

RACIAL AND SOCIAL CLASS DIFFERENCES IN THE MEMORIZATION
OF CATEGORIZED ITEMS

A Thesis
Presented to
the Faculty of the Department of Psychology
University of Houston

In Partial Fulfillment
of the Requirements for the Degree
Master of Arts

By
Penny W. Kemp
August, 1976

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ABSTRACT

Black and white fifth graders from low and middle income families were given 2-minute study periods in which to memorize 24 pictures. Performance measures were the degree of manual clustering of the pictures during the study period (study period organization), clustering during recall, mean number of items correctly recalled on each trial, and clustering on a free sort task. Results indicated no significant racial or social class differences on any of these measures; however, subjects who demonstrated study period organization (organizers) performed significantly better on all response measures than did subjects showing no study period organization (non-organizers). Teacher ratings of classroom performance were found to be significantly positively correlated with study period organization, clustering during recall, and clustering on the free sort task. Teacher ratings predicted recall for organizers but not for non-organizers. The results were discussed in terms of what they indicated about fifth graders' awareness of the demands of such a task.

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CHAPTER I

INTRODUCTION

Jensen (1961, 1965, 1968, 1969b) has extensively investigated the relationship between performance on a variety of learning tasks and psychometric intelligence. He has been especially concerned with analyzing learning abilities in children termed culturally disadvantaged. He has found that on some learning tasks, such as digit span memory, paired-associative learning, and serial learning, low socio-economic-status (SES) children do as well as middle SES children although their IQ scores may differ by as much as 15 to 20 points. Jensen accounts for this finding by positing that these learning tasks require associative ability (rote memory ability) and that this ability appears to be fairly evenly distributed among social classes. Jensen claims that standardized mental tests, on the other hand, require conceptual or problem-solving ability which seems to be distributed about a higher mean for middle and upper SES children.

Jensen (1969a) reports that the multitrial free recall task, with a minor variation in procedure, can be used to measure either associative ability, which he terms Level I ability, or conceptual ability, which he terms Level II ability. When low SES children are given five trials to learn 20 unrelated objects which are presented sequentially, they perform about as well as do middle SES children. However, when the objects are not unrelated but can be grouped into categories a social class difference of about the same magnitude as the IQ difference emerges in favor of the middle SES children. Jensen attributes the better recall of the middle

SES children on the categorized list to their tendency to cluster the items according to category during recall. Jensen (1971) claims that the processes involved in clustering closely correspond to his characterization of Level II ability:

Associative clustering in verbal free recall is one of the clearest forms of evidence of conceptual, hierarchical processes. For clustering to occur, the subject must actively organize the stimulus input according to certain self-provided superordinate categories. (p. 61)

Jensen reports that low SES children show less category clustering than do middle SES children, although many show rather idiosyncratic pairwise "clusters" that persist from trial to trial. Jensen points out that the failure of low SES children to cluster is not due to their not knowing the category names, as determined by post-test interviews. The children know the categories but tend not to spontaneously use them to structure recall. Instead, they appear to learn the categorized list in much the same rote, associative way that they learn the list of unrelated items.

Various studies have been conducted in order to test the validity of Jensen's claim concerning SES related differences on the free recall of categorized items. A number of studies done at Berkeley (Glasman, 1968; Gerdes, 1971; Peterson, 1971; Jensen and Frederiksen, 1973) produced findings supportive of Jensen's position, i.e., there were no significant SES differences in performance on the free recall of uncategorized items, but there were significant SES differences in performance on the free recall of categorized items as measured by total number of words recalled and the amount of clustering in favor of the middle SES children.

Although Jensen (1969a) claims that differences in conceptual or

Level II ability are more closely associated with social class than with ethnic background, the Berkeley studies confound race and SES (middle SES children were white while low SES children were black) making the findings on the free recall task difficult to interpret in a strict social class framework. Mensing and Traxler (1973) investigated social class differences in a black population and found no significant SES differences in amount recalled on a categorized list of items. Unfortunately, they did not look at clustering during recall to see if social class differences on this measure were present. However, the finding of no social class differences in amount recalled suggests that the Berkeley studies may be reflecting racial as well as social class differences. It also points out the need for a study examining both racial and SES differences on this task.

