SOME EFFECTS OF SOCIAL SATIATION AND VISUAL AMBIGUITY UPON RETARDATES AND NORMALS

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SOME EFFECTS OF SOCIAL SATIATION AND VISUAL AMBIGUITY UPON RETARDATES ANDNormals

DISSERTATION

Presented to the Graduate Council of the North Texas State University in Partial Fulfillment of the Requirements

For the Degree of

DOCTOR OF EDUCATION

By

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Denton, Texas

August, 1970
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CHAPTER I

INTRODUCTION

The purpose of this research has been to investigate the ability of subjects of three mental ability levels—normal, educable retardates, and trainable retardates—to recognize and identify familiar visual images projected in a manner assuring standard degrees of ambiguity of the projected images under the conditions of social satiation and non-satiation.

The total body of educational, psychological and developmental research into the nature and causes of mental retardation is relatively small. Compared to the number of studies in a well-researched area, such as anxiety for example, the number of studies in the field of mental retardation is approximately one-third as large. Large-scale, relatively systematic research into the nature and causes of mental retardation began about twenty years ago. There has been a recent surge of scientific interest in this field.

There are a number of reasons for this apparent delay of systematic scientific attention to mental retardation.
First, the general public—and the parents of retardates particularly—were most reluctant to face the issues relevant to the education and development of retarded children. This is at least understandable in view of the long-standing social and cultural stigma attached to mental retardation. Such influences made even accurate actuarial figures difficult or impossible to obtain. Second, educators and educational psychologists, faced with the practical problems of designing educational programs suitable for retarded persons, found little time or motivation to concern themselves with questions more theoretical than categorizing retardates into relatively homogeneous groupings. However, it was the great difficulty encountered in categorizing retardates objectively that led to further and further differentiation of retardates and study of their skills. It became necessary to answer theoretical questions about the particular skills of some retardates. Interest in the abilities of the idiot savant is one example. Third, the field of mental retardation research was one of the last to receive its share of funds from sponsoring institutions such as foundations or the government. It would appear now, however, that mental retardation research grants have been made in sufficient number and size that this inequity has
been eased. Fourth, the relative ease with which an index of intelligence can be obtained led many interested in the field of mental retardation to use this as one of a very few measurements, perhaps the only one, of the skills of a retarded person. Objection to this, especially in the 1930's, was heard, usually in the form of pointed statements about the differences in the mental capabilities of two children who earned the same intelligence quotient on a standardized intelligence test.

As matters now stand, the field of theoreticians--educational, psychological, and developmental--apparently are divided on the issue of what may be termed the basic cause of mental retardation. One group of theoreticians hold the "defect position"; this group claims that mental retardates have or experience some mental defect of a neurological type causing their mental functions to be substandard. Though most authorities would certainly agree with this regarding the brain-damaged retardate, those holding the "defect position" apparently believe that all retardates have some defect; the fact that neurologists and psychologists often cannot detect such a defect in some retardates only proves to this group that measurement and assessment techniques lack enough refinement and minute accuracy to
detect and measure the existent defect. The "defect position" apparently is held by the majority of theoreticians interested in mental retardation research today.

The other group of theoreticians are somewhat more liberal in their position. They limit their interest and work mostly to the familial retardate without observable neurological defect; however, they usually agree that neurological problems can and do attenuate mental capability. They are not willing to concede, though, that persons with no observable defect do indeed have such a defect that defies detection. Rather they claim that it is entirely possible for a person to be mentally retarded for a variety of reasons having nothing to do with his neurological status. They claim, for example, that cultural deprivation, inherited conditions, motivational variables, institutionalization, and even emotional problems mitigate against the demonstration of mental ability. Perhaps the leading theoretician of this group has been Edward Zigler of Yale, who has investigated a number of variables he believes can cause mental retardation, or at least retarded behavior (1, 3, 5, 10, 11, 12, 13, 14, 15).

Workers in both of these major groups are currently interested in investigating the cognitive functioning of
retardates, apparently having concluded that the measurement of mental ability in the more customary or traditional ways is inadequate. There has been a variety of positions taken regarding the relationship of cognitive functioning and retardation (2, 4, 7, 8, 9) which have pointed to an assortment of defects related to the problem. Some researchers apparently have taken what can only be described as an all-encompassing position as to the cause of mental retardation on the basis of one or two experiments (6, 12).

Research efforts made to investigate the nature and function of abilities of the retardate have customarily required overt physical behavior of one kind or another, immediately giving rise to the question of motivational variables. Experimental procedures have required drawing, the playing of marble board games, exercises, or other activities requiring considerable expenditure of energy.

Perception is said to exist when an observer or perceiver is in some relation to an object to be perceived. Under ordinary conditions, there is no difficulty encountered by the perceiver in giving meaning to the object to be perceived. However, should the object itself be unfamiliar to the perceiver, giving meaning to the object becomes difficult or impossible. Furthermore, if the conditions of
perception are made difficult in some manner, giving meaning to the object is thereby made difficult in some degree. In either condition, the perceiver is faced with the fact that more than one meaning or understanding of the object is possible. As long as there is more than one meaning that can be given to the object, a condition of ambiguity is said to exist.

In the present study ambiguity caused by visual images of objects unfamiliar to the subjects was eliminated by insuring that all subjects were familiar with the objects imaged. Ambiguity was created by interfering with the conditions of perception, namely by projecting the visual images of familiar objects in several out-of-focus conditions to assure that the subjects could give more than one meaning to the visual images. Subject performance required only the physical effort necessary for a minimum of speech.

No previous studies have investigated the relationship of intelligence, social satiation, and visual recognition phenomena.
CHAPTER BIBLIOGRAPHY


4. Kounin, J., "Experimental Studies of Rigidity, II; 'The Explanatory Power of the Concept of Rigidity As Applied to Feeblemindedness'", Character and Personality, IX (1941), 166-273.


CHAPTER II

REVIEW OF THE LITERATURE

The purpose of this chapter is to describe and discuss research previously done which is similar or related to the present study. Research findings will be described in two groups: those dealing with social satiation or social reinforcement, and those dealing with recognition of ambiguous visual stimuli.

Visual Ambiguity Studies

Galloway (10) conducted a study to test the hypothesis that perceptions initially made in a relatively unstructured field tend to persist as cognitive influences, and then to make further perceptions, particularly more adequate and accurate perceptions, more difficult. This study involved the use of eighty-eight subjects who were college students at the University of California. They were approximately equally divided between men and women.

Fifteen slides were used, both colored and continuous-tone black-and-white. These slides were projected on a screen; the criterion tasks were the correct identification
of slide content, and the production of "guesses" when subjects were not sure of the nature of slide content. Subjects were divided into six groups for different types of presentation. There was one experimental condition requiring serial presentation of slides in eight successive stages. The first stage of the series was the most blurred. Each successive stage was less blurred (out of focus), and the last stage, stage number eight, was in perfect focus. Other conditions were structured so that subjects in four groups received only an isolated presentation of selected slides in each blurred stage from stage four through stage seven. A final group, used as something of a control, viewed each of the slides in the final stage of sharp focus, stage eight. Slide exposure was for four seconds; then subjects were given a short time to write their responses before presentation of the next slide. The design was counterbalanced so that subjects exposed to part of the slides in serial presentation were also exposed to other slides in one of the isolated presentations. Subjects seeing slides exposed in one or more of the isolated presentations were also presented other slides serially. This method was used to hold constant the effects of individual differences, such as differential underlying cognitive skills, among subjects.
The design was rather uneven, however, because the number of measures from the several isolated conditions varied greatly.

Galloway's findings supported his hypothesis significantly since there was greater accuracy of visual recognition of slide presentations which had not been preceded by more blurred presentations of the same images. Hence the interpretation was that initially viewing slides in an ambiguous presentation created interference which had to be countered or controlled by subjects before accurate image identification could be made. Another finding was that a large number of repetitive stereotyped recognition hypotheses were produced by subjects, particularly in the serial presentation condition. Stereotyped responses were noted not only from one focus position to another of the same slide, but also from one slide to another. Fewer stereotyped responses were noted for those slides presented in the isolated conditions. These phenomena were interpreted as further evidence of the interference effect of initially incorrect recognition hypotheses on finally reaching a correct recognition hypothesis.

Bruner and Potter (3) have investigated the phenomenon of interference in the recognition of visual stimuli. They point out that the visual recognition of stimuli, such as pictures and slides, is ordinarily effortless and not subject
to any discernible interference. However, they quote Galloway's claim that to introduce distortion or diminished clarity in the visual image does delay visual recognition (10). Bruner and Potter have investigated the possible systematic effects of such ambiguity factors related to this delay of visual recognition.

Bruner and Potter first used a sample of thirteen visually normal subjects for evaluating the "ambiguity potential" of each slide in a series, and used only those similar in this quality.

The positions of slide blur or visual ambiguity used in the actual study formed a continuum. The focus positions or points were, in order, the Very Blurred Point, the Medium Blurred Point, the Light Blurred Point, and finally the First Quartile Point, which was the last point at which any slide was presented. The points are described as follows:

Very Blurred Point—presentation of each slide in an extremely out-of-focus condition. This was the beginning point for each slide in serial presentation and presumably was the most out-of-focus condition possible to obtain with the projector used, though this was not explained in the Bruner and Potter report.
Medium Blurred Point—an arbitrarily selected point four-fifths of the distance on the projector lens barrel from the Very Blurred Point to the First Quartile Point for each slide.

Light Blurred Point—the point at which any single subject was able correctly to identify the content of each slide.

First Quartile Point—the focus point at which one-quarter of the subjects had correctly identified the content of each slide. This was the final position at which presentation of a slide was made to subjects.

Bruner and Potter used a slide projector with a motorized variable-speed focusing mechanism capable of changing the focus of a slide at a constant rate. Their design called for bringing the slide presented into better and better focus continuously rather than stopping at given intermediate stages as in the present study. They measured the time of exposure from the Very Blurred Point, and each intermediate point described above, to the final First Quartile Point using an arbitrary focusing rate. From the Very Blurred Point to the First Quartile Point was 122 seconds; from the Medium Blurred Point to the First Quartile Point was 35 seconds; from the Light Blurred Point to the
First Quartile Point was 13 seconds. These time periods were used in the investigation.

Eighty-nine new subjects were obtained and divided into nine groups of approximately equal size. Three groups began their viewing of each slide at the Very Blurred Point. One of these three groups covered the course of focus conditions from the Very Blurred Point to the First Quartile Point in 122 seconds, another in 35 seconds, and the third in 13 seconds. Three other groups began their viewing of the slides at the Medium Blur Point and each covered the remaining course of focus conditions until the reaching the First Quartile Point in the same three time periods. Finally the remaining three groups began their viewing at the Light Blur Point and each covered the remaining course of focus conditions until reaching First Quartile Point in the same three time periods. Thus time of exposure as well as initial degree of blur or ambiguity were manipulated.

An analysis of variance was computed, and the resultant F ratios demonstrated significance regarding both the time and the focus position variables. There was no significant interaction. As predicted, the longer ambiguous images were presented to subjects, the more difficult it was for them to produce correct identifications of the visual
image. The average number of subjects making correct identifications was significantly greater in the groups exposed for 13 seconds than in the groups exposed to slides for 35 seconds; the group exposed to the slides for 35 seconds also had a significantly greater number of correct responses than the group exposed to the slides for 122 seconds. Results also showed that the more ambiguous or sub-standard the initial presentation, the fewer the correct identifications. Both findings were interpreted by Bruner and Potter as supporting their contention that subjects presented visual images in an ambiguous manner do, in fact, produce hypotheses as to the nature of the visual image before it becomes sufficiently clear to identify it correctly. The authors suggest that these incorrect recognition hypotheses "flow" in the sense that they are, or may be, constantly rejected and new recognition attempts made until such time as a final correct recognition hypothesis is finally attained. Also they conclude that the longer the time a subject is exposed to an ambiguous image, the more incorrect hypotheses he will form and the more these will interfere with his attainment of a correct recognition.

Bruner and Patton report elsewhere (5, p. 4) their belief that the higher the intelligence of the subject, the
more incorrect recognition hypotheses he will make and consequently the more recognition interference he will experience. This was not tested empirically, however.

Frederiksen (7) has done research investigating recognition of stimuli presented both visually and auditorially. His research included the investigation of the relationship of cognition to the correct identification of auditory and visual stimuli. Therefore he measured visual and auditory stimuli recognition and also used other tests of cognitive abilities with his subjects.

Part of the presentation of ambiguous visual images was in standard stages of ambiguity employed in the study reported in this paper; he also presented ambiguous visual images over a wider range of ambiguity as a partial replication of Bruner and Potter's work (3).

