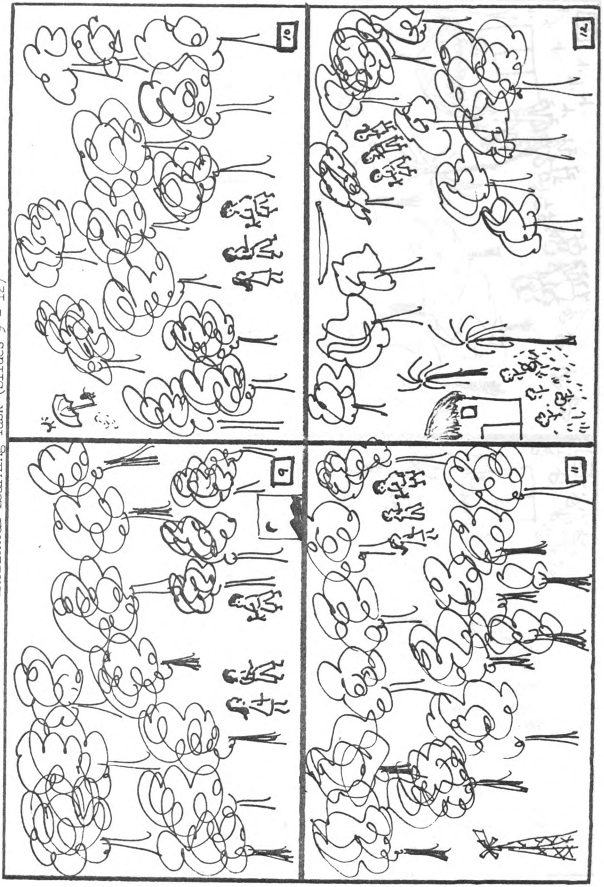
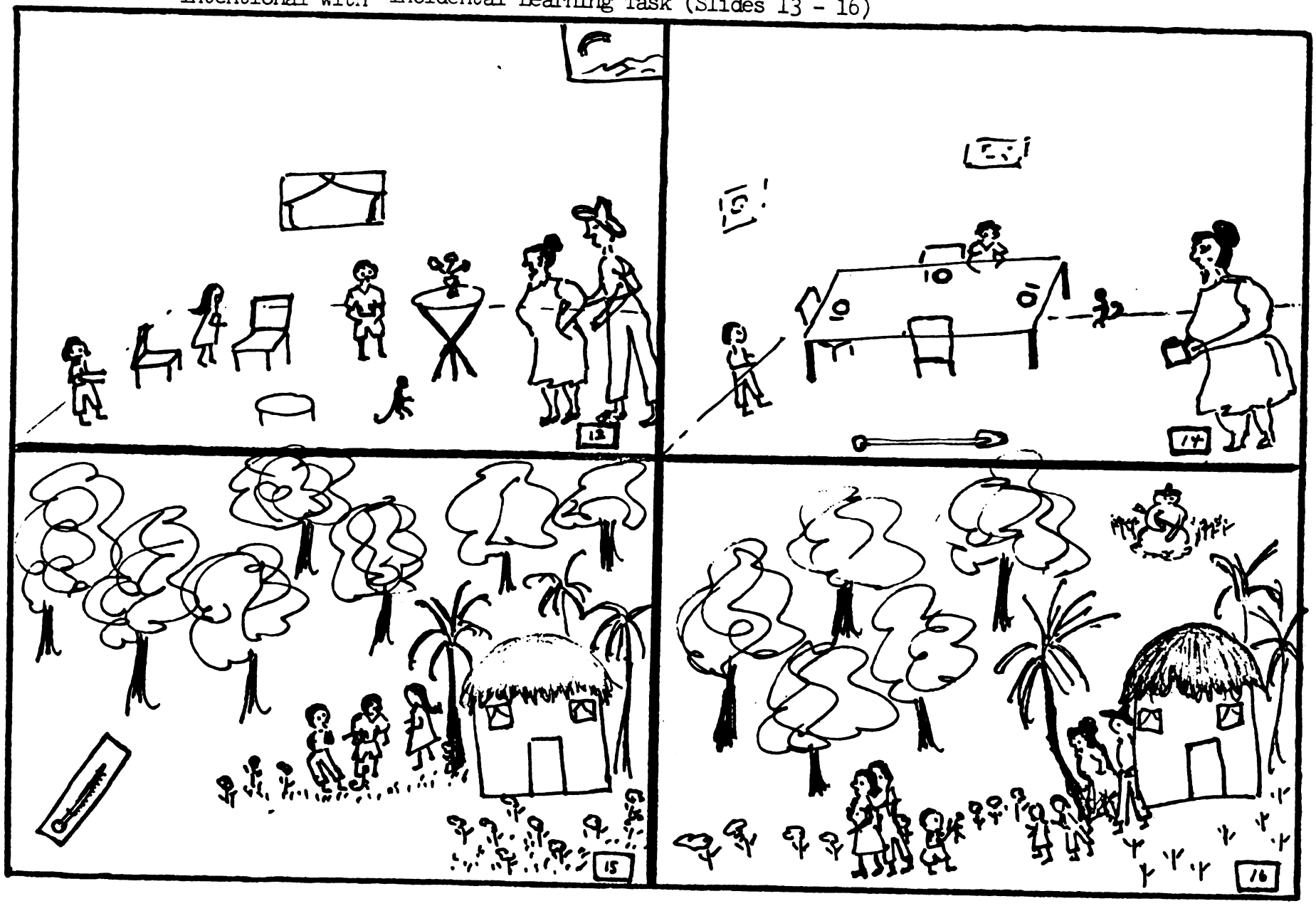
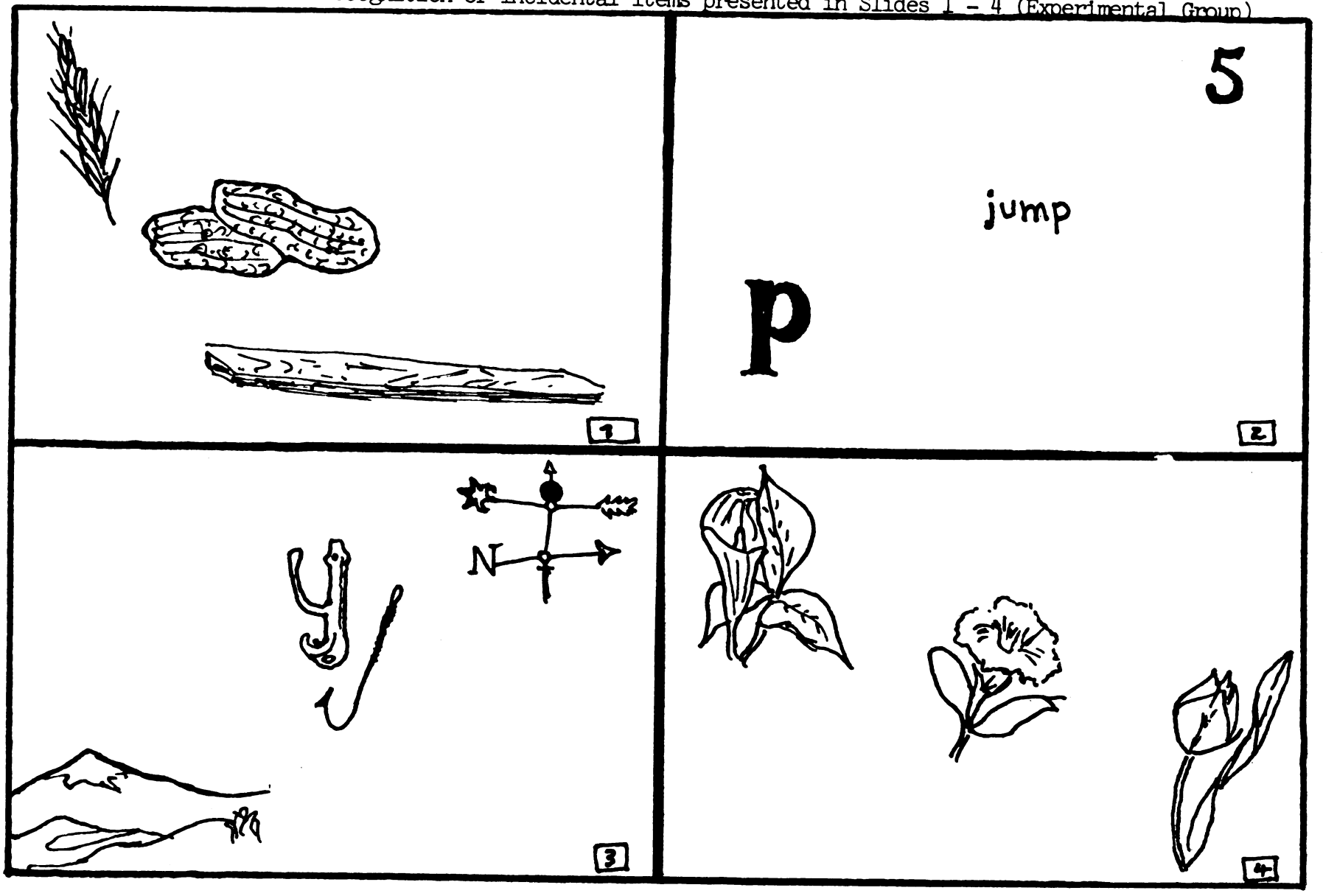