In recent years the free recall task has become a basic tool for studying the development of organizational processes in children. Although this literature stands apart from the Jensen literature, there have been some interesting findings that Jensen may do well to consider. These findings have to do with the relationship between clustering and recall. While investigators have implicitly assumed, as has Jensen, that it is increased clustering that leads to increased recall, there is evidence that this notion needs to be reexamined. Cole, Frankel, and Sharp (1971) found that clustering does not usually occur until the fourth or fifth trial and that even then the absolute amounts of clustering are fairly low. Also, for some children rather high levels of recall occur before significant clustering is noted. This finding causes one to question whether clustering precedes recall or if it is recall that

precedes clustering. There is also evidence that clustering does not necessarily reflect organization based on the active use of category labels. Neimark, Slotnick, and Ulrich (1971), using a study-test procedure, found that some children cluster items during recall without having shown any prior deliberate organization of the stimulus items during the study period. Since it is not clear at the present time exactly what processes underlie good performance on the free recall of categorized items, it seems a bit premature to suggest, as has Jensen, that the poorer performance of low SES children is due to a conceptual deficit on their part.

All of the studies which have investigated social class differences on the free recall task have used the sequential method of presenting the items, i.e., the objects are presented one at a time in a different randomized order on each trial. It is very difficult to determine how the subject is learning the items using this presentation method. One must either infer what the subject did from examining the free recall protocol, or one can ask the subject in a post-test interview to explain how he went about learning the items. The shortcoming of the interview procedure is that the subject may not accurately describe how he learned the items or he may leave out important details. One presentation method that has been used to better observe how children go about learning the items is the study-test procedure, first used by Moely, Olson, Halwes, and Flavell (1969). In this presentation method the items are arranged on a table in front of the subject and he is given a brief study period in which to learn them. During the study period the subject is free to move the items around at will. At the end of the study period, the pictures are collected and the subject is instructed to recall as many of them as he can remember.

This procedure is repeated for three trials or until the subject remembers all of the items, whichever comes first. The advantage of this procedure is that it allows the experimenter to observe first-hand what strategies the subject uses to learn the items. Does the subject spontaneously group the items into categories? If so, does he then use these groupings to structure recall? What other things does he do to help him remember the items (e.g., counting the number of items in each category, singling out particular items for increased study, rehearsing the names of the items, self-testing to check his progress, etc.)? These are but a few of the questions that can be looked at using this presentation method.

It would appear that the study-test procedure coupled with an interview procedure should offer a valuable way to gain insight into those factors that may be responsible for social class or racial differences in performance on this task. For this reason this investigator used these two techniques to examine differences in performance on the free recall of categorized items. Since there is some question as to whether these differences are more closely associated with race or social class, both black and white children from low and middle income groups were selected. So this study had two main purposes: to reveal the extent to which there are social class or racial differences in the memorization of an array of categorized items, and to provide some indication as to why these differences may exist (i.e., are they due to the differential use of particular strategies?). In addition, since the study-test procedure is not too unlike a classroom situation in which children are presented with material to learn and then left on their own to learn it,

it would seem that there should exist a relationship between performance in the two situations. In order to assess if a relationship between the two does exist, teachers were asked to rate the performance of the subjects in several areas related to classroom performance. (See Appendix A for a copy of the Teacher Rating Form.)

So in summary, this study investigated three main issues: (1) Are there racial and/or social class differences on the free recall of categorized items? (2) If differences do exist, are they associated with the differential use of certain strategies? and (3) What is the relationship between performance on this task, using a study-test procedure, and performance in the classroom?