For the part of his study investigating auditory ambiguity, Frederiksen used an auditory masking technique. He used single polysyllabic words as stimuli overlaid electronically with four other voices speaking simultaneously to mask the stimulus words. The masking was presented at different levels of loudness in relation to the loudness of the stimulus word. Since this part of his study is not completely pertinent to this dissertation, the design of the
auditory portion of this study will not be further summarized.

Frederiksen's subjects were 145 paid male undergraduate and graduate students at Princeton University. Eighty-five students were used to study the effects of a wide range of ambiguity in both the auditory and visual portions of the study; sixty students were used to investigate the effects of a narrow range of ambiguity in both sense modalities. In the visual recognition investigation, the Wide Range of Ambiguity condition was designed so that there were sixteen slide focus positions or states for each slide, the last being the position of complete clarity. In the Narrow Range of Ambiguity condition, the number of focus positions for each slide differed depending upon its history of being recognized early or late in the course of visual presentation. Focus positions at which no subjects identified slide content during the Wide Range condition were eliminated for the Narrow Range condition. There was an allowable elimination of ten focus positions for each of the slides; the elimination of the first eight focus positions was the average for the slides presented in the Narrow Range of Ambiguity condition.
The criterion task was the identification of fourteen color slides of ordinary objects in the environment. Subjects were asked to try to identify the image as the slides came more and more into sharp focus. "Recognition point" was that point at which a subject produced a criterion word or phrase which correctly identified the visual image without a subsequent return to an incorrect word or phrase. His score was the number of the focus position at which correct recognition was produced, unless he produced none in which case he was given a score of sixteen.

Frederiksen also used data collected from subjects using other tests of their cognitive abilities. Such data were obtained through the administering of twenty-seven separate tests of cognitive ability culled from research into cognitive ability; the tests included the measures used by Wand (16); Frick, Guilford, Christensen and Merrifield (9); French, Ekstrom, and Price (8); and Scheier (13). Selected cognitive factors were combined by factor analysis to form a cognitive rigidity-flexibility factor of particular relevance to recognition of visual and auditory stimuli.

Frederiksen's findings demonstrated that both visual and auditory recognition speed, under the Narrow Range of Ambiguity condition, could be predicted from cognitive data
more significantly than they could be under the Wide Range of Ambiguity condition. This finding was predictable from the work of Bruner and Potter. Also significantly greater visual recognition efficiency was found under the Narrow Range of Ambiguity condition than under the Wide Range of Ambiguity condition, also predictable from the work of Bruner and Potter. This was, again, explained on the basis of the narrower range of ambiguous presentation presenting less opportunity for subjects to form incorrect recognition hypotheses which would then interfere with their arriving at a correct recognition hypothesis.

With regard to the cognitive rigidity-flexibility dimension of this study, the results support Frederiksen's hypothesis that greater flexibility is significantly associated with later visual recognition while greater cognitive rigidity is significantly associated with earlier visual recognition. However, the findings from the auditory recognition portion of this study showed the reverse. Subjects who were more cognitively flexible could identify ambiguous auditory stimuli significantly earlier and at a more ambiguous stage than could rigid subjects, while rigid subjects identified ambiguous auditory stimuli significantly later in their presentation and in a condition of less ambiguity.
The rationale of this seemingly contradictory finding was explained as being some function of the differing ways of masking stimuli for the two sense modalities. The presentation of visual stimuli in out-of-focus conditions was not seen as comparable with the manner of making auditory stimuli ambiguous as used in this study. The latter was a true masking effect in which the stimulus words were actually present in their correct form from first to last in the course of presentation. However, presenting visual images out of focus did not give subjects any opportunity of sensing a valid image until relatively late in the course of presentation. It was hypothesized that the invention of a visual masking method somewhat comparable to the auditory masking used in this study might well result in subjects cognitively flexible being able to produce correct visual recognition hypotheses earlier in the course of visual image presentation.

Frederiksen interprets his findings as indicating that recognition interference was greater in the auditory modality than in the visual, and that auditory test results are more highly related to the cognitive rigidity-flexibility quality than are visual ambiguity test results. Nevertheless,
cognitive rigidity-flexibility is significantly related to both auditory and visual recognition skills.

Wyatt and Campbell (17) did a study in which they were primarily interested in demonstrating the inadequate and the denigrating effect of "unverified hypothesizing on guessing" (17, p. 498) on perception.

Subjects used were four classes of sophomore students, the classes ranging in size from twenty-six to forty-one students. These were psychology classes at Ohio State University. Therefore the subjects were presumably above average intelligence.

The criterion task was the correct identification of a projected visual image which was exposed for five seconds after which time was allowed for subjects to write their recognition hypotheses. One class was shown the series of twelve slides serially. The other classes were shown the slides in three isolated out-of-focus ambiguous conditions. The design was counter-balanced to insure that subjects in three of the classes were measured on three different isolated out-of-focus presentations. The written response protocols were then scored for accuracy of identified slide content. As a check of scoring reliability, both Wyatt and Campbell scored a sample of test protocols separately
with the result that they agreed on eighty-five of eighty-six responses.

The results of the Wyatt and Campbell study demonstrate significantly that inadequate or inaccurate perceptions do have a degrading effect upon later perceptions. They point out that longer perceptual experiences may well represent a liability regarding viridicality of later perceptual experiences. Wyatt and Campbell are inclined to generalize this phenomenon into the sphere of social and interpersonal perception, a generalization which may or may not be warranted.

The findings also were replete with evidence of stereotypy of responses. A stereotyped response was defined as any repeated error. A sample of forty-five protocols were randomly selected for examination of this phenomenon from the serial presentation group. Out of 690 possible opportunities for a stereotyped response, the authors report noting 344. They further report that percentage analysis of stereotypy by individual subjects revealed a minimum of seventeen percent to a maximum of eighty-eight percent. The authors interpret this finding in the light of what they term "sophisticated reinforcement doctrine". They contend that the high incidence of the stereotyped responses can be
explained by noting that any "guess" or hypothesis was rewarded merely by meeting the requirement of the instructor, or at least by providing a partial escape from the situation. Initial responses had been reinforced in one or the other of these ways and subjects could therefore be interpreted as sustaining their stereotyped responses later into the successive stages of each slide for this reason alone. Wyatt and Campbell also note that even if later research of a similar type does not require a response for each stage of ambiguity and if stereotypy is still found, this could easily be explained as occurring because of the secondary reinforcement value in our society of making a response, even if it is not necessarily the correct one.

Synthesis of Visual Ambiguity Studies

Galloway (10), Bruner and Potter (3), Wyatt and Campbell (17), and Frederiksén (7) have all done studies reported here which demonstrate that the recognition of ambiguous visual stimuli is more difficult than the recognition of visual stimuli presented clearly and without ambiguity. In each instance this finding has been further elaborated by demonstrating that subjects presented initially with highly ambiguous stimuli were significantly less
efficient in final correct recognition than subjects presented initially with less ambiguous stimuli. The nature of this inefficiency was explained in some detail by Frederiksen as including both time inefficiency and total exposure inefficiency. Subjects who had been presented ambiguous visual stimuli required significantly more time for recognition. Also more focus positions or conditions were required for correct recognition by those subjects initially presented with great ambiguity than for those subjects presented with less ambiguity. All of these studies have interpreted the findings as being indicative of visual recognition interference having significant negative effect upon a solution of the problem, i.e., correct recognition of the visual stimuli.

Frederiksen (7) also introduced the idea of a relationship between cognitive flexibility-rigidity phenomena and the ability to recognize ambiguous visual images. Specifically he has demonstrated that late recognition of ambiguous visual images is significantly associated with high cognitive flexibility, making efficiency of visual recognition an effective predictor of cognitive rigidity-flexibility.
Wyatt and Campbell (17) and Galloway (10) report a high incidence of response stereotypy in their visual recognition studies. The first-mentioned writers suggest that their subjects were very highly "right answer oriented", and demonstrated some perceived value in producing some hypothesis identifying ambiguous visual stimuli, even if the hypothesis produced was incorrect. They account for this on the basis of reinforcement principles by saying that there was at least minimal reinforcement value in producing an incorrect hypothesis, even a stereotyped one.

These studies have not investigated the phenomenon of recognition of ambiguous visual images as some function of mental ability. However, one report of Bruner's work (3) suggests that children have about the same efficiency in visual recognition as adults. Frederiksen's work demonstrates a significant relationship between the dimension of cognitive rigidity-flexibility and the ability to recognize ambiguous visual images. If retardates are cognitively rigid, then possibly they would be more efficient than those of normal mentality in visual recognition ability. All authors reported above uniformly suggest that the existence of incorrect visual recognition hypotheses creates inter-
ference with final correct hypothesis formation. It seems parsimonious to suggest that retardates may well have less difficulty producing correct recognition hypotheses since they are likely to produce fewer incorrect hypotheses.

Social Satiation and Reinforcement Studies

While considerable research effort has been expended finding and further substantiating the conclusion that positive verbal reinforcers generally work to enhance or facilitate behavior while negative verbal reinforcers generally attenuate behavior, some studies (4,6,19) have suggested that verbal reinforcers differ as to kind and type. Typical of such studies is one by Zigler and Kanzer (19) in which two classes of verbal reinforcers are investigated in relation to social class membership of subjects. The two classes of verbal reinforcers discussed are those connoting correctness (such as the words right and correct), and those connoting praise (such as good and fine).

Subjects used for study were forty children, half belonging to the middle socio-economic class and half to the lower socio-economic class. Subjects were all second graders of at least average intelligence whose mean age was 7.9 years. Subjects of both middle and lower class
were equally divided into sections to receive either "praise" treatment or "correct" treatment as experimental conditions. All groups were approximately equally divided between boys and girls.

The criterion task was playing the two-hole marble board game. Each subject was merely given the instruction to place marbles in either of the two holes he wished, one at a time, for ten minutes. During the first three minutes no reinforcers were dispensed, and this period was used by the experimenter to determine the subject's preference for one hole or the other. For the last seven minutes, the experimenter began dispensing verbal reinforcers to responses to the least preferred hole, initially for ten responses at the rate of one reinforcer for each trial. For the next ten responses he dispensed a reinforcer for every second response until ten more responses had been reinforced. For the next fifteen responses a reinforcer was given after every third response. Thereafter a reinforcer was given after every fifth response until the game ended. The criterion score was the reinforcer effectiveness score devised by Gewirtz and Baer (11, pp. 54-55). This score was defined as the median reinforced response percentage computed for each one-minute segment of the seven-minute reinforcement
period minus the percentage during the third minute of the three-minute baseline period.

Performance difference before and after reinforcement regarding the use of the least preferred hole in the marble board was significant statistically, indicating that mean reinforcer effectiveness scores were all significantly greater than zero for combined conditions. Reinforcer effectiveness scores were not related either to the social class of subject or the differences in reinforcement conditions since differences were not significant statistically. The interaction effect between treatment condition and social class was significant.

Zigler and Kanger conclude that social reinforcement has again been shown to be effective in enhancing criterion behavior of children. Also the interaction effect discovered seems to have considerable importance theoretically and practically. The data indicate that "praise" reinforcers are more effective for lower class children while "correct" reinforcers are more effective with middle class children. The authors do not know why this finding occurred, but they hypothesize that among middle class children being "right" may have been associated most often with primary and secondary reinforcers, while for lower class children being
praised may well have the same associations. The authors point out that some research has shown that the need for praise and attention diminishes with maturity, and suggest that perhaps lower class children of the age used in their study are "developmentally lower" than middle class children if a hierarchy of reinforcers does exist. Zigler and Kanger also suggest that "correct" reinforcers are, in and of themselves, more "abstract" than "praise" reinforcers and therefore may constitute more reinforcement value for middle class children for this reason.

One wonders if there might not be significant differences between lower and middle class children in the Northeast, where this sample was taken, and lower and middle class children in other geographic areas which might partially invalidate such explanations and conclusions.

Gewirtz and Baer have done two studies providing information pertinent to the present study. The earlier study (11, p. 51) utilized early school-aged children in a research design intended to answer the question of whether social drives exist in the same sense that "primary appetite drives" do, and if such social drives respond to deprivation of reinforcement in a similar manner to these more basic drives.
Their results did support the conclusion that social drives and more basic drives co-exist. Both are highly influential on the behavior of normal children. Reinforcement deprivation was shown to have a systematic and predictable effect upon behavior linked to the satisfaction of social drives.