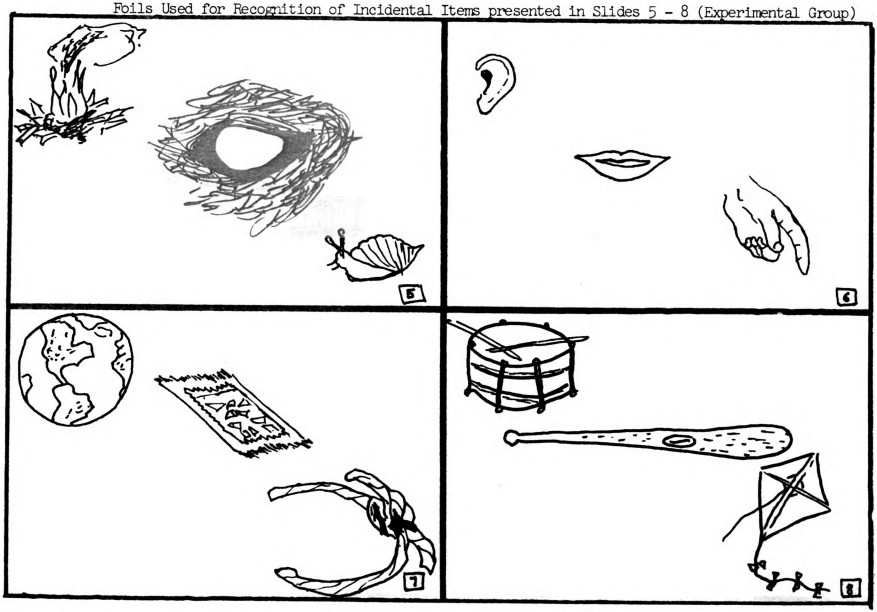
Intentional with Incidental Learning Task (Slides 13 - 16)