CHAPTER II

METHOD

Subjects

The subjects were 40 fifth-grade children enrolled in the city of Houston's Catholic school system. Fifth graders were chosen because Jensen (Jensen and Frederiksen, 1973) has indicated that differences on the free recall of categorized items are clearly evident in this age group due to the emergence of Level II ability. Twenty low SES children (10 black and 10 white) and 20 middle SES children (10 black and 10 white) were selected from four elementary schools. Each experimental group attended a different school. Originally, subjects were to be assigned to low and middle SES groups on the basis of their fathers' occupations; however, for most subjects the job descriptions contained in the school records were not detailed enough to permit this kind of classification. Consequently, since two of the schools served primarily lower income residential areas and the other two served middle to lower middle income residential areas, grouping by school attended was chosen as a viable alternative. The neighborhood population characteristics of the residential areas from which the experimental groups were drawn are summarized in Table 1. If the job classification problem had been anticipated earlier, schools which were located in areas more clearly representative of low and middle income families would have been selected.

The mean chronological age in months was 134.2, 134.0, 135.7, and 134.9 for low SES blacks, middle SES blacks, low SES whites, and middle

TABLE 1
POPULATION CHARACTERISTICS OF THE RESIDENTIAL AREAS
FROM WHICH THE EXPERIMENTAL GROUPS WERE DRAWN

Population Characteristics	Experimental Groups			
	Black		White	
	Low SES	Middle SES	Low SES	Middle SES
Median family income	6571	10,116	8055	10,168
Median value of owner occupied housing unit	8150	15,000	9700	12,900
Median years of high school completed by adults over 25	8.3	12.3	10.1	12.1
Percentage of adults over 25 who are high school graduates	43.1	57.7	30.1	54.3

Note. This information was taken from 1970 census records.

SES whites, respectively. All the groups had an equal number of boys and girls with the exception of the middle SES white group which had 6 boys and 4 girls. Moely et al. (1969) found no significant sex differences in performance and the present author's data does not suggest any although sex was not included as an experimental variable.

Materials

The materials to be learned consisted of 24 pictures from the Peabody Picture Vocabulary Test which could be categorized into four classes of six pictures each: bear, camel, cow, dog, goat, horse; bicycle, boat bus, car, train, truck; chair, crib, lamp, sink, stove, table; jacket, mitten, purse, shoe, sock, tie. These materials were identical to those previously used by Neimark, Slotnick, and Ulrich (1971). Three decks of the 24 pictures were prepared just as they described: each picture was Xeroxed, cut to a 3-inch-square size, and laminated in plastic film. All the decks were arranged in the same randomized order. In addition, a practice deck identical to the one used by Neimark et al. (1971) was similarly prepared. It was comprised of five items: apple, bat, broom, crayons, pear.

Procedure

Each subject was tested individually by the experimenter. The child was told, "We're going to play a memory game. Do you like to memorize things?". The child's answer was recorded and the experimenter made some appropriate comment based on whatever the child said. Then the experimenter continued: "I have some pictures here. I am going to put them down in front of you and you will have a minute to study them. After one minute I am going to pick them up and I'll want you to tell me what they

were. Okay? Here they are." The five pictures were then spread in a row in front of the child. After recall of the five pictures (every child correctly recalled all five), the subject was told: "Now we are going to do this again but this time there will be more pictures. Before we begin let's go through them to see what they are. Would you please name each one for me as I show it to you?" After the subject correctly identified each picture the experimenter continued:

I'm going to put all of these pictures on the table. When I have finished you will have two minutes to study them. During this time you may pick them up, put them in a different order, or do anything else you like to help you learn them. After two minutes, I'll pick them up and you tell me as many of them as you can remember. You don't have to learn them in any special order. Here they are.

The experimenter then placed the pictures on the table in five rows of five cards each (four in the last row). During the 2-minute study period the experimenter made notes on the strategies used by the subject to memorize the items (e.g., organizing, verbal rehearsal, self-testing, singling out missed items for increased study, counting, etc.) See Appendix B for a copy of the Observational Data Sheet. At the end of 2 minutes the pictures were picked up and the experimenter recorded the subject's recall in order. The subject's recall was also tape-recorded to allow a check for accuracy. This procedure was repeated with the second deck. The subject was told:

Now we are going to do the same thing again. I will put the pictures on the table and you will have two minutes to study them. During this time you can move them around or do whatever you like to help you learn them. At the end of two minutes I will pick them up and you tell me as many as you can remember.