A later related study (11, pp. 53-63) partially replicated the first study and also investigated the effect of social satiation. One hundred and two first and second grade children from a laboratory school setting were used as subjects. They had a mean age of seven years, six months and a median Stanford-Binet I. Q. score of 127. They were equally divided between boys and girls in all treatment conditions which included conditions of deprivation, non-deprivation and satiation. The social satiation condition consisted of a twenty-minute period in which each subject drew pictures, cut out designs from paper, or similar activity. During this period the experimenter maintained constant friendly conversation along with encouragement of the subject to talk about himself and his activities. At the end of this twenty-minute period the subject was then taken to the testing site. In the deprivation condition, the subject was isolated for a
twenty-minute period in which he could draw or cut out designs. In the non-deprivation condition, subjects were given the drawing and paper-cutting materials for their use. The experimenter, though he was physically present in the room, held interaction with the subjects in this condition to an absolute minimum, and preferably did not interact with them at all.

After the treatment period each subject was given a two-hole marble board game to play requiring certain color marbles to be placed in the required holes, which was the "central task". Beginning with a base-line period of four minutes of such play during which time no reinforcers were dispensed, testing continued for another ten minutes during which verbal reinforcers such as "good" and "that's fine" were spoken by the experimenter according to scheduled ratios of reinforcement. The number of marbles correctly placed were counted. Reinforcer effectiveness scores were computed for subjects previously placed under each of the three pre-task conditions.

The findings of this study strongly support the hypothesis that social reinforcers of the type used in this study are differentially effective on behavior depending upon whether or not children are subjected to a pre-condition of
deprivation, non-deprivation or satiation. While verbal reinforcers were found to be significantly effective following all three pre-conditions used in this study, they were found to have their greatest effectiveness following the deprivation condition, somewhat less effectiveness following the non-deprivation condition, and the least effectiveness following the satiation condition as predicted.

These studies by Gewirtz and Baer support the general hypothesis that there exists, at least for children, social drives subject to conditions of social deprivation and social satiation. These drives apparently respond similarly to what have been called "primary appetitive drives" under conditions of satiation and deprivation. They do point out that their later study was limited to only one kind of social reinforcer, that of a "verbal approval" reinforcer, and that the effects of all possible kinds of social reinforcers are not demonstrated by their work.

Waldron (15) has done a study investigating the effects of drive level, intelligence level, and different types of reinforcers used with the two-choice discrimination learning task criterion used by Gewirtz and Baer and described above. Subjects used were ninety female retardates of the familial type. The subjects' mean chronological age was twelve
years, two months with a range from six years through twenty-one years, four months. Their range of intelligence quotients was from twenty to seventy with a mean of thirty-nine.

Waldron used a three-dimensional analysis of variance design involving the following:

Drive levels—deprived, non-deprived, and satiated;
Intelligence levels—mildly retarded, moderately retarded, and severely retarded;
Reinforcement types—social and material.

Subjects of the different intelligence levels were assigned at random to each of eighteen treatment conditions. Subjects performed the criterion task for a total of thirteen minutes of which the first three minutes was used as a baseline period without reinforcement. The remaining ten-minute period was the reinforcement period with correct responses being given either social or material reinforcement. Verbal reinforcement made during the criterion task was exactly as described by Gewirtz and Baer (11, p. 54). Material reinforcement was in the form of candy given to subjects for desired performances.

The deprived condition was effected by the experimenter leaving the subject alone in the testing room for a
twenty-minute period on the pretext of having to get materials required for the game they were to play. The non-deprived condition was effected by bringing each subject into the testing room and beginning to play the game immediately. The satiation condition was created for subjects by bringing them into the testing room and telling them that it would be a little while before they could play the game and that this time would be used by letting the subject play with materials available. These consisted of simple toys such as mechanical puzzles and plastic nuts and bolts. Having subjects play with these toys for the twenty-minute period merely assured sufficient time and opportunity for the experimenter to maintain constant praise, admiration for their play with the toys, and a steady stream of friendly conversation. The plan for this period was to provide each subject with at least thirty such social-verbal reinforcers during the twenty minute period. After this period was over, the criterion task was performed.

In absolute values of reinforcer effectiveness, the learning of socially deprived subjects was the most enhanced, the learning of the non-deprived subjects was the next most enhanced, and that of the socially satiated subjects the least enhanced. However, the mean differences noted
among these groups did not achieve significance statistically.

Regarding the relative effectiveness of the two different kinds of reinforcers used, differences obtained also failed to achieve significance statistically. However, there was a small absolute difference in learning in favor of social reinforcers, rather than material reinforcers, as predicted. As a possible explanation of why this difference was not greater, it was suggested that the manner of creating social deprivation may not have been completely effective. Another finding was that the severely retarded responded significantly better to social reinforcers than to material reinforcers, a finding inconsistent with predictions made. About this Waldron says the following:

One possible explanation of the counter-results was that the severely retarded, due to their condition of extreme deviation from societal norms, constituted a sub-group who had a history of long-term social deprivation. If such a condition existed, they would be more affected by social-type reinforcers in keeping with drive reduction theory. (15, p. 88).

McCoy and Zigler (12) have done a study investigating the possible relationship between social reinforcer effectiveness and the nature of the relationship between the child and the adult dispensing the social reinforcers. They investigated this because the work of other researchers suggested
that at times the reinforcers dispensed by adults unfamiliar to the child were more effective or enhancing on behavior than were reinforcers dispensed by fathers and mothers. In fact, research has shown that supportive comments made during testing activity by parents may actually have an attenuating effect, a neutral effect, or an enhancing effect on child behavior. (12, p. 605). McCoy and Zigler's interpretation of such findings included that parents' comments to children undoubtedly have both positive and negative reinforcement value simultaneously, the final effect depending upon the reinforcement history of a given child and his parent. McCoy and Zigler structured their study in such a manner as to control the reinforcement history of the relationship between subjects and the experimenter.

Their subjects consisted of thirty-six first and second grade boys (boys only in order to avoid confounding the results by possible sex differences). Subjects were assigned to experimental conditions at random with the one restriction that none of the subjects had been judged as behavior problems by their teachers or principals. The mean age of the subjects was 7.2 years.

The experimental conditions defined the nature of social interaction between the experimenter and the subjects prior
to the criterion task. There were three such conditions. The stranger condition occurred when the experimenter was unknown to the subjects and had had no social contact whatsoever with the subjects prior to the criterion task. The familiar-neutral condition was created when the experimenter had met with the experimental subjects in two groups of six children each prior to the criterion task. The experimenter did this with the familiar-neutral group three times over a three-week period. During these meetings the experimenter merely provided the subjects with art materials and suggested they make drawings of their choice. She told these subjects she would be busy at her desk in the front of the room (the same room). Any further attempts to interact with the experimenter by the subjects were handled in a neutral manner which discouraged further contact. When such further interaction was attempted by a subject, he was asked to work independently and quietly, and the authors report that little effort was required to keep the children working quietly without interaction with the experimenter. The familiar-positive condition utilized the same procedures as the familiar-neutral condition with the following differences:

... the experimenter responded at some length to all questions and comments as she passed out the materials. As the children began to work, the
experimenter approached each boy individually and talked with him about what he was drawing. . . . then continued to interact with each subject attempting to establish a warm, positive relationship by being complimentary, helpful and responsive. By the end of the three sessions the experimenter was employing the subjects' first names in her interaction with them . . . (12, p. 607).

The criterion task for Part One was the playing of the familiar two-hole marble board game in the same manner previously described in Gewirtz and Baer study (11). Playing time was the criterion score. Subjects played to a terminal point (defined as the point at which the subject stated that he wished to stop, or when a subject stopped without comment and did not place a marble for thirty seconds, or when fifteen minutes passed with no marbles placed regardless of verbal behavior). Part Two was then administered in which subjects were instructed to reverse the marble-color-hole relationship which had been the rule in Part One of the game. Subjects then played the game until one of the terminal points, described above, was again reached.

During the criterion tasks subjects were reinforced verbally at fifteen and forty-five second intervals with statements such as "You are doing very well", "You're really good at this game", "That's fine", and "That's very good".
The results of this study were that playing times were significantly greater in the familiar-positive condition than in the familiar-neutral condition, and playing times in the familiar-neutral condition were significantly greater than playing times in the stranger condition. These were the findings for both Part One and Part Two criterion tasks. In both the familiar-positive and the familiar-neutral conditions there was a significant decrease in playing time between Part One and Part Two; however, playing times in both Part One and Part Two under the stranger condition were approximately the same, both being far below the playing times of the other two groups.

The writers interpret their findings as indicating that the nature of the pre-existing relationship between an adult and a child will have an important effect upon the effectiveness of verbal reinforcers provided by that adult. In view of the significance of differences obtained in the behavior of subjects across the stranger, familiar-neutral and the familiar-positive conditions, McCoy and Zigler claim that the operation of simultaneous positive and negative reaction tendencies is confirmed in relation to verbal reinforcers from adults. The clearly superior behavior noted in the familiar-positive condition suggests to the authors
that this condition provided for both reduction of the existing negative reaction tendency and, at the same time, an increase of the existing positive reaction tendency. The most effective verbal reinforcers provided by adults are likely to be those provided by adults with whom the child has had a history of positive interpersonal contact.

The effects of social reinforcement have also been investigated by Stevenson and Cruse (14). Their work consists of a two-part study designed to test the effectiveness of social reinforcement over a five-day period among children of normal intelligence, and children who were retarded. Also they investigated the relation between age differences and reinforcer effectiveness.

The testing task for both parts was the two-hole marble game in which subjects were required to place marbles of different colors into the appropriate colored hole in a marble board apparatus during experimental conditions. The criterion measure used was the number of marbles correctly placed. The task was repeated on each of five consecutive days.

Part One of their study involved the use of sixty experimental subjects; there were thirty normals and thirty retardates with mean mental ages of just over six
years for both groups. The retarded subjects were residents of a school for the retarded while the normal children attended a private kindergarten. Ten subjects of both mental levels were placed at random into each of three experimental reinforcement conditions.

In the reinforcement condition, the experimenter made supportive or reinforcing comments during the child's performance such as "That's swell", "You really know how to play this game", and "You are doing very well." These reinforcers were made in an unscheduled manner except that they were begun only after each subject in this condition had successfully performed the criterion task fifteen times. After this, dispensing the reinforcers was randomized. The second experimental condition was the attentive condition in which the experimenter was merely attentive to the subjects' behavior but did not comment at all. The third experimental condition was the absent condition in which the experimenter merely gave instructions as to how to perform the criterion task, and then left the testing room.

The data obtained the first day from Part One of the study demonstrated that the retarded subject groups evidenced a significantly higher level of response to
social reinforcement than did the normal subject groups in the two conditions in which the experimenter was present. The absent condition, in which the experimenter left retarded subjects alone in the testing situation, proved unsatisfactory since these subjects were prone to take handfuls of marbles at a time and place them into the apparatus so that they could leave the testing site. However, the difference between the performance of retardates in the reinforcement condition and in the attentive condition was not significant.

Regarding comparisons between the normal and retarded groups, it was found that all three differences between experimental conditions among the normals were significant; none of the differences between the conditions among the retardates were significant, but were in the predicted direction. Thus it would appear that the presence of an adult, at least potentially approving, is socially reinforcing to retarded children, though such reinforcement effectiveness does not seem clearly associated with the nature of verbal reinforcing statements made.

Regarding the effect of reinforcement over time, it is reported that performances of retardates over the five days were not significantly different from one another,
but the performance of normals was significantly reduced each day over the five day period. This finding was explained by the writers as probably having some relationship to the nature of the criterion task. It seemed probable to them that normal subjects found the marble game tiring and boring when repeated each day for five days while the retarded subjects either did not get bored with the task, or else had sufficiently greater need for social reinforcement from adults that they continued the task day after day in the two conditions affording them social contact with the experimenter. While all normal subjects seemed to enjoy the testing activities the first day in all conditions, after the first day they seemed to lose interest, particularly in the absent condition, and even in the attentive condition in which they were totally in which they were totally unsuccessful in getting the experimenter to interact with them.

Part Two of the Stevenson and Cruse study involved a different approach to answer slightly different questions. Though being a partial replication of Part One, they were interested in determining if chronological age was a relevant variable related to the experimental conditions used. Also some changes were made in the experimental
conditions. The reinforcement conditions and the attentive condition were retained. However, the absent condition was changed so that the experimenter left the immediate vicinity where subjects played the marble board game; he remained in the same room, but stayed apart from the subjects. A punishment condition, or negative social condition, was added in which the experimenter not only sustained attention to the play of the subjects but also offered critical or negative comment about task performance.

There were thirty-six mentally retarded children and seventy-two children of normal mentality. Half of the normal children were selected to match approximately the chronological ages of the retardates; the other half were selected to match approximately the mental ages of the retardates. The chronological age match was not close, however, since the mean chronological age of the normals in this group was 12.4 while that of the retarded group was 15.0. Each of the three groups—retarded, normal-younger, and normal-older—were subjected to all four conditions—reinforcement, attentive, absent, and punishment. All groups were required to perform the same two-hole marble board game described above.
The findings of Part Two of this study include significant differences in performance among the groups according to mental ability level and age in combination. The retarded group performances were superior to those of the normal-younger groups; normal-younger group performances were superior to those of the normal-older groups, without regard to test conditions.