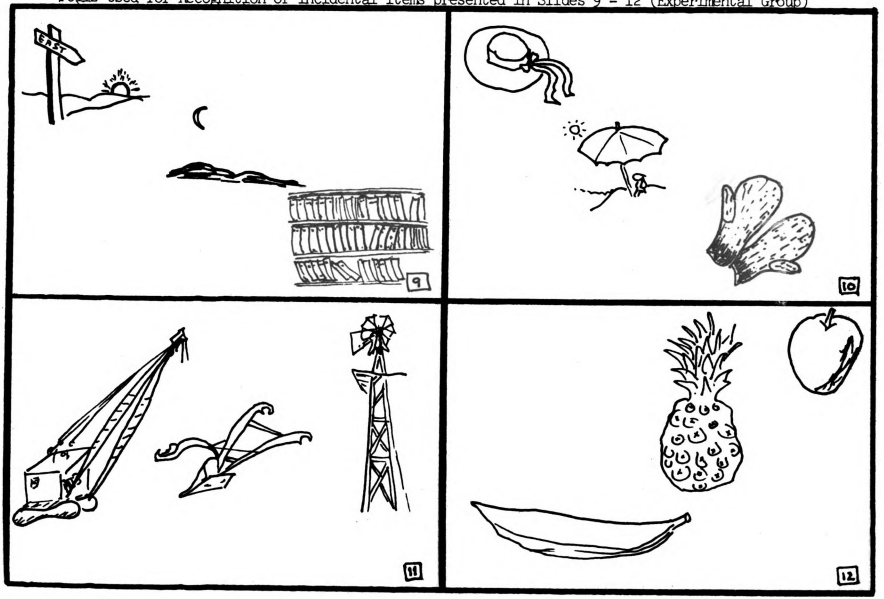
Foils Used for Recognition of Incidental Items presented in Slides 1 - 4 (Experimental Group)