A third trial was given if the subject had not attained perfect recall

on the second trial. (All subjects received 3 trials except one.) The subject was told: "We are going to do this once more. I will put the pictures down and again you will have two minutes to study them. This is the last time we will do this so try to remember as many as you can."

At the completion of each trial, the subject was asked to describe how he went about learning the pictures. His response was written down as well as tape-recorded. After the third trial a more detailed interview was conducted (Appendix C). In addition, those subjects who had not spontaneously grouped the items during the study period were asked to free sort the items, i.e., "group the pictures that go together or are alike in some way". The experimenter recorded any partial or complete category groupings that were produced.

Teachers were asked to rate subjects on each of 10 work habits as "Strong", "Satisfactory", or "Weak" (Appendix A). They were also asked to give an overall rating of the subjects using the same descriptive terms as for the work habits. Five teachers were involved in the rating process (the low SES white group was drawn from two classes instead of only one as were the other experimental groups).

CHAPTER III

RESULTS

Amount Recalled

Means and standard deviations of the number of items correctly recalled on each trial are summarized in Table 2. If the subject showed perfect recall on the first or second trial, thereby terminating the session, it was assumed for scoring purposes that he would have subsequently clustered and recalled exactly as he had on that trial. A three-way (Race X SES X Trials) repeated measures analysis of variance performed on these data indicates a significant main effect for trials ($F = 63.72$, $df = 2/72$, $p < .01$). This finding is not too surprising since one would expect recall to improve over trials; however, unexpectedly, the main effects for race and SES were not significant nor were any of the interactions.

Study Period Organization

A 4-point rating scale employed by Neimark et al. (1971) was used to assess the degree of systematic rearrangement of the pictures during the study period. Criteria for the ratings are as follows: 0 for no systematic rearrangement of the pictures, 1 for organization of part of the pictures, 2 for an organization which encompasses all 24 pictures, and 3 for an elaborated exhaustive organization which imposes order within classes as well as between classes (e.g., alphabetizing the items within each category). These data are summarized in Tables 2 and 3.

A three-way repeated measures analysis of variance of ratings reveals

TABLE 2
MEANS AND STANDARD DEVIATIONS OF RESPONSE
MEASURES ON SUCCESSIVE TRIALS

Measure	Experimental Groups							
	Black				White			
	Low SES		Middle SES		Low SES		Middle SES	
	M	SD	M	SD	M	SD	M	SD
No. recalled								
Trial 1	12.9	1.97	13.8	1.17	14.1	3.05	15.3	1.68
Trial 2	16.0	2.57	16.9	2.77	17.3	3.69	17.5	3.11
Trial 3	18.0	2.32	18.8	2.79	18.7	3.16	20.5	2.82
Overall	15.6		16.5		16.7		17.7	
Clustering								
Trial 1	.59	.16	.43	.17	.49	.23	.61	.21
Trial 2	.56	.27	.42	.25	.51	.24	.57	.25
Trial 3	.56	.17	.50	.17	.51	.29	.64	.24
Overall	.57		.45		.50		.61	
Organization								
Trial 1	.10	.30	.20	.40	.10	.30	.20	.40
Trial 2	.50	.81	.30	.64	.40	.66	.50	.81
Trial 3	.20	.60	.40	.80	.40	.80	.70	.90
Overall	.27		.30		.30		.47	
Clustering on Free Sort Task								
	.90	.14	.86	.17	.71	.36	.86	.24