Mean performance differences across conditions among the retarded normal-younger and normal-older groups were not significant. The absolute mean scores from retarded groups decreased, in order, from the punishment condition, the absent condition, the attentive condition, and the reinforcement condition, but differences were not significant.

For both normal groups, reinforcement condition performances were significantly superior to attentive condition performances. However, both normal groups' performances in the absent condition were significantly superior to performances in the attentive condition. The normal-younger group performance in the absent condition was significantly superior to that demonstrated in the punishment condition; a non-significant difference in the same direction was demonstrated by the normal-older groups. Performances in the punishment condition differed significantly for the
two normal groups; performance of the normal-younger group
was significantly superior to that of the normal-older
group.

Stevenson and Cruse conclude that normal-older subjects
are probably less needful of social reinforcement than are
normal-younger subjects. Regarding the fact that both
normal groups demonstrated less performance in the attentive
condition than in the absent condition, it was hypothesized
that the normal groups simply wished to terminate the
testing task as quickly as possible in order to reinstate
social interaction with the experimenter, who, in this part
of this study, was physically present in the testing room
but not interacting with the subjects.

One of the most relevant findings from the work of
Stevenson and Cruse is that the response to social rein-
forcement apparently is systematically greater for retardates
than for normals. This suggests that the underlying need
for social reinforcement among retardates is greater than
among normals; also that the effect of providing such
reinforcement is increased activity. Though their statistical
results were not significant, absolute mean differences
suggest that reinforcement as a condition is superior to any
other kind of condition in this study in its enhancing
effect upon performance of a two-hole marble board game.

Research projects in the area of social reinforcer effectiveness have used two different approaches to investigation. Some researchers (2, 6, 11, 15) have used reaction times or learning measures as criterion variables. These studies have typically concluded that social interaction between experimenter and subject affect subject responsiveness to social reinforcers by modifying his level of "social drive". Other workers (12, 18) have utilized persistence measures using time with the experimenter, or time engaged in the criterion task, as the criterion scores. These studies have typically concluded that the nature of the social interaction between subject and experimenter influences "experimenter valence" which is explained as determining the value a subject places upon social reinforcers dispensed by that experimenter. A study by Berkowitz, Butterfield, and Zigler (1) has attempted to bring together these two areas of apparently contradictory interpretations by conducting a rather large and complicated experiment involving both kinds of methodology in order to study differences between data obtained both ways.
The persistence criterion task was the two-hole marble board game in which subjects were instructed to place marbles of a given color one at a time in a given hole, and marbles of the other color into the other hole for Part One; then the marble-hole relationship was switched for Part Two. The writers do not describe any terminal point for stopping the game; however, the subjects were told they could stop whenever they wished. The first verbal reinforcement was made after the tenth marble, and consisted of the usual verbal statements reported in other studies such as "You really know how to play this game", or "That's very good".

The learning criterion task involved each subject's use of an electrical apparatus box with two small windows through which either red or green light would show; the colors were changed in random order by a programming device. Under each window was a switch to be depressed by the subject which turned off the light. The subject was not given any criteria for deciding which color to switch off, but rather was given free choice. During a base-line period of the initial twenty-four responses, the experimenter was able to determine the most and least preferred color. After this the experimenter reinforced each trial in which the subject responded to the least preferred color. While
the report of this study does not indicate the specific nature of the verbal reinforcements used, it seems safe to assume that much the same reinforcers were used here as were used in the persistence criterion task.

The subjects used were second grade children, equally divided between boys and girls. No child who had failed a grade was used.

Ninety-six subjects were administered one of the criterion tasks after a condition of positive prior contact, and the same number after a condition of negative prior contact. Half of the subjects in each of these two groups were administered one of the criterion tasks immediately following prior contact (positive-immediate and negative-immediate); half were tested after a five-day delay (positive-delay and negative-delay). Forty-eight additional subjects were used as controls; they were not subjected to any prior contact whatever. The subjects in the control group were simply taken from their school classrooms directly to the testing site the day of testing, and experienced no social contact other than that which occurred inevitably while the experimenter took each child from his school room to the testing site.
Once these groupings were made—assignment in all cases was random—then each group established was further divided in half and assigned either to a persistence task or to a learning task. Two experimenters were used in this study who were naive as to the hypotheses to be tested. They were used as initial social contacts for the experimental subjects and as experimenters in both the persistence criterion task and in the learning criterion task. However, the services of these two experimenters were switched so that half the subjects with prior social contact (positive and negative) had the same experimenter for the criterion task administration while the other half of the subjects had the other experimenter and thus had had no prior social contact with her. Switching of the experimenters for the controls was also designed. This switching of experimenters was intended to cancel any systematic effects of experimenter differences which might have had effects upon the results.

Regarding the nature of the conditions of prior contact, or interaction, all subjects assigned to either condition were subjected to four events giving occasion for social interaction, positive or negative. First there was the Card Game in which subjects were to attempt to pick only red cards from a deck spread face down on a table.
In the positive condition, all of the cards spread were red, insuring no "failures". In the negative condition all cards were black insuring no "correct" responses.

Subjects next played the Nail Board Game in which they rolled marbles down an inclined maze arrangement with two boxes at the bottom. Subjects were told that if the marbles they rolled fell into the left box, they would "win", and that the marbles might fall in either box. Actually the marbles rolled into the left box ninety-five percent of the time. For subjects in the positive condition this box was declared "correct", and for subjects in the negative condition the right box was said to be "correct".

In a School Game subjects were given pictures of children and asked to guess which of two schools these children attended. For subjects in the positive condition, each guess was correct, and each guess was incorrect in the negative condition.

After these three games were completed, each subject was given crayons and paper and instructed to draw a picture of something he liked. Subjects in the positive condition were subjected to positive verbal reinforcements during and after their drawing, while subjects in the negative condition were subjected to negative verbal
statements or comments while they drew and afterward. All through the game experiences, subjects in the positive condition were treated warmly and in a friendly and supportive manner, while subjects in the negative condition were treated in an aloof, business-like, and somewhat cold manner.

Results indicate that subjects' playing time on the persistence task was significantly less when experimenters were switched than when the same experimenter provided prior social contact and administered the criterion task as well. This finding certainly is in accord with other studies such as that of McCoy and Zigler (12), previously reported, and others supporting the valence concept. Further, when the same experimenter was used for both the prior contact and the criterion task, playing times were significantly longer for both the positive-immediate and positive-delay groups than when experimenters were switched.

Two primary variance analyses were performed on data from the learning criterion task. These involved the use of one score reflecting the number of responses to reinforced stimuli, and one score reflecting learning shift used by Gewirtz and Baer (11). These analyses do not lend support to the "social drive" position, or to the "valence" position because the F ratios were not significant statistically.
Interpreting absolute results, the authors indicate that more learning was measured in the negative-delay condition than in the positive-delay condition, which apparently is contrary to the "valence" position. However, significantly longer application times to persistence measures followed positive-prior contact than was true when prior contact was negative. Positive interaction prior to the task may very well lead subjects to prolong interaction with the experimenter. However, it does not necessarily suggest any enhancement of the experimenter, or his reinforcement effectiveness as a teacher of the child. It seems possible that a subject's desire to prolong interaction may exist only in relation to an experimenter dealing with a simple learning task or a persistence task as used in this study. It may well be, however, that positive prior social interaction facilitates greater learning on far more complex kinds of tasks, such as are required by a classroom teacher, while negative prior social interaction might attenuate learning performance. This study neither supports nor rejects such a conclusion. Compared to negative prior social contact, positive prior social contact significantly enhanced performance on a persistence criterion task. This was true of positive prior contact that occurred immediately before
task administration, and positive prior contact that was followed by a delay before testing.

**Synthesis of Social Satiation and Reinforcement Studies**

The group of studies discussed in the following paragraphs demonstrate that social reinforcement and satiation have enhancing effect upon the behavior of children of normal and below normal intelligence. The studies by Gewirtz and Baer (11), McCoy and Zigler (12), Stevenson and Cruse (14), Berkowitz, Butterfield and Zigler (1), and by Zigler and Kanzer (19) demonstrate the effectiveness of social reinforcement in enhancing the behavior of normal children on various types of criterion tasks. The studies reported by Stevenson and Cruse (14) and by Waldron (15) offer evidence that social reinforcement is also effective in facilitating the behavior of the mentally retarded.

Some possible explanations for the effectiveness of such social reinforcement in facilitating behavior are reported by Berkowitz, Butterfield, and Zigler (1). They suggest that the existence of the "valence effect", or the effect of social reinforcement, depends upon who provides the reinforcement and what a subject's experience history
with this provider might be. Zigler and Kanzer (19) in their study suggest that reinforcer effectiveness may be influenced by social class membership of the subject.

Hypotheses

The hypotheses listed below represent predictions based on the research results reported earlier in this chapter. These hypotheses form the basis for the research project described, reported, and evaluated in the remaining chapters of this dissertation. They are arranged according to criterion variables used.

1. The more intelligent the non-satiated experimental subjects, the more recognition interference they will experience.

2. Non-satiated normal subjects will produce significantly more incorrect recognition hypotheses than will non-satiated educable or non-satiated trainable retardates.

3. Satiated retardates, both educable and trainable, will produce more incorrect recognition hypotheses than will non-satiated retardates, both educable and trainable.

4. Non-satiated normals will require more time than non-satiated educable retardates to produce correct recognition hypotheses.
5. Non-satiated normals will require more time than non-satiated trainable retardates to produce correct recognition hypotheses.

6. Satiated educable retardates will require less time to produce correct recognition hypotheses than non-satiated educable retardates.

7. Satiated trainable retardates will require less time to produce correct recognition hypotheses than non-satiated trainable retardates.

8. Non-satiated educable and non-satiated trainable retardates will produce more stereotyped incorrect recognition hypotheses than will non-satiated normal subjects.

9. Satiated educable and satiated trainable retardates will produce more stereotyped incorrect recognition hypotheses than will satiated normal subjects.

10. Both satiated and non-satiated normal subjects will produce the same number of correct recognition hypotheses.

11. Both satiated and non-satiated educable retardates will produce the same number of correct recognition hypotheses.

12. Both satiated and non-satiated trainable retardates will produce the same number of correct recognition hypotheses.
13. Both non-satiated normals and non-satiated educable retardates will produce significantly more correct recognition hypotheses than will trainable retardates, satiated or not.

Each of the studies discussed in Chapter II analyzing social satiation or reinforcement involved a criterion task which required significant overt physical behavior and a consequent utilization of energy. It seems reasonable to assume that a criterion task requiring less physical energy for performance would require less experimental control of motivation or desire to perform. The study reported in this dissertation evaluates the effects of social satiation by using a criterion task requiring a minimum of physical behavior. The use of a criterion task measuring the visual recognition phenomena associated with ambiguous visual images seemed especially suitable since task performance required only the expenditure of energy necessary for a minimum of speech. Visual recognition phenomena have not been studied in relation to different mental ability levels or conditions of social satiation.
CHAPTER BIBLIOGRAPHY


CHAPTER III

METHOD

The purpose of this chapter is to explain in detail the methodology used in this investigation. Included are the terms used with their definitions, the nature of subjects used and how they were selected, how data were gathered including the apparatus used, and the design of the problem itself including statistical treatment of the data.

Definition of Terms

Specific terms used in the remainder of this paper are listed below with their operational definitions.

Familial Retardate

A familial retardate is a child who has consistently scored within the mentally retarded range on standardized measures of intelligence, about whom there is no evidence of physical or central nervous system defect associated with his mental retardation. This, then would exclude all children who give evidence of brain damage or central nervous
system dysfunction either in their intelligence test protocols or batteries, or in their health history.

**Educable Mental Retardate**

An educable mental retardate is a child whose intellectual evaluations have consistently yielded I.Q. scores from standardized tests in the range of 50 to 75. Also these same evaluations have consistently failed to yield evidence of the existence of additional intellectual potential in the clinical judgment of the examiners conducting the evaluations.

**Trainable Mental Retardate**

A trainable mental retardate is a child whose intellectual evaluations in the past have consistently yielded I.Q. scores within the range of 25 to 49. Their evaluations have also failed to suggest to the examiners conducting them the existence of additional intellectual potential.