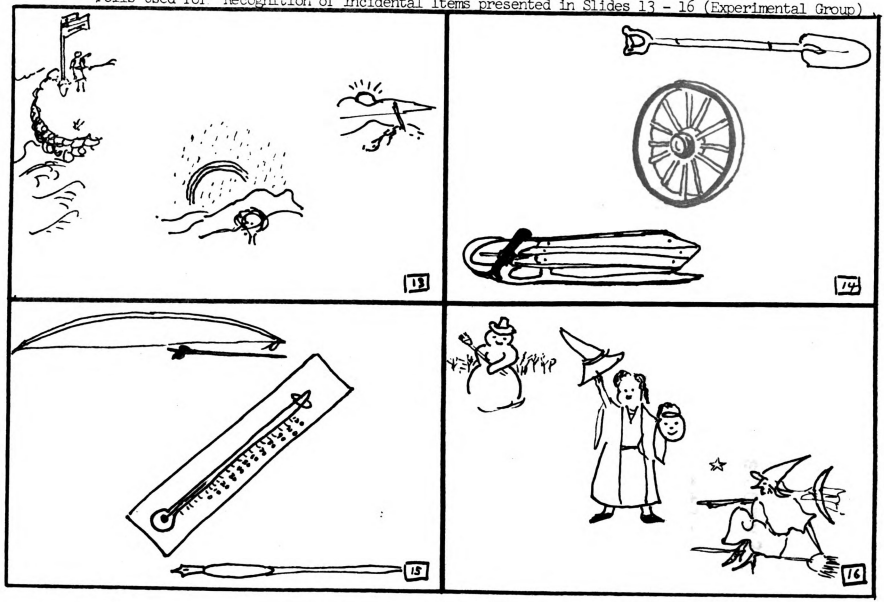
Foils Used for Recognition of Incidental Items presented in Slides 5 - 8 (Experimental Group)



Foils Used for Recognition of Incidental Items presented in Slides 9 - 12 (Experimental Group)



Foils Used for Recognition of Incidental Items presented in Slides 13 - 16 (Experimental Group)



Test Questions for Intentional Learning

QUESTIONS

1. What was the name of the story?

2. What is the name of the little girl in the story?

3. Did Amy and Danny live in a house like yours? - like the house in which you live?

4. Where were Amy and Danny's father when the children were eating?

5. Where were Chip's parents?

6. What did Chip have in his arms when Amy and Danny met him in the woods?

7. Were Amy and Danny's parents angry with them for bringing Chip home?

8. Danny had a sister. Did Chip also have a sister?

9. Where will Amy and Danny go during their next holiday?

10. What did Amy and Danny do when they heard the sound of a whistle, but saw no one?

Appendix B

Smith, J. D., L. W. Lezotte, and W. H. Schmidt, "The Preschooler, Socioeconomic Status, Race, and Incidental Learning," Research Report # 14, Center for Urban Affairs, Michigan State University, East Lansing, Michigan, March, 1972

THE PRESCHOOLER: SOCIOECONOMIC STATUS
RACE, AND INCIDENTAL LEARNING

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THE PRESCHOOLER:
SOCIOECONOMIC STATUS, RACE, AND INCIDENTAL LEARNING

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March, 1972

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ABSTRACT

This study investigated incidental learning in middle and lower class black and white preschool children. The study questioned whether (a) preschool children acquire learning incidentally; (b) there was a difference in the quantity of such learning between black and white children; (c) differences in learning was influenced by socioeconomic status; (d) differences were as evident for familiar as compared with unfamiliar stimulus materials. The experiment used a measure of incidental learning obtained by exposing subjects to a room containing selected items but giving them no instructions to attend to the objects. A comparison group was also placed in the same room but instructed to attend to the objects. The second dimension of familiarity was added by including items in the room which were known to the children as well as objects likely to be unfamiliar. Following a fixed exposure of three minutes, each child was given a free recall and recognition test. The findings verify the presence of incidental learning in preschool children. Black youngsters did substantially better than their white counterparts on the recall of familiar objects. White preschool children did substantially better than their black counterparts on the recognition of unfamiliar objects in the incidental learning condition.

INTRODUCTION

Every item present in a classroom represents a potential source of learning for students independent of any formal or direct instruction. Therefore, even though the teacher does not bring many of these stimuli to the attention of students, the stimuli may facilitate learning. Any knowledge gained from such stimuli is quite coincidental and aptly called "incidental learning" (INC). The phenomena has been described as learning which occurs in the absence of an overt set to learn since no instructions are suggested or implied. Formal learning is, nonetheless, influenced by implicit cues given to the learner as well as sets which the individual brings to a novel situation as a function of his past experiences.

At a time when "early intervention" for "disadvantaged" children has been the concern of educators, government, and private citizens alike, it is pertinent to investigate variables which appear to be helpful in advancing the "readiness" of such children for gains provided through conventional school experiences. The existence and understanding of INC may be utilized by the curriculum builders by providing selected learning material in the classroom to which children are exposed during directed learning experiences as well as play situations.

It is clear that many early intervention programs (in which the strategy seems a most viable tool) include lower class and minority group children, a majority of whom are often black. The degree to which these children from lower socioeconomic levels may profit from use of incidental learning strategies as well as stimuli capable of providing INC learning should be of specific importance.