TABLE 3
FREQUENCY DISTRIBUTION OF ORGANIZATION RATINGS

Experimental Group	Rating Level			
	0	1	2	3
Low SES Black				
Trial 1	9	1	0	0
Trial 2	7	1	2	0
Trial 3	9	0	1	0
Middle SES Black				
Trial 1	8	2	0	0
Trial 2	8	1	1	0
Trial 3	8	0	2	0
Low SES White				
Trial 1	9	1	0	0
Trial 2	7	2	1	0
Trial 3	8	0	2	0
Middle SES White				
Trial 1	8	2	0	0
Trial 2	7	1	2	0
Trial 3	6	1	3	0

no significant main effects or interactions. As can be seen in Table 3, only a few subjects (14 in all--4 subjects organized on all three trials, 4 organized on just two trials, and 6 organized on one trial only) demonstrated any study period organization and no one attained an elaborated (third level) ordering. An interesting finding, however, is that the mean recall of the subjects showing study period organization "organizers" is significantly greater than the mean recall of subjects showing no study period organization "non-organizers" ($t = 1.99$, $df = 38$, $p < .05$). These data are summarized in Table 4.

Clustering During Recall

The same clustering measure employed by Moely et al. (1969), the proportion of repetition (PR) index, was computed for the recall data of each subject on each trial. These data are summarized in Table 2. The PR was calculated according to the formula: $PR = \frac{r}{N-c}$, where r equals the number of clustered pairs (from the same conceptual category), N equals the total number of items recalled, and c equals the number of categories represented in recall. Category intrusions (e.g., an animal not in the original list) and repetitions (items repeated more than once on the same recall trial) were scored as list items in computing r , N , and c . A PR score is an exact measure of the number of clustered pairs relative to the number that could have been clustered, given the number of categories recalled.

A three-way repeated measures analysis of variance of the clustering scores over trials yielded no significant main effects or interactions; however, as was true with recall, organizers clustered significantly more during recall than non-organizers ($t = 6.18$, $df = 38$, $p < .01$). These

TABLE 4

MEANS OF RESPONSE MEASURES FOR SUBJECTS SHOWING STUDY PERIOD
 ORGANIZATION (ORGANIZERS) VERSUS SUBJECTS SHOWING
 NO STUDY PERIOD ORGANIZATION (NON-ORGANIZERS)

Response Measure	Organizers (n = 14)	Non-Organizers (n = 26)	
No. Recalled	17.60	16.15	$\underline{t} = 1.99^*$
Recall Clustering	.72	.43	$\underline{t} = 6.18^{**}$
Free Sort Clustering	.98	.75	$\underline{t} = 2.99^{**}$

* $p < .05$

** $p < .01$

data are summarized in Table 4.

Since the minimum possible clustering score is zero (and the maximum possible 1.0), nearly all subjects evidenced some clustering. An examination of the interview questionnaires revealed that, with one exception (one of the non-organizers), subjects who had a mean PR score of .60 or greater (12 organizers and 3 non-organizers) expressed awareness of the categorized nature of the list prior to being questioned about it during the post-test interview, while only 2 subjects (both organizers) scoring below .60 (2 organizers and 23 non-organizers) did so.

Clustering on the Free Sort Task

The PR index was also used to measure the degree of category clustering on the free sort task (Table 2). All subjects who had not clearly categorized the pictures during the study period were asked to group together those pictures that were alike in some way. A two-way analysis of variance shows no significant racial or social class differences in clustering on this task, nor was there any significant interaction. Again, organizers clustered significantly more than non-organizers ($t = 2.99$, $df = 38$, $p < .01$). This difference was primarily due to the tendency of the non-organizers to make more than the four designated groupings (e.g., not including "sink" and "stove" with the other furniture items, or "bike" and "sailboat" with the motorized vehicles, or "purse" with the clothing items). However, when subjects who had responded in this manner were asked if they could group the pictures so that they would end up with only four groups, all were able to do so.

Teacher Ratings

In order to assess the relationship between the teacher ratings and

the other response measures, a score of "3", "2", or "1" was assigned to an overall rating of "Strong", "Satisfactory", or "Weak", respectively. (Informal observations of the teacher ratings of the subjects' work habits were made, but no statistical analyses were performed on these data.) Table 5 gives a breakdown of each experimental group according to the overall rating each subject received. Significant positive correlations were found to exist between these ratings and three response measures: study period organization ($r = .35$, $df = 38$, $p < .05$); clustering during recall ($r = .27$, $df = 38$, $p < .05$); and clustering on the free sort task ($r = .39$, $df = 38$, $p < .05$). Teacher ratings predict recall for organizers ($r = .54$, $df = 12$, $p < .05$), but not for the entire group of subjects ($r = .12$) or for non-organizers ($r = -.18$). Table 6 gives a frequency distribution of the overall teacher ratings for organizers and non-organizers.