**Normal**

A normal is a child whose intellectual evaluations have consistently yielded scores placing him within the 90 to 109 I.Q. score range. Additionally there is no evidence of significantly higher intellectual potential in the clinical judgment of the examiners.
Ambiguous Visual Images

Ambiguous visual images are defined as visual images projected from a slide projector which are systematically presented out of focus. The resulting out-of-focus image is ambiguous as regards the ability of the subjects to define the content of the slide. Various degrees of ambiguity are made possible by means of projecting the visual images in eight different out-of-focus conditions.

Social Satiation

Social satiation is defined as that condition which results when subjects used in the study were subjected to an intensive amount of social contact and stimulation by being placed in a situation providing both for a period of five minutes immediately prior to placing the subject in the experimental situation.

Non-satiation

Non-satiation is defined as that condition which exists when the experimental subjects were brought into the experimental situation immediately from their regular activities. Subjects' regular activities were controlled to insure that no unusual social satiation occurred accidentally which would yield invalid results.
Recognition Hypothesis

Recognition hypothesis is any attempt a subject made to identify the nature of the projected image, correct or incorrect.

Stereotyped Incorrect Recognition Hypothesis

Stereotyped incorrect recognition hypothesis is repetition of incorrect recognition hypotheses.

Subjects

Persons used as experimental subjects in this study were children enrolled in public school programs in the northeast Louisiana area. Lists were prepared of the total population of identified retarded children in this geographic area and potential subjects were then further divided into lists of educable retardates and trainable retardates depending upon classification by the Special Education Evaluation Teams operating in that area. A list of potential subjects of normal mentality was prepared in the same manner except that this list was obtained from first grade rosters.

A number of other selection procedures were utilized. First, children repeating the first grade were not used as subjects since using them would have resulted in less
homogeneity of chronological age among subjects of normal mentality. Second, all children who lived in institutions of any kind were rejected. In view of the work by Butterfield and Zigler (2), Shepps and Zigler (6), and Hobbs (5) indicating differing motivational variables operating in institutionalized and non-institutionalized retardates and normals, it was decided to limit subjects used to those residing at home. Third, only familial retardates were used as subjects. Since persons having central nervous system defects or dysfunctions often have visual perceptual difficulties, and since only those with normal vision were needed for this study, any indication of visual perceptual problems in a child was sufficient to eliminate him as a potential subject. The criteria used to determine the existence of such problems is detailed in the Definitions section. Fourth, children with known or discoverable visual defects were eliminated as subjects. Potential subjects who had not had a vision test within the six-month period immediately preceding the experiment were administered the Keystone Telebinocular Vision Test; if their vision would not then be classified as normal, they were rejected as experimental subjects. Fifth, potential subjects with whom the candidate had had prior experience were
eliminated as subjects. It was considered probably that subjects who knew the candidate from previous experience might perform experimentally in a somewhat different way than those without any prior relationship (1). Sixth, potential subjects who were ill, who were absent from school, who were on field trips, who had been unusually satiated or who had been punished on the day of testing were also eliminated as subjects.

After the selection procedures were complete, pools of potential subjects in each of the three mental ability levels were available. Twenty subjects from each of the three mental ability groups were then selected at random for a total of sixty subjects.

The twenty subjects in the normal group ranged in chronological age from five years, ten months through six years, six months; and the mean chronological age was six years, three months. This group ranged in mental age from six years through six years, six months with both the mean and median mental age for the group being six years, three months. Their intelligence quotients ranged from 93 through 106 with the mean being 100.2.

The educable retarded group ranged in chronological age between eight years, five months and eleven years,
seven months with the mean chronological age being nine years, eleven months. They ranged in mental age from six years through six years, six months with both the mean and the median being six years, three months. The range of intelligence quotients was from 55 through 74 with the mean being 63.9.

The group of trainable retardates ranged in chronological ages from thirteen years through twenty-three years, nine months with the mean being sixteen years, five months. Their mental ages ranged from six years through six years six months with the mean and median being six years, three months. Their intelligence quotients ranged from 26 through 48 with the mean being 38.4.

Apparatus

Apparatus and supplies used included a slide projector, screen, twelve color slides, timer, and test protocol sheets. The slide projector was capable of critically sharp focus and the slides were glass-mounted to prevent heat buckling and thus eliminate focus irregularities. The screen was a fine-grained lenticular type rigidly supported. The screen and projector were placed to insure that the slides and the screen surface were exactly parallel. The lens barrel
of the projector was modified so that projecting slides in eight standard focus positions was possible. Focus positions were exactly one-eighth of an inch apart on the lens barrel, and numbered from one to eight. Focus position number eight was assigned to the position of critically sharp focus with each successively smaller numbered step representing a greater and greater degree of blur or ambiguity of the projected image. A timer was used to control precisely the amount of time each transparency was exposed to each subject in each focus position.

The subject matter of the slides was as follows: slide 1—cloud scene; slide 2—uniformed soldier; slide 3—parked cars; slide 4—ship; slide 5—group of children at play; slide 6—house; slide 7—bouquet of flowers; and slide 8—decorated Christmas tree.

The subject matter of the first four unscored trial slides consisted of a doll, a flowering shrub, a swimming pool scene, and a tree-lined street.

Procedure

The criterion task for each subject was to view each projected slide in scheduled stages of ambiguity and to present an hypothesis, if possible as to the subject matter
content of the presented visual image. When all subjects were brought to the experimental site, they were given the following instructions:

Please sit in this chair, facing that screen. We are going to play a game that you will enjoy. This will be a color slide game. Do you like to look at color slides? Good! I am going to show some color slides on that screen, and I want you to tell me what you see just as soon as you think you know what it is. At first, the slide will be blurred and dull. But they will get clearer. Just as soon as you think you might know what the slide shows, tell me. Even if you are not sure, guess what you think it is. Do you understand? Good! Let's show the first slide now.

Each subject was shown four trial slides, not included in the scoring, to familiarize him with the procedure. However, these trial slides were not identified as such, and the transition from trial slides to the experimental slides was unremarked. Subjects were encouraged verbally to guess at the content of each image in the last three ambiguous focus positions if he was not already presenting such hypotheses, but only for the trial slides. If a subject did not produce an hypothesis at all for a given slide, after the final exposure ended in position eight (perfect focus), he was asked, "What do you think it is?" Any recognition hypothesis offered to this query was accepted. Only one such occasion arose in which no hypothesis was offered; the
subject was an educable retardate. On being asked this question, he responded with a correct recognition hypothesis. No other question or encouragement was given in association with the experimental slides under any circumstance. A record was made of the number of recognition hypotheses produced by each subject to each transparency in all focus positions. The correctness of his hypotheses, the time between first exposure and the production of a correct recognition hypothesis, the focus position at which both correct and incorrect recognition hypotheses were presented, and whether or not an incorrect recognition hypothesis was stereotyped were also recorded for each subject.

Subjects not to be satiated were brought directly from their classrooms into the experimental room and engaged in the experimental task immediately.

Subjects to be satiated were brought to an isolated part of the experiment room in which had been placed play materials including inflated toys, bean bags, toy cars, toy animals, dolls, chalkboards, chalk, paper, pencils, crayons, and a table for their use. Subjects were encouraged to play with any or all of the toys for a period of five minutes. During this period the experimenter engaged them constantly in friendly and warm conversation about themselves.
and their on-going play activities. In this way, and operationally, a condition of social satiation was produced. In addition, the experimenter provided each subject to be satiated with a minimum of fifteen positive statements or comments about their activities, the schedule being to provide these with the approximate frequency of three each minute as a minimum. No difficulty was encountered in doing so despite the fact that four subjects certainly could not be called highly verbal in their relationship with the experimenter. No negative statements or comments were made by the experimenter at any time for any subjects. The providing of the positive statements or comments was aided by the experimenter's being engaged with each subject in the play activities, a fact which seemed clearly to be favored by all satiated subjects regardless of mental ability level. It seems probable that doing so enhanced the relationship between the experimenter and the subject, though no empirical evidence of this was obtained.

As a check of the standardization of the social satiation condition, the experimenter made a running tally of the positive statements and comments provided for each subject. Also tape recordings were made of each social satiation session from which a neutral observer also made
a running tally of the positive comments he heard on the recording for each subject. A Pearson Product-Moment correlation coefficient (3,4) was computed as an index of agreement between the experimenter's tally and the neutral observer's tally with the result being a coefficient of .90. Of the thirty subjects experiencing these positive comments from which the experimenter's tally was made, the neutral observer disagreed as to the number used with only four subjects. Nevertheless both the experimenter's tally and the neutral observer's tally revealed that all satiated subjects received at least the planned fifteen positive comments.

As to possible reinforcement occurring in the criterion testing period itself, it seemed parsimonious to treat all subjects as much alike as possible, and as neutrally as possible, especially in view of the findings of two research works quoted elsewhere in this paper. The work of Zigler and Kanzer (7) suggested a differential effect of types of reinforcers depending upon the socio-economic status of subjects. The work by Berkowitz, Butterfield, and Zigler (1) suggested the existence of a "valence effect" making some verbal reinforcements more effective than others, depending upon the history of inter-
personal contact between an adult and a child.

Not having made an evaluation of the socioeconomic class of the subjects used in this study, it was decided to make the contact between subject and experimenter as neutral as possible. This was accomplished by providing subjects with no verbalization at all during the criterion testing period. When some kind of verbalization was required in order to prevent losing the cooperation of a subject, only "Mmmn" or "Yes" were used, and in a manner which did not suggest judgment of a subject's actions. Also these were verbalizations used in the absence of any eye contact or physical contact with subjects.

On only two occasions were even these verbalizations necessary; both occurred with the same subject working with the same transparancy. Why such was necessary with this child is not clear, but it seemed unlikely that this subject's experimental behavior was significantly influenced.

When bringing each subject from his classroom to the testing site, the experimenter routinely followed the procedure of asking his name, where he lived, who was his teacher, the names of his siblings, the names of his parents, and the names of his pets. During this time the experimenter was as neutral as possible with each subject.
Upon completion of the criterion task by each subject, they were thanked for their help and returned to the activities in which their class was then involved. Each teacher had been requested to prevent communication between subjects in her classroom already tested and subjects yet to be tested, and this was done successfully with all subjects.

The testing sites used were in the public schools. In all but one school an empty classroom was available for use, and in such cases the apparatus and the play materials used in the satiation activities were always screened from one another. At one school testing was done in a small room used for individual remedial reading work and the social satiation activities were done in an adjoining infirmary room since these were the only facilities available. It seems unlikely that this minor lack of uniformity of testing sites influenced results in any significant manner.

Experimental Design

The basic experimental design used in this study was a two by three factorial analysis of variance in which there were two treatment conditions and three mental ability levels. These were: treatment conditions--social satiation and non-satiation; mental ability levels--intellectually
normal subjects, educable retarded subjects, and trainable retarded subjects.

This is reflected in the figure below.

<table>
<thead>
<tr>
<th></th>
<th>Satiated</th>
<th>Non-satiated</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal Intelligence Subjects</td>
<td>n=10</td>
<td>n=10</td>
</tr>
<tr>
<td>Educable Retardate Subjects</td>
<td>n=10</td>
<td>n=10</td>
</tr>
<tr>
<td>Trainable Retardate Subjects</td>
<td>n=10</td>
<td>n=10</td>
</tr>
</tbody>
</table>

Fig. 1—Analysis of variance design

Five different criterion scores were entered into this basic design. The names of these and their respective scoring operations are:

**Criterion Score One**

Criterion score one is recognition interference score, which corresponds to the focus position of the projector at which the correct recognition hypothesis is produced, totaled for all slides. The larger the number of each focus position, the more nearly to sharp focus it was at the time of correct recognition, and the less the ambiguity of the visual image. Thus the larger the number of the focus position, the greater
the degree of recognition interference and the better the focus had to be for a subject to produce a correct hypothesis.

**Criterion Score Two**

Criterion score two is the absolute number of incorrect recognition hypotheses produced by a subject, totaled for all slides.

**Criterion Score Three**

Criterion score three is latency in seconds between first exposure of a slide until production of a correct recognition hypothesis, totaled for all slides.

**Criterion Score Four**

Criterion score four is the absolute number of incorrect stereotyped recognition hypotheses, totaled for all slides.

**Criterion Score Five**

Criterion score five is the absolute number of correct recognition hypotheses produced by each subject, totaled for all slides.

Main effect mean differences and individual cell mean differences were analyzed by using t tests where appropriate.
A significance level of .05 was selected as a satisfactory compromise of risk of making Type I and Type II errors in this investigation. Two-tailed tests of significance were used exclusively.
CHAPTER BIBLIOGRAPHY


CHAPTER IV

RESULTS AND DISCUSSION

The results of this investigation will be presented in relation to each of the criterion variables defined in Chapter III. Statistical findings will be presented relevant to each hypothesis and its prediction of the criterion behavior of subjects.