While the phenomena of INC learning has been of theoretical interest since the 1930's, a cursory summary of previous research reveals that INC as a function of race and social class has received only minimal attention.

Wilson (1958) found no significant positive relationship between socioeconomic status and incidental learning among educable mentally retarded and normal adolescents. Brown (1968) found white normal nine to fourteen year old boys systematically lower than Negro normals and the retarded groups on learning and retention of meaningful material under both incidental and intentional learning conditions. No significant differences were found among the normal and retarded groups on the learning and retention of non-meaningful material. Incidental learning was systematically inferior to intentional learning on meaningful and non-meaningful material by both normal and retarded groups. In a pilot study of concept attainment and incidental social learning, Colton (1970) demonstrated that although gains were made in attaining some concepts, there was no pre - post change in the choices of "preferred companions" by integrated or all white kindergarten children as a result of viewing either unknown, same, or opposite color children portraying "teachers" in videotaped sequences. Naylor (1971) investigated the differences in learning behavior of disadvantaged Mexican American and Anglo American first graders and failed to support his hypothesis that learning style (i.e., information demand, field dependence-independence, and originality) differences existed though an impulsivity-reflectivity measure showed the Anglo American children made more errors.

Fewer studies are available in which the performance of

preschool children on this phenomena is stated. Wilson (1958) concluded that in his preschool children performance on imitative responses in an appropriate set in the absence of a model was essentially that of learning an incidental cue. Mussen (1965) found preschool girls of nurturant mothers showed more incidental imitative learning and Ross (1966) showed a positive relationship between dependency and incidental learning possibly due to the value of high achievement placed by parents of low dependent children.

OPERATIONAL CONCEPTS

Two basic types of INC learning conditions may be distinguished. In Type I the subject is exposed to the stimulus materials but given no instruction to learn. His retention is then tested unexpectedly folowing the exposure. Such retention may be tested by recognition, free recall, or transfer to a new task. Choice of the test is determined by the criteria of INC learning in the experiment. Criteria is based on kind and amount of learning required for successful performance.

In a second approach to INC learning, subjects are given a specific task to be learned but during instruction is exposed to information or cues which are not a part of the instructions. His retention for the latter features of the situation define the amount of INC learning he has acquired and the measure obtained will again be a function of the test. This second (Type II) situation may be further subdivided into two classes on the basis of the relationship between the relevant and irrelevant components of the total learning situation. The irrelevant component may be features or attributes of the materials which the subject has been instructed

to learn but which are irrelevant in the sense that their discrimination and retention are not required. For example, if verbal items which the subject has been instructed to learn are printed in different colors, the colors are a feature of the learning material which is irrelevant to the explicit task but essential to INC. On the other hand, the irrelevant components may be materials or cues which bear no direct relationship to the learning task, e.g., when the instructions are to learn a series of words but such additional items as digits or geometric forms are exposed along with the words. Thus, the two classes are distinguished within the Type II situation and refer respectively to the incidental learning of intrinsic and extrinsic components of the experimenter defined task.

OBJECTIVES

The questions being asked in the investigation were:

(1) Do preschool children acquire learning incidentally?

(2) Is there a difference in the quantity of such learning between a group of black as compared with a group of white children?

(3) Does such a difference between these groups also differ according to the children's socioeconomic status?

(4) Are there manifest differences in incidental learning of familiar versus unfamiliar stimulus materials?

METHODOLOGY

A single experiment of the Type I design discussed in the an earlier section of the paper was conducted. Difficulty in designing tasks suitable for the Type II design for the preschool level was found in a previous experiment conducted by the authors.

Population and Sample

Subjects were identified as being black/white and lower/middle socioeconomic (SES) levels respectively. The latter were determined using parents' occupation. An expected family income of less than $5,000 per year identified a child as being from the lower SES level. Children with parents whose occupations were representative of an income of $6,000 per year or higher were considered as middle SES. Children whose parents were welfare recipients were automatically classified as coming from the lower SES levels, while children whose parents were then enrolled as graduate students at the university were considered middle SES.

The ages of the children fell within a range of three to four and one-half years (preschool level). All children were selected from the Friendship Day Care Center, Lansing, and the Eastminster Day Care Center, East Lansing, Michigan.

Data and Instrumentation

As previously noted, subjects were divided into an experimental (INC) and control (INT) group.

Experimental Group (INC Learning). A small and otherwise empty room was used. Sixteen pretested stimulus items were then placed in the room. Eight items were classified as "familiar" to subjects while the remaining items were "unfamiliar" to the children. The authors felt that it would be of interest to note whether this selection of familiar/unfamiliar items might give some inkling of whether utilization of an INC strategy is in any way related to past experience as that provided by the home environment, for example. Care was taken, however, to achieve a "normalized" (not overcrowded)

effect in the room. (See the Appendix for items used in the study).