Other Study Period Activities

No statistical analyses were performed on the study period activities data other than on the organization ratings; however, an inspection of these data reveals some interesting observations. A greater proportion of subjects who received an overall teacher rating of strong engaged in self-testing and/or singling out missed items for increased study than did subjects rated as satisfactory or weak. The proportions for self-testing are strong (64%), satisfactory (24%) and weak (11%). Those for studying missed items are strong (43%), satisfactory (29%) and weak (none).

TABLE 5
FREQUENCY DISTRIBUTION OF OVERALL TEACHER RATINGS

Experimental Group	Rating Level		
	Strong	Satisfactory	Weak
Low SES Black	3	4	3
Middle SES Black	3	3	4
Low SES White	4	5	1
Middle SES White	4	5	1
Total	14	17	9

TABLE 6
FREQUENCY DISTRIBUTION OF OVERALL TEACHER RATINGS
FOR ORGANIZERS AND NON-ORGANIZERS

Group	Rating Level		
	Strong	Satisfactory	Weak
Organizers	7	5	2
Non-Organizers	7	12	7
Total	14	17	9

CHAPTER IV

DISCUSSION

The results of this study indicate no significant racial or social class differences on the free recall of categorized items. These findings do not support Jensen's contention that low SES groups will perform more poorly than middle SES groups on this task due to the differential distribution of Level II, or conceptual, ability among socio-economic populations. However, the results of this study must be viewed with caution due to the rather narrow range of income levels sampled. Perhaps had a wider income range been tested, Jensen's prediction would have been confirmed. This appears to be particularly true of the white population. The middle SES white group performed somewhat better (but short of significance) on all performance measures than did the low SES white group (Table 2). The middle SES black group performed about the same as did the low SES black group--a finding that substantiates that of Mensing and Traxler (1973)--with their performance being comparable to that of the low SES white group. It appears that more research, using a wider range of income levels, is needed before the full story concerning racial and social class differences on this task will become known.

In addition to investigating racial and social class differences on this task, this study also sought to determine if differences in performance were associated with the differential use of particular strategies. Along these lines, it was found that subjects who organized the material during the study period (regardless of which experimental group they were

in) performed significantly better on all response measures than those showing no study period organization. Rather than trying to interpret this finding in terms of Jensen's Level I and Level II ability, it can perhaps be better understood if discussed in the framework of what a subject must do for maximal performance on this task. Neimark et al. (1971) have postulated that list memorization requires two things: (1) an exhaustive organization for the efficient encoding of each list item and (2) a mechanism for keeping track of what has been recalled and what is yet to come. For the material in this study, the most efficient learning strategy would be to group the pictures categorically and then to use these categories to structure recall. Only about a third of the subjects did this, indicating that at this grade level children are still relatively unaware of these requirements. The most common strategy utilized was that of studying the pictures according to spatial arrangement and then recalling them in any order that came to mind. Although a number of subjects reported trying to recall the pictures by rows, only 7 were able to do so with any degree of success (as demonstrated by a spatial clustering PR score of over .50). The mean score of the number correctly recalled for these subjects (17.0) is above that for the group of non-organizers (16.15) but still below that for the organizers (17.6). Apparently, recalling items according to spatial arrangement is not as efficient as recalling according to categories but is more efficient than a random ordering.

Although the performance of the organizers is significantly better than that of the non-organizers, it does not measure up to the performance of college-age subjects, who according to Neimark et al. (1971) "have a

well-structured system for organizing material which is applied immediately and efficiently" (p. 431). The performance of college age subjects differs in three main ways from that of the organizers in this study: (1) college subjects completely categorize the items from the very outset (no organizers in this study achieve complete categorization before Trial 2), (2) they commonly use elaborated orderings, such as alphabetizing the items within each category (no organizers used an elaborated ordering) and (3) they typically attain criterion by the end of three trials (only two organizers in this study did so).