Recognition Interference Criterion

Recognition interference criterion score means and variabilities for each cell in the design and also for main effects are presented in Table I.

Hypothesis number one predicted that more intelligent non-satiated subjects would experience greater recognition interference than would less intelligent non-satiated subjects. More specifically, non-satiated intellectually normal subjects were expected to experience more recognition interference than either non-satiated educable retardates or non-satiated trainable retardates, and non-satiated educable retardates were expected to experience more recognition interference than non-satiated trainable retardates.
### TABLE I
MEANS AND VARIABILITIES OF THE RECOGNITION INTERFERENCE CRITERION

<table>
<thead>
<tr>
<th>Treatment Conditions</th>
<th>Intelligence Levels</th>
<th>Main Effects</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Normal</td>
<td>Educable</td>
</tr>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
</tr>
<tr>
<td>Satiated</td>
<td>39.3</td>
<td>5.08</td>
</tr>
<tr>
<td>Non-satiated</td>
<td>42.2</td>
<td>2.23</td>
</tr>
<tr>
<td>Intelligence Main Effects</td>
<td>40.8</td>
<td>4.1</td>
</tr>
</tbody>
</table>

Inspection of mean scores in the non-satiated row in Table I offers evidence as to the validity of these predictions and demonstrates that mean scores for both non-satiated retarded groups were larger than the mean score of the non-satiated normal group. However, the mean score of non-satiated educables is larger than that of the non-satiated trainables.

For further analysis the data were subjected to analysis of variance. The results are reflected in Table II.

As shown, the F test across the satiation - non-satiation dimension was significant at the .05 level, and the F test across the mental ability levels was significant at the .001 level. Interaction between mental ability levels and satiation-non-satiation conditions was not significant.
TABLE IX

ANALYSIS OF VARIANCE OF THE RECOGNITION INTERFERENCE CRITERION

<table>
<thead>
<tr>
<th>Source</th>
<th>SS</th>
<th>df</th>
<th>ms</th>
<th>F</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Satiation-Non-satiation</td>
<td>38.4</td>
<td>1</td>
<td>38.4</td>
<td>4.74</td>
<td>.05</td>
</tr>
<tr>
<td>Mental Ability</td>
<td>5058.233</td>
<td>2</td>
<td>2529.117</td>
<td>312.31</td>
<td>.001</td>
</tr>
<tr>
<td>Interaction</td>
<td>13.3</td>
<td>2</td>
<td>6.65</td>
<td>.82</td>
<td>ns</td>
</tr>
<tr>
<td>Error</td>
<td>445.4</td>
<td>55</td>
<td>8.098</td>
<td>....</td>
<td>....</td>
</tr>
<tr>
<td>TOTAL</td>
<td>5555.333</td>
<td>59</td>
<td>....</td>
<td>....</td>
<td>....</td>
</tr>
</tbody>
</table>

Tests of significance between the mental ability main effect means were computed using t tests. The mean score of all educable subjects was significantly larger than the mean score of all normal subjects (t value was 22.85, significant beyond the .001 level). The mean score for all trainable subjects was significantly larger than the mean score of all normal subjects (t value was 14.18, significant beyond the .001 level). The mean score of all educable subjects was significantly larger than the mean score of all trainable subjects (t value was 7.72, significant beyond the .001 level).

Hypothesis number one is only partially supported by the data. As predicted, non-satiated educable subjects
experienced significantly more recognition interference than did non-satiated trainable subjects as indicated by the F test for mental ability levels in Table II, and by the t test of the mean difference between cells. However, the non-satiated normal subject group mean was significantly smaller than either the non-satiated educable group mean or the non-satiated trainable group mean which was contrary to predictions.

There appear to be two possible explanations why these findings are contrary to predictions. First it is possible that non-satiated normal subjects do not experience as much recognition interference as non-satiated educable or non-satiated trainable subjects. This explanation is contrary to theory and predictions of other experimenters quoted in Chapter II of this paper (2). Another rather more parsimonious explanation is that non-satiated normal subjects were more efficient in achieving correct recognition hypotheses in spite of experienced interference. This was certainly suggested by the experimenter's subjective judgments of behavior made during the criterion testing. Intellectually normal subjects in both the non-satiation and satiation conditions demonstrated more involvement and greater production of trial hypotheses than subjects in either
retarded group. It would appear that retarded subjects are not as efficient as intellectually normal subjects in dealing with the recognition interference they do experience.

If increased efficiency in dealing with recognition interference is associated with higher intelligence, then intelligence effects do not appear to be uniform. Examination of criterion score means for non-satiated subjects reveals that the educable retarded group mean score is significantly higher than either the non-satiated normal group mean score or the non-satiated trainable group mean score. These data would seem to suggest the possibility of a critical intellectual level, possibly near the lower limits of the normal intelligence range. Above this theoretical point of intellectual ability, visual recognition efficiency apparently is sufficient to overcome interference effects. Below this point recognition interference reduces visual recognition efficiency to a far greater degree. If this explanation holds for normal and educable subjects, it still does not account completely for the visual recognition behavior of trainable subjects; a possible explanation of their behavior would appear to be that trainable subjects do not experience as great a degree of recognition interference as do normal and educable
subjects since their relatively low intelligence, or perhaps the concreteness of their thinking, reduces the number of competing trial hypotheses or "guesses" the trainable subject makes. The design of this investigation does not permit an empirical test of a possible critical intelligence level, however.

Incorrect Recognition Hypotheses Criterion

Incorrect recognition hypotheses criterion scores were the number of incorrect or trial hypotheses presented by subjects. Criterion score means and variabilities for each group individually and main effects are presented in Table III.

**TABLE III**
MEANS AND VARIABILITIES OF THE INCORRECT RECOGNITION HYPOTHESES CRITERION

<table>
<thead>
<tr>
<th>Treatment Conditions</th>
<th>Intelligence Levels</th>
<th>Satiation Main Effects</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Normal</td>
<td>Educable</td>
</tr>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
</tr>
<tr>
<td>Satiated</td>
<td>39.4</td>
<td>5.56</td>
</tr>
<tr>
<td>Non-satiated</td>
<td>12.3</td>
<td>3.33</td>
</tr>
<tr>
<td>Intelligence Main Effects</td>
<td>25.85</td>
<td>14.60</td>
</tr>
</tbody>
</table>
Hypothesis number two predicted that non-satiated normal subjects would produce significantly more incorrect recognition hypotheses than would both non-satiated educable subjects and non-satiated trainable subjects. Hypothesis number three predicted that satiated educable subjects would produce significantly more incorrect recognition hypotheses than non-satiated educable subjects, and that satiated trainable subjects would produce significantly more incorrect recognition hypotheses than non-satiated trainable subjects.

Incorrect recognition hypotheses score data were subjected to analysis of variance, and the results of this analysis are presented in Table IV.

**TABLE IV**

**ANALYSIS OF VARIANCE OF THE INCORRECT RECOGNITION HYPOTHESES CRITERION**

<table>
<thead>
<tr>
<th>Source</th>
<th>SS</th>
<th>df</th>
<th>ms</th>
<th>F</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Satiation-Non-satiation</td>
<td>2065.006</td>
<td>1</td>
<td>2065.006</td>
<td>222.07</td>
<td>.001</td>
</tr>
<tr>
<td>Mental Ability</td>
<td>3750.233</td>
<td>2</td>
<td>1875.117</td>
<td>201.65</td>
<td>.001</td>
</tr>
<tr>
<td>Interaction</td>
<td>1792.034</td>
<td>2</td>
<td>896.017</td>
<td>96.36</td>
<td>.001</td>
</tr>
<tr>
<td>Error</td>
<td>511.46</td>
<td>55</td>
<td>9.299</td>
<td>......</td>
<td>....</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>8118.773</td>
<td>59</td>
<td>.......</td>
<td>......</td>
<td>....</td>
</tr>
</tbody>
</table>
The F tests across satiation - non-satiation conditions was significant at the .001 level; the F tests across mental ability levels also was significant at the .001 level. However, there was significant interaction across mental ability levels and satiation - non-satiation conditions indicated by the F test for interaction which also was significant at the .001 level. Because of this significant interaction, further statistical evidence was necessary before the tenability of the two relevant hypotheses could be evaluated. This further statistical evidence is in Table V. This table reflects t tests of all possible cell mean differences.

Specific interaction effects are reflected by differences in cell means so small that t test values are non-significant. The larger mean scores associated with satiation effects both on educable retardates and trainable retardates were consistently noted and do not account for the significant interaction obtained. However, the mean score of the satiated normal group was much larger than the mean score of the non-satiated normal group. Table III displaying means and variabilities of the incorrect recognition hypotheses criterion scores indicates that the mean score of the satiated normal group was approximately four times larger than that of the non-satiated normal
group. Satiation has a far greater effect on normal subjects than on retardates. In any case, the interaction did not affect the tenability of hypotheses two or three.

**TABLE V**

**t VALUES OF INCORRECT RECOGNITION HYPOTHESES**

**MEAN DIFFERENCES**

<table>
<thead>
<tr>
<th></th>
<th>M2</th>
<th>M3</th>
<th>M4</th>
<th>M5</th>
<th>M6</th>
</tr>
</thead>
<tbody>
<tr>
<td>M1</td>
<td>13.21**</td>
<td>14.75**</td>
<td>15.94**</td>
<td>15.34**</td>
<td>18.91**</td>
</tr>
<tr>
<td>M2</td>
<td></td>
<td>.41</td>
<td>2.46*</td>
<td>1.3</td>
<td>15.56**</td>
</tr>
<tr>
<td>M3</td>
<td></td>
<td></td>
<td>2.77*</td>
<td>1.23</td>
<td>11.6**</td>
</tr>
<tr>
<td>M4</td>
<td></td>
<td></td>
<td></td>
<td>1.6</td>
<td>15.56**</td>
</tr>
<tr>
<td>M5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>7.26**</td>
</tr>
</tbody>
</table>

*significant at the .05 level.

**significant at the .01 level or beyond.

M1--mean score, satiated subjects of normal mentality.
M2--mean score, non-satiated subjects of normal mentality.
M3--mean score, satiated subjects of educable mentality.
M4--mean score, non-satiated subjects of educable mentality.
M5--mean score, satiated subjects of trainable mentality.
M6--mean score, non-satiated subjects of trainable mentality.

Hypothesis two was supported by the data. The non-satiated normal group mean score was significantly larger
than either the non-satiated educable group mean score or the non-satiated trainable group mean score. Greater intelligence would then appear to lead to greater productivity of incorrect or trial hypotheses. That intelligence is fundamentally related to higher production of incorrect recognition hypotheses is confirmed more fully by results not hypothesized. These results are that the mean performance score of the non-satiated educable group was significantly larger than that of the non-satiated trainable group. The $t$ test value of the difference between these two group means was 15.56, significant beyond the .001 level.

Hypothesis number three was also supported by the data. The specific predictions were first, that satiated educable retardates would produce more incorrect recognition hypotheses than would non-satiated educable retardates, and second, that satiated trainable retardates would produce more incorrect recognition hypotheses than would non-satiated trainable retardates. Both satiated groups did, in fact, demonstrate significantly larger mean performances than did their non-satiated counterparts. On the basis of these results it seems clear that intensive social satiation provided by adults for five minutes increases the behavior
of retarded subjects to a level significantly above that of non-satiated retardates of the same mental ability levels. These findings are in accord with research results discussed in Chapter II (5,6).

A significantly larger criterion mean score for satiated normal subjects as compared to non-satiated normal subjects is also demonstrated by the data, though it was not predicted by the hypotheses tested. The positive effect of enhanced behavior of satiated subjects of normal mentality demonstrated in this investigation is in accord with research findings of a similar type reported earlier in this paper (1,3).

Latency Criterion

Latency criterion scores were obtained by measuring the amount of time in seconds that subjects required for producing correct recognition hypotheses for all slides. The criterion score means and variabilities for each group individually and the main effects are presented in Table VI.

Hypothesis number four predicted that non-satiated normal subjects would require significantly more time than non-satiated educable subjects to produce correct recognition
TABLE VI
MEANS AND VARIABILITIES OF THE LATENCY CRITERION

<table>
<thead>
<tr>
<th>Treatment Conditions</th>
<th>Intelligence Levels</th>
<th>Satiation Main Effects</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Normal</td>
<td>Educable</td>
</tr>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
</tr>
<tr>
<td>Satiated</td>
<td>349.2</td>
<td>52.72</td>
</tr>
<tr>
<td>Non-satiated</td>
<td>384.8</td>
<td>22.89</td>
</tr>
<tr>
<td>Intelligence Main Effects</td>
<td>367.0</td>
<td>43.58</td>
</tr>
</tbody>
</table>

hypotheses. Hypothesis number five predicted that non-satiated normal subjects would require significantly more time than non-satiated trainable subjects to produce correct recognition hypotheses. Cell means in Table VI for non-satiated subjects are relevant to these two hypotheses, and these reveal considerable larger mean scores for both non-satiated retarded groups than for the non-satiated normal group.