Each child in this group was placed alone in the room with instructions as follows: "I want you to wait here for me for a few minutes. As soon as I find what I'm looking for, we could play a little game together". Each child stayed alone for a three minute period. He was then taken to another nearby room and told: "Before we play our little game, I want you to tell me all the things you saw in the room where you were waiting for me". This instruction represents the unexpected free recall test. A maximum of five minutes was used for this part of the examination.

Directly following the free recall test, the child was told, "Okay, suppose we play a little game. I will show you some pictures. You show me which one of the pictures is the same as something you saw or saw a picture of in the room where you were when you were waiting for me". For each item in the room a set of four pictures (including a picture of the item) was presented on a single sheet. Each child was given a maximum of one minute to make the appropriate selection and had a single chance to identify each correct response. Where a child responded a second time and in quick succession he was given a second trial after restatement of the question in order to decrease the possibility of correct responses through guessing. As each set of pictures is presented, the experimenter would say, "Show me which of these you saw".

Each child was scored one (1) for each item recalled and zero (0) for those not recalled during the five minute period. (A longer time period was allowed only if the child appeared to be attempting to recall something but having difficulty doing so. Descriptions of an item to the experimenter's satisfaction was

considered acceptable. It was expected that the experimenter could recognize when the child had completed his maximum recall.

Four scores of INC learning derived from this "no instruction" condition were computed for each child who took part in the experiment. There was a recall score as well as a recognition score for both the familiar as well as unfamiliar objects.

Control Group (INT Learning). To establish that INC learning is in fact different from INT learning, the second group of children were tested in the following manner. In the second condition each child was asked to sit in the same room. These subjects, however, were instructed as follows, "I want you to wait here for a few minutes. We will play a little game. You are to try to notice and remember everything that is in this room. When I come back, we will leave here and I will ask you to tell me all you saw in this room while you were waiting".

Each child was allowed to wait for a three minute period after which he was taken to another room and tested in the same manner as the first group of children. He was first asked to recall the items in the room and then asked to recognize from among pictures of a group including the item itself, the one present in the room. In a manner similar to the experimental (INC) group, each child in the control (INT) group received separate scores on recall and recognition of familiar and unfamiliar objects.

The items were chosen with the assumption that all were neutral and of equal familiarity or unfamiliarity for each group of subjects. Common relevance to racial and SES level was, therefore, assumed, i.e., an assumption of the culture balance of the items.

Analysis Procedures

The data were analyzed using the multivariate analysis of covariance procedure. The final design used to analyze the data and test the hypothesis of interest was a two by two by two design with four dependent variables and with age in months as the covariate. Figure 1 presents the design matrix for the study.

Figure 1

Research Design Matrix

INCIDENTAL				INTENTIONAL			
Black		White		Black		White	
Low SES	Middle SES	Low SES	Middle SES	Low SES	Middle SES	Low SES	Middle SES
6	6	6	6	6	6	6	6

The four dependent measures analyzed were recall of familiar objects, recognition of familiar objects, recall of unfamiliar objects, and recognition of unfamiliar objects. All hypotheses were tested using the .05 alpha level with the appropriate degrees of freedom.

RESULTS

The hypothesis tests were conducted by testing the higher order interactions initially. The first hypothesis test was the test for a significant three way interaction between learning type, race, and SES. A multivariate F ratio of .515 was computed and found not to be significant with 4 and 36 degrees of freedom. Therefore, the null hypothesis of no sigificant three way interaction was not rejected.

Finding no significant three way interaction permitted the testing of each of the two way interactions. No significant two way

interaction was found when the socioeconomic status by race interaction was tested. Similarly no significant interaction was found in the test of the interaction between learning type and SES. However, the test of the interaction between race and learning type was found to be significant at the $p = .05$ level. A multivariate F ratio of 2.71 was found which, with 4 and 36 degrees of freedom, yields a probability level of .045. Therefore, the null hypothesis of no significant interaction between race and learning type was rejected.

An examination of the univariate F ratios on each of the four dependent measures associated with the significant multivariate F ratio reveals that two variables seem to account for the significance. The univaraite F ratio associated with the recognition of unfamiliar objects was found to be 5.26 which was significant at the .03 probability level. The second univariate F ratio found to be significant was that associated with the recall of familiar objects ($F = 4.09$, $p = .050$). Table I presents the estimated effects for the cells associated with the recognition of unfamiliar objects.