A question arises as to what factors account for the differences in performance between the college age subjects in the Neimark et al. (1971) study and the organizers in the present study. Did the college subjects do better because they are more familiar with the categories and therefore faster at detecting them, or is it that they are more practiced at the mechanics of organizing material for its systematic retrieval? While both factors probably contribute to the performance differential between the two groups, it would appear that the second factor may do so to a greater extent than the first. Most of the organizers did not appear to know exactly what to do once they had grouped the pictures. Twelve of the 14 organizers did not even bother to count the number of items in each category, making it difficult at best to keep track of the number of items in each group remaining to be recalled. It is apparent that fifth graders have not had much experience at this type of activity, probably because classroom material is sufficiently structured to permit efficient retrieval without having to resort to the kind of organizing activities required for the memorization of the material in this study.

This may explain why no significant correlation was found between the overall teacher ratings and the number of items correctly recalled.

A second question that arises from the results of this study is why more children did not organize the material. It appears that it could have been for either of two reasons: (1) they did not detect the categorized nature of the stimuli (implying that if they had they would have organized the pictures), or (2) they did not recognize that such groupings could be helpful in structuring recall (implying that category detection would not have necessarily led to organization). While both explanations are possible, the second seems to be the more probable. It is true that all but 3 of the non-organizers failed to detect the category groupings, but nearly all of them were aware that some of the items seemed to go together. It seems that this should have provided a cue as to the categorized nature of the pictures had they been actively seeking an organization. Furthermore, most of the non-organizers had no difficulty categorizing the items on the free sort task. It is tempting to speculate that the performance of many of the non-organizers would not have been significantly improved had they been apprised of the list structure at the very beginning of the task.

One interesting observation that was noted while examining the performance of the subjects who were rated as being strong students (overall rating) by their teachers is that organization (and not self-testing or studying missed items) does seem to be the critical variable affecting recall. The mean recall of the 7 strong subjects who organized is 18.9 while that of the 7 strong non-organizers is 16.1. This implies that recall is not determined by ability, per se. Even a strong student must

organize the material to do well on this task.

In conclusion, it can be stated that no racial or social class differences on the free recall of categorized items were found. Those subjects organizing the pictures during the study period did significantly better on all performance measures than did those subjects showing no study period organization. These results were interpreted in terms of the subjects' awareness of the demands of the task. In the opinion of this author, performance differences can be more readily explained in this framework than by resorting to Jensen's hierarchy of abilities.

BIBLIOGRAPHY

BIBLIOGRAPHY

8F699.D46

- Cole, M., Frankel, F., & Sharp, D. Free recall learning in children. Developmental Psychology, 1971, 4, 109-123.
- Gerdes, B. The relationship of provided organization to free recall learning in two populations. Unpublished doctoral dissertation, University of California, Berkeley, 1971.
- Glasman, L. D. A social class comparison of conceptual processes in children's free recall. Unpublished doctoral dissertation, University of California, Berkeley, 1968.
- Jensen, A. R. Learning abilities in Mexican-American and Anglo-American children. California Journal of Educational Research, 1961, 12, 147-159.
- Jensen, A. R. Rote learning in retarded adults and normal children. American Journal of Mental Deficiency, 1965, 69, 829-834.
- Jensen, A. R. Patterns of mental ability and socio-economic status. Proceedings of the National Academy of Science, 1968, 60, 1330-1337.
- Jensen, A. R. How much can we boost IQ and scholastic achievement? Harvard Educational Review, 1969, 39, 1-123. (a)
- Jensen, A. R. Intelligence, learning ability, and socio-economic status. Journal of Special Education, 1969, 3, 23-35. (b)
- Jensen, A. R. The role of verbal mediation in development. Journal of Genetic Psychology, 1971, 118, 39-70.
- Jensen, A. R., & Frederiksen, J. Free recall of categorized and uncategorized lists: A test of the Jensen hypothesis. Journal of Educational Psychology, 1973, 65, 304-312.
- Mensing, P. M., & Traxler, A. J. Social class differences in free recall of categorized and uncategorized lists in black children. Journal of Educational Psychology, 1973, 65, 378-382.
- Moely, B. E., Olson, F. A., Halwes, T. G., & Flavell, J. H. Production deficiency in young children's clustered recall. Developmental Psychology, 1969, 1, 26-34.
- Neimark, E., Slotnick, N. S., & Ulrich, T. The development of memorization strategies. Developmental Psychology, 1971, 5, 428-432.