The data of the latency criterion were subjected to analysis of variance. The results of this analysis are presented in Table VII.

As shown in Table VII, the F test across mental ability levels was found to be significant at the .001 level, though
neither of the other F tests achieved significance. Further analysis of these data was accomplished by computing t tests of main effects mean differences.

**TABLE VII**

**ANALYSIS OF VARIANCE OF THE LATENCY CRITERION**

<table>
<thead>
<tr>
<th>Source</th>
<th>SS</th>
<th>df</th>
<th>ms</th>
<th>F</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Satiation-Non-satiation</td>
<td>1.17</td>
<td>1</td>
<td>1.17</td>
<td>4.02</td>
<td>ns</td>
</tr>
<tr>
<td>Mental Ability</td>
<td>55.155</td>
<td>2</td>
<td>25.578</td>
<td>87.9</td>
<td>.001</td>
</tr>
<tr>
<td>Interaction</td>
<td>.046</td>
<td>2</td>
<td>.023</td>
<td>.079</td>
<td>ns</td>
</tr>
<tr>
<td>Error</td>
<td>15.986</td>
<td>55</td>
<td>.291</td>
<td>......</td>
<td>.....</td>
</tr>
<tr>
<td>TOTAL</td>
<td>68.357</td>
<td>59</td>
<td>......</td>
<td>......</td>
<td>.....</td>
</tr>
</tbody>
</table>

The mean latency score of all educable subjects was significantly larger than the mean score of all normal subjects (t value was 10.57, significant beyond the .001 level). The mean latency score of all trainable subjects was significantly larger than the mean score of all normal subjects (t value was 3.18, significant beyond the .01 level). There was no significant difference between the mean score of all educable subjects and the mean score of all trainable subjects (t value was .77, not significant).
Neither hypothesis number four nor hypothesis number five were supported by the data. Results from the analysis of variance and t tests of main effect mean differences suggest that results were completely contrary to predictions. As yet a further analysis t tests were computed to determine the significance of differences between individual cell means. The non-satiated educable group mean was significantly larger than the non-satiated normal group mean (t value was 25.14, significant beyond the .001 level). The non-satiated trainable group mean was significantly larger than the non-satiated normal group mean (t value was 14.38, significant beyond the .001 level).

After evaluating the results of recognition interference data analysis, latency criterion results were expected and predictable. By definition, high recognition interference scores are associated with high latency scores. The more focus positions required for each subject to identify projected image content, the more time would be required as well.

The best explanation of these findings apparently is that subjects of normal mentality are so much more highly efficient in handling of recognition interference produced by this experiment that they achieved correct hypotheses
more rapidly than was possible for retarded subjects who apparently experienced less interference.

Just as was true of non-satiated cell means in the recognition interference criterion, the latency criterion cell means for non-satiated subject groups again demonstrate that the non-satiated educable group mean was significantly larger than either the non-satiated normal group mean or the non-satiated trainable group mean. It seems likely that the same explanation of the recognition interference results applies to latency criterion results as well. Intellectually normal subjects seemed able to produce correct recognition hypotheses more rapidly than other subjects due to their intelligence. Again, however, the intelligence of educable subjects seemed to create inefficiency that trainable subjects did not experience since trainable subjects' intelligence was lower and apparently prevented them from producing as many interfering hypotheses; hence, they performed somewhat more rapidly.

For the same reasons offered in discussion of the recognition interference phenomenon, a critical level of intelligence at or near the lower limits of the normal range may exist to account for the inconsistency of intelligence effects.
Hypotheses number six and number seven dealt with the possible effect satiation might have on reducing the time educable and trainable retardates required for the production of correct recognition hypotheses. Means and variabilities of retardates, educable and trainable, are above in Table VI, which reflects mean scores which are, in fact, smaller for satiated educable and satiated trainable groups as compared to their respective counterparts who had not been satiated. The analysis of variance results reported in Table VII reflect that the F test across treatment conditions for all mental ability groups did not achieve significance. As a further analysis, two t tests were computed. The t value associated with the difference between the satiated educable group mean and the non-satiated educable group mean was .62 which is not significant. Hypothesis number six therefore is not supported by the data. The t value associated with the difference between the satiated trainable group mean and the non-satiated trainable group mean was 2.16 which was significant beyond the .05 level. Hypothesis number seven, therefore, is supported.

It would appear that social satiation has a differential effect upon retarded subjects depending upon whether they are classified as educable or trainable. The data tend
to suggest that subjects of less mental ability possibly are more motivated to perform, at least on the criterion task required in this investigation, than subjects of somewhat higher mental ability. This explanation gains support when mean performance means of satiated and non-satiated normal subject groups are compared; the t value associated with the difference between the means of these two groups was 2.0 which was not significant. Satiation as an experimental condition apparently had no effect regarding time efficiency with normal or educable subjects, but it did increase the time efficiency of trainable subjects as a group.

One theoretical explanation for the difference in satiation effect upon subjects depending upon their mental level might be their history of success experiences. One suspects that the typical trainable retardate experiences much more failure than either the educable retardate or the child of normal mentality due to his more severe mental limitations. It seems very likely, therefore, that the trainable retardate would respond much more fully to satiation experiences, particularly as these were designed for purposes of this investigation. While it is not expected that social satiation actually increased the cognitive skills
underlying visual recognition, it seems reasonable to assume that the satiation might have served to energize behavior or increase motivation.

**Stereotyped Incorrect Recognition Hypotheses Criterion**

The stereotyped incorrect recognition hypotheses criterion means and standard deviations are reported below in Table VIII.

**TABLE VIII**

MEANS AND VARIABILITIES OF THE STEREOTYPED INCORRECT RECOGNITION HYPOTHESES CRITERION

<table>
<thead>
<tr>
<th>Treatment Conditions</th>
<th>Intelligence Levels</th>
<th>Satiation Main Effects</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Normal M SD</td>
<td>Educable M SD</td>
</tr>
<tr>
<td>Satiated</td>
<td>2.9 2.23</td>
<td>3.0 1.41</td>
</tr>
<tr>
<td>Non-satiated</td>
<td>1.2 1.03</td>
<td>3.7 2.36</td>
</tr>
<tr>
<td>Intelligence Main Effects</td>
<td>2.1 1.91</td>
<td>3.4 1.93</td>
</tr>
</tbody>
</table>

Hypotheses number eight and nine dealt with the stereotyped incorrect recognition hypotheses criterion. Hypothesis number eight predicted that both non-satiated educable subjects and non-satiated trainable subjects would produce significantly more stereotyped incorrect recognition
hypotheses than would non-satiated normal subjects. Hypothesis number nine predicted that both satiated educable retardates and satiated trainable retardates would produce significantly more stereotyped incorrect recognition hypotheses than would satiated normal subjects. The mean values associated with the tenability of these hypotheses are reported in the rows of Table VIII.

The data were further analyzed by using an analysis of variance. The results of this analysis are reported in Table IX.

### TABLE IX

**ANALYSIS OF VARIANCE OF STEREOTYPED INCORRECT RECOGNITION HYPOTHESES CRITERION**

<table>
<thead>
<tr>
<th>Source</th>
<th>SS</th>
<th>df</th>
<th>ms</th>
<th>F</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Satiation-Non-satiation</td>
<td>56.066</td>
<td>1</td>
<td>56.066</td>
<td>17.56</td>
<td>.001</td>
</tr>
<tr>
<td>Mental Ability</td>
<td>70.233</td>
<td>2</td>
<td>35.117</td>
<td>10.99</td>
<td>.001</td>
</tr>
<tr>
<td>Interaction</td>
<td>76.034</td>
<td>2</td>
<td>38.017</td>
<td>11.91</td>
<td>.001</td>
</tr>
<tr>
<td>Error</td>
<td>175.6</td>
<td>55</td>
<td>3.193</td>
<td>......</td>
<td>......</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>377.933</td>
<td>59</td>
<td>......</td>
<td>......</td>
<td>......</td>
</tr>
</tbody>
</table>

The F tests across treatment conditions and across mental ability levels achieved significance beyond the .001
level. To discover exactly where interaction effects were influencing this design, t tests were computed between all possible pairs of means for determining significance levels. The results of this further analysis are reported in Table X.

**TABLE X**

**t VALUES OF STEREOTYPED INCORRECT RECOGNITION HYPOTHESES MEAN DIFFERENCES**

<table>
<thead>
<tr>
<th></th>
<th>(M_2)</th>
<th>(M_3)</th>
<th>(M_4)</th>
<th>(M_5)</th>
<th>(M_6)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(M_1)</td>
<td>2.18*</td>
<td>.12</td>
<td>.77</td>
<td>4.40**</td>
<td>.73</td>
</tr>
<tr>
<td>(M_2)</td>
<td>......</td>
<td>3.25**</td>
<td>3.07**</td>
<td>8.21**</td>
<td>2.06</td>
</tr>
<tr>
<td>(M_3)</td>
<td>......</td>
<td>......</td>
<td>.81</td>
<td>6.47**</td>
<td>1.14</td>
</tr>
<tr>
<td>(M_4)</td>
<td>......</td>
<td>......</td>
<td>......</td>
<td>3.46**</td>
<td>1.63</td>
</tr>
<tr>
<td>(M_5)</td>
<td>......</td>
<td>......</td>
<td>......</td>
<td>......</td>
<td>6.25**</td>
</tr>
</tbody>
</table>

*significant at the .05 level.

**significant at the .01 level or beyond.

\(M_1\)--mean score, satiated subjects of normal mentality.

\(M_2\)--mean score, non-satiated subjects of normal mentality.

\(M_3\)--mean score, satiated subjects of educable mentality.

\(M_4\)--mean score, non-satiated subjects of educable mentality.

\(M_5\)--mean score, satiated subjects of trainable mentality.

\(M_6\)--mean score, non-satiated subjects of trainable mentality.
The t values in Table X which did not achieve significance indicate the cells in which interaction may have influenced criterion scores. However, examination of mean values in Table VIII reveals what apparently is the location of most of the interaction in the design; satiated educable retardates produced a lower mean score than non-satiated educable retardates. This result was exactly contrary to any reasonable prediction.

Hypothesis number eight is only partially supported by the data; the non-satiated educable mean score was significantly larger than the non-satiated normal mean. The non-satiated trainable mean was not significantly larger than the non-satiated normal mean though the absolute difference was in the predicted direction. This non-significant difference may be due to interaction effects.

Hypothesis number nine also is only partially supported. The satiated educable group mean score is not significantly larger than the satiated normal group mean score, possibly due to interaction effects. The satiated trainable group mean score was found to be significantly larger than the satiated normal group mean score.

These results appear to suggest that when trainable retardates and educable retardates are not satiated,
trainable retardates are somewhat less inclined to produce trial recognition hypotheses, even stereotyped ones, than are educable retardates. However, the enhancing influence of satiation again appears to be considerable on the trainable retardates since under a pre-condition of satiation their group mean score was significantly superior to that of the satiated normal subject group. No hypothesis was made about a mean difference in the performance of trainable and educable retardates in this criterion. Examination of Table X reveals that the mean criterion score of the satiated trainable group was significantly larger than the mean criterion score of the satiated educable group (t value was 6.47, significant beyond the .001 level). It was expected that trainable retardates, due to their intellectual limitations (4), would produce more stereotyped responses than the other groups studied under both satiation conditions. Due to the interaction effects, however, this phenomenon can only be demonstrated reliably with regard to the difference between satiated trainable subjects and satiated educable subjects.
Correct Recognition Hypotheses Criterion

Table XI below reflects the means and standard deviations of subjects in each cell and main effects with regard to correct recognition hypotheses criterion scores.

TABLE XI
MEANS AND VARIABILITIES OF THE CORRECT RECOGNITION HYPOTHESES CRITERION

<table>
<thead>
<tr>
<th>Treatment Conditions</th>
<th>Intelligence Levels</th>
<th>Satiation Main Effects</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Normal M</td>
<td>SD</td>
</tr>
<tr>
<td>Satiated</td>
<td>8.0 0</td>
<td>8.0 0</td>
</tr>
<tr>
<td>Non-satiated</td>
<td>8.0 0</td>
<td>7.9 0.31</td>
</tr>
<tr>
<td>Intelligence Main Effects</td>
<td>8.0 0</td>
<td>7.9 0.23</td>
</tr>
</tbody>
</table>

The means and standard deviations shown in Table XI are the data used in the testing of hypotheses number ten through thirteen. Hypothesis number ten predicted that satiated and non-satiated normal subjects would produce the same number of correct recognition hypotheses. Hypothesis number eleven predicted that both satiated and non-satiated educable subjects would produce the same number of correct recognition hypotheses. Hypothesis number twelve predicted that both satiated and non-satiated trainable subjects
would produce the same number of correct recognition hypotheses. Hypothesis number thirteen predicted that non-satiated normal subjects and non-satiated educable subjects would produce more correct recognition hypotheses than would trainable subjects, satiated or not.