Table I

Estimated Effects Associated with Recognition of Unfamiliar Objects

	Incidental	Intentional
Black	-3.60	-1.39
White	-1.86	-2.07

An examination of Table I reveals that the white children did substantially better than the black children on the recognition of unfamiliar objects in the incidental learning condition. However, the black children did substantially better than the white youngsters

in the recognition of unfamiliar objects in the intentional learning condition.

Table II presents a summary of the estimated effects associated with the recall of familiar objects.

Table II

Estimated Effects Associated with Recall of Familiar Objects

	Incidental	Intentional
Black	-1.44	- .17
White	-1.73	-1.86

Examination of Table II reveals that black children did somewhat better than the white children in the recall of familiar objects in the incidental learning condition. In the intentional learning condition the black students did substantially better than the white youngsters.

Due to the significant higher order interactions the significance tests of the main effects are somewhat confounded and ought to be interpreted with extreme caution. The main effect test of learning type yielded a multivariate F ratio of 1.86, which was not significant. The multivariate test of the variable of socioeconomic status yielded an F ratio of 2.87 which was significant at the .04 probability level. An examination of the univariate F ratios associated with the multivariate test revealed that a univariate F of 3.98 associated with the recognition of unfamiliar objects was significant. The estimated effects associated with this hypothesis test revealed that lower SES children (-2.76) did substantially poorer than the middle SES children (-1.70) on the recognition of unfamiliar objects.

Finally, the main effect test of race was found to be significant ($F = 3.90$, $p = .01$). An examination of the univariate F ratios associated with the multivariate test revealed that the tests of recall of familiar objects ($F = 8.19$, $p = .006$) and recognition of familiar objects ($F = 3.59$, $p = .06$) contributed to the multivariate significance. Black children (-.80) did substantially better than white children (-1.79) on the recall of familiar objects. Similarly, black children (5.11) did substantially better than white children (4.32) on recognition of familiar objects.

DISCUSSION AND SUMMARY

The experiment sought to verify the existence of incidental learning among preschool age children. The data strongly supports that learning does, in fact, occur in the absence of set for preschool youngsters.

The data further supports the observation that the type of intrinsic set brought to the INC learning situation by children of different racial and socioeconomic groups does influence their learning. Black children performed substantially better than their white counterparts on recall of familiar objects in both the incidental and intentional learning conditions. And while the white children did better on the incidental learning of unfamiliar objects as measured by recognition, their black counterparts did better on such recognition in the intentional learning situation.

While this study should be viewed as suggestive and not conclusive, some interesting questions are raised. Why should the black children perform any differently than white children when objects familiar to both groups were present. One possible explanation is

that the race of the tester (black) interacted with the race of the subjects, thus resulting in differential performance on the tests of incidental and intentional learning. This explanation can and will be examined in subsequent research.

A second possible explanation may be found in the background experiences of black and white youngsters. Could it be that by direct or indirect processes black youngsters are set to focus on things in the environment which are known to them, whereas their white counterparts are, by similar processes, set to focus on those aspects of the immediate environment which are not known to them. With some imagination an experimental procedure could be divised to determine the degree to which this explanation may be viable.

Further research is needed to determine why the expected difference between incidental and intentional learning was not found. Subsequent research is planned which will examine intentional and incidental learning using many and varied tasks.

APPENDIX

Table Showing Content of Instrument Used

Item	Classification	Mode
plants	familiar	object
road signs	familiar	picture
plants	unfamiliar	object
abstracts	unfamiliar	pictures
tables	familiar	object
sea shells	unfamiliar	object
chairs	familiar	object
musical instruments mbira steel drum bongo drum	unfamiliar	object
clocks	familiar	object
fruits coconut cassava banana	unfamiliar	object
numbers 4 2 5	familiar	picuture
miscellaneous desk calendar hand hold punch desk directory	unfamiliar	object
flowers	familiar	picture
miscellaneous stapler tania shadow on film	unfamiliar	object