Peterson, R. S. The effects of categorization training and class inclusion training on children's use of categories in free recall. Unpublished doctoral dissertation. University of California, Berkeley, 1972.

APPENDIX A
TEACHER RATING FORM

TEACHER RATING FORM

Would you please rate the following work habits of _____

as strong, satisfactory, or weak:

<u>Work Habits</u>	<u>Strong</u>	<u>Satisfactory</u>	<u>Weak</u>
Uses time wisely	_____	_____	_____
Follows directions	_____	_____	_____
Completes work	_____	_____	_____
Demonstrates accuracy in work	_____	_____	_____
Works independently	_____	_____	_____
Has adequate attention span	_____	_____	_____
Accomplishes homework assignments	_____	_____	_____
Takes pride in work	_____	_____	_____
Learns easily	_____	_____	_____
Desires to learn	_____	_____	_____
Overall, how would you rate this student?	_____	_____	_____

Comments or any additional information that you think might be helpful in evaluating this child's academic performance:

APPENDIX B

OBSERVATIONAL DATA SHEET

OBSERVATIONAL DATA SHEET

<u>Study Period</u>	<u>Trial 1</u>	<u>Trial 2</u>	<u>Trial 3</u>
Rehearses items			
aloud	_____	_____	_____
silently	_____	_____	_____
Groups items			
not at all	_____	_____	_____
partially	_____	_____	_____
completely			
categorically	_____	_____	_____
otherwise	_____	_____	_____
Utilizes self-testing			
before grouping	_____	_____	_____
after grouping	_____	_____	_____
Singles out missed items			
before grouping	_____	_____	_____
after grouping	_____	_____	_____
Other strategy	_____	_____	_____
Utilization of time			
fully utilizes time	_____	_____	_____
does not fully use time	_____	_____	_____
Attitude toward task			
remains interested	_____	_____	_____
gets bored or distracted	_____	_____	_____

Recall Period

General manner			
hurried	_____	_____	_____
relaxed	_____	_____	_____
Searches room for cues	_____	_____	_____
Counts items	_____	_____	_____
Time	_____	_____	_____

Free Sort Task

Could sort correctly	_____
Could sort correctly with verbal prompts	_____
Could sort correctly with picture prompts	_____

Did you enjoy doing this? Yes _____ No _____

Would you like to do something like this again sometime? Yes _____ No _____

Comments:

APPENDIX C

INTERVIEW QUESTIONNAIRE

INTERVIEW QUESTIONNAIRE

To be asked after the first recall:

What did you do during the study period to learn the pictures?

What else did you do?

To be asked after the second recall:

What did you do this time during the study period to learn the pictures?

Did you do anything different this time from what you did last time?

To be asked after the third recall:

What did you do this time to learn the pictures?

Did you do anything different from before?

Did you try to recall the pictures in any certain order?

Do you know how many pictures there were?

If the subject has not mentioned noticing categorical groups:

Were there some pictures that seemed to go together so that when you remembered one of them you were reminded of others? Which ones?
Hand the subject the pictures. Ask him to group the pictures that seem to go together in some way.

If the subject makes too many groups or does not group correctly:

Good. Now, do you think you can group these pictures so that you end up with only four groups? (If the subject cannot do this correctly, prompt him until he can.) Have the subject explain the basis for his groupings.

Did you enjoy doing this?

Would you like to do something like this again sometime?