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Appendix C

Univariate Analysis of Variance of Intentional Learning Scores

UNIVARIATE ANALYSIS OF VARIANCE OF INTENTIONAL LEARNING SCORES

Source of Variation	F test for ANOVA in Intentional Learning				
	Sums of Squares	d.f.	Mean Squares	F	Significance Level
Ts (Race of Tester)	.09	1	.09	.03	.86
Ses (socioeconomic level)	41.34	1	41.34	14.96	.002*
Sx (Sex)	4.59	1	4.59	1.66	.22
R (Race)	4.59	1	4.59	1.66	.22
T (Treatment Group)	.51	1	.51	.18	.67
G (Grade)	53.38	2	26.69	19.31	.0002*
Ts X Ses	.01	1	.01	.004	.95
Ts X Sx	5.51	1	5.51	1.99	.18
Ts X R	3.76	1	3.76	1.36	.26
Ts X T	7.59	1	7.59	2.74	.12
Ts X G	.13	2	.06	.05	.97
Ses X Sx	3.01	1	3.01	1.09	.32
Ses X R	2.34	1	2.34	.85	.37
Ses X T	.01	1	.01	.004	.95
Ses X G	7.13	2	3.56	2.58	.11
Sx X R	.01	1	.01	.004	.95
Sx X T	.26	1	.26	.09	.76
Sx X G	.13	2	.06	.05	.96
R X T	1.76	1	1.76	.64	.44
R X G	11.38	2	5.69	4.12	.04*
T X G	2.79	2	1.40	1.01	.39
Ts X Ses X Sx	.09	1	.09	.03	.86

UNIVARIATE ANALYSIS OF VARIANCE OF INTENTIONAL LEARNING SCORES contd.

Source of Variation	F test for ANOVA in Intentional Learning				
	Sums of Squares	d.f.	Mean Squares	F	Significance Level
Ts X Ses X R	3.01	1	3.01	1.09	.32
Ts X Ses X T	.09	1	.09	.03	.86
Ts X Ses X G	1.29	2	.65	.47	.64
Ts X Ses X T	.09	1	.09	.03	.86
Ts X Ses X G	1.29	2	.65	.47	.64
Ts X Sx X R	19.26	1	19.26	6.97	.02*
Ts X Sx X T	.26	1	.26	.09	.76
Ts X Sx X G	2.79	2	1.40	1.01	.39
Ts X R X T	.51	1	.51	.18	.67
Ts X R X G	.04	2	.02	.01	.99
Ts X T X G	.87	2	.44	.32	.73
Ses X Sx X R	1.76	1	1.76	.64	.44
Ses X Sx X T	.09	1	.09	.03	.86
Ses X Sx X G	1.54	2	.77	.56	.59
Ses X R X T	7.59	1	7.59	2.75	.12
Ses X R X G	7.63	2	3.81	2.76	.10
Ses X T X Gq	4.29	2	2.15	1.15	.25
Sx X R X T	8.76	1	8.76	3.17	.10
Sx X T X Gq	1.29	2	.65	.47	.64
Sx X R X G	3.29	2	1.65	1.19	.34
R X T X G	2.79	2	1.40	1.01	.39
Error	35.93	13	2.76	α = .05	

Appendix D

Pearson Product Moment Correlation Coefficients
between Incidental and Intentional Learning Scores
for Kindergarten, First, and Second Grades

Pearson Product Moment Correlation Coefficients**
Between Incidental and Intentional Learning Scores
for Kindergarten, First, and Second Grades

	K	1.00								
Common	G_1	1.00								
Recall	G_2	1.00								
	K	.71	1.00							
Common	G_1	.45	1.00							
Recog.	G_2	.10	1.00							
	K	-.15	-.005	1.00						
Uncom	G_1	.48	.38	1.00						
Recall	G_2	.42	.13	1.00						
	K	.19	.56	.47	1.00					
Uncom	G_1	,08	.44	.42	1.00					
Recog.	G_2	.17	.60	.37	1.00					
	K	.30	.50	.47	.62	1.00				
Inten-	G_1	.13	.34	-.17	-.09	1.00				
tional	G_2	-.04	.80	.33	.29	1.00				
	K	.77	.61	.50	.46	.56	1.00			
Com+Unc	G_1	.86	.49	.86	.29	-.02	1.00			
Recall	G_2	.88	.14	.80	.31	.14	1.00			
	K	.49	.87	.27	.89	.64	.61	1.00		
Com+Unc	G_1	.29	.80	.47	.89	.10	.44	1.00		
Recog.	G_2	.15	.89	.28	.80	.38	.25	1.00		
Com Rcl	K	.84	.97	-.50	.48	.47	.71	.81	1.00	
+	G_1	.78	.91	.49	.35	.30	.74	.70	1.00	
Com Reg	G_2	.53	.90	.30	.59	.31	.51	.83	1.00	
Unc Rcl	K	-.15	-.004	1.00	.47	.47	.50	.27	-.05	1.00
+	G_1	.47	.38	1.00	.41	-.17	.86	.47	.49	1.00
Unc Reg	G_2	.42	.13	1.00	.37	.33	.80	.28	.30	1.00
	K	.59	.88	.35	.86	.66	.74	.98	.84	.38	1.00
Total	G_1	.58	.80	.71	.79	.07	.74	.93	.82	.71	1.00
Inc.	G_2	.45	.80	.53	.89	.37	.58	.93	.88	.53	1.00

** For all grade levels, coefficients of .35 and .45 are needed for $p < .05$ and $p < .01$ respectively.