The data were further analyzed by using an analysis of variance the results of which are reported in Table XII.

**TABLE XII**

**ANALYSIS OF VARIANCE OF THE CORRECT RECOGNITION HYPOTHESES CRITERION**

<table>
<thead>
<tr>
<th>Source</th>
<th>SS</th>
<th>df</th>
<th>ms</th>
<th>F</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Satiation-Non-satiuation</td>
<td>.016</td>
<td>1</td>
<td>.016</td>
<td>1.00</td>
<td>ns</td>
</tr>
<tr>
<td>Mental Ability</td>
<td>.033</td>
<td>2</td>
<td>.017</td>
<td>1.06</td>
<td>ns</td>
</tr>
<tr>
<td>Interaction</td>
<td>.032</td>
<td>2</td>
<td>.017</td>
<td>1.06</td>
<td>ns</td>
</tr>
<tr>
<td>Error</td>
<td>.9</td>
<td>55</td>
<td>.016</td>
<td>....</td>
<td>....</td>
</tr>
<tr>
<td>TOTAL</td>
<td>.983</td>
<td>59</td>
<td>....</td>
<td>....</td>
<td>....</td>
</tr>
</tbody>
</table>

Table XII reflects that all F tests failed to achieve significance. This was expected in view of the number of identical means and the lack of variance reflected in Table XI.
Hypotheses number ten, eleven, and twelve were supported by the data. There were no significant differences in the mean criterion scores associated with satiation or non-satiation. With the exception of a single educable subject, all subjects in all other groups correctly identified image content of all slides.

The support of these three hypotheses tends to confirm the fact that the task of identifying projected visual images is not too difficult for subjects of the mental ability levels used in this investigation. Hence whether or not subjects can do the task required is obviously less important than the manner in which they accomplish it, such as time required, how many incorrect attempts are made, degree of ambiguity which can be handled successfully, and the number of stereotyped responses produced.

The prediction made in hypothesis thirteen that non-satiated normal subjects and non-satiated educable subjects would produce significantly more correct recognition hypotheses than trainable subjects, regardless of satiation condition, was not supported by the data. There were no significant differences found between the mean performances of any subject groups. These results tend to suggest that final or ultimate success in visual recognition
tasks is as much a realistic expectation for trainable retardates as for educable retardates or subjects of normal mentality, though efficiency is associated both with mental ability level and satiation conditions.
CHAPTER BIBLIOGRAPHY


4. Kounin, J., "Experimental Studies of Rigidity, II; 'The Explanatory Power of the Concept of Rigidity As Applied to Feeblemindedness'", Character and Personality, IX (1941), 166-273.


CHAPTER V

SUMMARY AND CONCLUSIONS

The purpose of this chapter is to summarize the research done for this dissertation, to present conclusions that can be drawn from the results, and to make suggestions for further research.

Summary

The purpose of this investigation has been to gather evidence of the ability of groups of subjects to perform visual recognition tasks with the presence or absence of social satiation influences on their behavior. The sixty subjects used in this study were divided into three groups of twenty each, and the groups were defined by intellectual ability. The groups included subjects of normal intelligence (I. Q. scores from 90 to 109), subjects of the educable mental ability level (I. Q. scores from 50 to 75), and subjects of the trainable mental ability level (I. Q. scores from 25 to 49). The mean mental age for all three groups was six years.
Subjects in each mental ability grouping were then divided in half at random, half to receive social satiation and half to receive no satiation. Subjects in the first group were subjected to five minutes of intensive social satiation immediately prior to the criterion task. They were brought to the testing site individually, and play materials were provided for them. During the initial five-minute period when the subject was allowed to use the toys, the experimenter actively engaged the subject in conversation, and generally interacted with him in a warm and friendly manner. Each subject was provided with a minimum of fifteen positive statements or comments about himself or his play activities during the five-minute period.

Subjects not satiated were brought directly to the testing site with a standard minimum of social interaction prior to the criterion testing. Steps were taken to insure that no subject received unplanned significant social satiation prior to testing.

The criterion task required each subject to view color slides of familiar objects projected in seven stages of ambiguity, and a final eighth stage in which the slide was projected non-ambiguously. Standard stages of visual
ambiguity were obtained by projecting the slides in seven measured out-of-focus conditions; stage number one was the most out-of-focus. Successively numbered stages were less and less ambiguous (more and more in focus). All subjects were instructed to produce hypotheses about image content as soon as they believed they could identify it. They were told to guess if they had any idea what the pictured object might be. Twelve slides were presented; the first four slides were used only to familiarize each subject with the task, and the last eight slides were used for scoring purposes. Exposure to each slide was ten seconds at each stage or focus position.

**Criterion Scores**

There were five criterion scores obtained for each subject.

**Recognition interference score.**--This is the sum of the individual focus position numbers at which each slide was correctly identified.

**Incorrect recognition hypotheses score.**--This is defined as the absolute number of incorrect recognition hypotheses.
Latency score.--This is defined as the total time in seconds required for correct identification of all slides.

Stereotyped incorrect recognition hypotheses score.--This is defined as the total number of stereotyped incorrect recognition hypotheses.

Correct recognition hypotheses score.--This is defined as the total number of correct recognition hypotheses produced.

The tenability of the hypotheses was tested by subjecting the data of each criterion variable to a two by three analysis of variance design. The significance levels of mean differences were computed using t tests where necessary.

Hypothesis number one predicted that more intelligent non-satiated subjects would experience more recognition interference, and produce higher recognition interference scores than less intelligent non-satiated subjects. The hypothesis was only partially supported. Non-satiated normal subjects produced significantly smaller recognition interference scores than either non-satiated educable or non-satiated trainable subjects. However, non-satiated educable subjects produced significantly higher recognition
interference scores than did the non-satiated trainable subjects confirming this part of the prediction. It has been suggested that subjects of normal intelligence probably do not experience less recognition interference but rather that they are more efficient in dealing with it. The result is less delay in the production of correct recognition hypotheses. Trainable subjects seemed not to experience significant recognition interference. Educable subjects experienced significant interference and were relatively inefficient in dealing with it.

Hypothesis number two predicted that non-satiated normal subjects would produce more incorrect or trial recognition hypotheses than would non-satiated educable or non-satiated trainable subjects. The hypothesis was supported. Further evidence that intelligence is a key quality related to a higher frequency of incorrect recognition hypotheses is offered by the result, not hypothesized, that non-satiated educable subjects produced significantly more incorrect recognition hypotheses than non-satiated trainable subjects.

Hypothesis number three predicted that social satiation would increase the production of incorrect recognition hypotheses; comparisons were between satiated and non-
satiated educable subjects, and between satiated and non-
satiated trainable subjects. This hypothesis was supported.
The data also indicate that satiated normal subjects pro-
duced significantly more incorrect recognition hypotheses
than non-satiated normal subjects.

Hypothesis number four predicted that non-satiated
normal subjects would have higher latency scores than would
non-satiated educables. Hypothesis number five predicted
that non-satiated normal subjects would have higher latency
scores than non-satiated trainable subjects. Neither hypothe-
sis was supported by the data. Exactly opposite results
were found. It was shown that the latency score is partially
related to the recognition interference score since a lower
magnitude of the one criterion must be associated with a
lower magnitude of the other. Therefore the same explana-
tion for the lack of support of hypothesis number one was
offered for the lack of support of hypotheses four and five.

Hypothesis number six predicted, first, that satiated
educable subjects would produce smaller latency scores
than non-satiated educable subjects and, second, that
satiated trainable subjects would produce smaller latency
scores than non-satiated trainable subjects. Only the second
prediction was supported by the data. These results were
explained as demonstrating that social satiation effects apparently are significantly greater on trainable subjects than on educable subjects. Differing life experiences of the two groups probably account for these results. Further support was offered for this explanation by data demonstrating that satiation effects did not create a significant difference in the performance means of satiated and non-satiated normal groups.

Hypothesis number eight predicted that non-satiated educable retardates and non-satiated trainable retardates both would produce significantly more stereotyped incorrect recognition hypotheses than non-satiated normal subjects. This hypothesis was only partially supported by the data. Non-satiated educable subjects produced significantly more stereotyped incorrect recognition hypotheses than did non-satiated normal subjects as predicted. The mean difference obtained between non-satiated trainable retardates and non-satiated normals was not significant but was in the predicted direction.

Hypothesis number nine dealt with the stereotyped incorrect recognition hypotheses criterion among satiated subjects and predicted that both educable and trainable retardates would produce larger stereotyped incorrect
recognition scores than normal subjects. This hypothesis also was only partially supported; satiated educable retardates produced a larger criterion score than did satiated normal subjects, but the difference was not significant. Satiated trainable retardates produced significantly more stereotyped incorrect recognition hypotheses than did satiated normal subjects.

The enhancing effect of social satiation on the behavior of trainable retardates was demonstrated by comparing the stereotyped incorrect recognition hypotheses criterion scores. There was no significant difference in the criterion performances of non-satiated trainable retardates and non-satiated normals; yet satiated trainable retardates produced significantly larger criterion scores than did satiated normal subjects. Also satiated trainable retardates produced significantly higher criterion scores than did satiated educable retardates.

Hypotheses number ten, number eleven, and number twelve dealt with the correct recognition hypotheses criterion. They predicted that social satiation effects would not influence or determine the correct number of correct recognition hypotheses ultimately produced by subjects of the mental ability levels used in this study. The data
confirmed these hypotheses. Only one subject failed to identify the content of one slide for reasons that are not clear.

Hypothesis number thirteen predicted that both non-satiated normal subjects and non-satiated educable subjects would produce more correct recognition hypotheses than would trainable subjects, satiated or not. This hypothesis was not supported by the data. With the one exception mentioned above, all subjects correctly identified the content of all slides when they were given enough focus positions and time.

Conclusions

It does not appear likely that intellectually normal subjects handle cognitive visual recognition tasks more efficiently because they do not experience visual recognition interference. On the contrary, intellectually normal subjects produced significantly more incorrect, interfering recognition hypotheses than did educable or trainable subjects, satiated or not. Yet these normal subjects did reach correct recognition hypotheses more quickly than either group. Intelligence apparently plays an important role in dealing with existing visual ambiguity
efficiently. No quality other than intelligence explains how normal subjects systematically reduced ambiguous interpretations of visual phenomenon to the point of correct recognition so rapidly and efficiently.

Of these mental ability levels tested, educable retardates had the most difficulty with recognition interference. There may be a point along a continuum of intellectual functioning above which intelligence can be used efficiently in the reduction of ambiguity, and that this theoretical point is at or near what is classified as the average level of intelligence. In a middle range of intellectual functioning, perhaps represented by the educable range, the visual ambiguity from competing hypotheses is formidable, and not handled efficiently. Within the trainable range, subjects produce fewer competing incorrect hypotheses; thus less efficiency is required to negate them prior to reaching a correct recognition hypothesis.

With regard to productivity of incorrect recognition hypotheses, intelligence plays a key role in such productivity. The frequency of incorrect recognition hypotheses decreased as intellectual ability decreased in both the satiated and non-satiated conditions. From theory (2, 5, 7)
such a conclusion seems warranted, though all motivational variables associated with intelligence were not studied in this investigation.

Motivation to increase criterion behavior can be manipulated successfully by a pre-condition of brief but intense social satiation. This was found to be true of all mental ability levels used in this study in that the production of trial incorrect recognition hypotheses was systematically greater for satiated subjects of all mental ability levels than their non-satiated counterparts. Though such a behavior increase has only been demonstrated in relation to the visual recognition task used in this study, it is expected that these findings generalize to other tasks as well, such as those normally required of children in typical classroom settings.

With the recognition interference data revealing as they do that non-satiated normal subjects handle visual ambiguity more effectively than either the non-satiated educable or non-satiated trainable retardates, it was inevitable that the latency criterion data would also indicate greater time efficiency for the normal subjects. One must conclude, therefore, that normal subjects resolve the ambiguity in a visual recognition task not only more
efficiently, but more rapidly as well. Intelligence is a key factor creating more or less rapidity in resolving visual ambiguity. With respect to the latency criterion, however, there is not the same evidence that intelligence does not influence criterion behavior systematically. Rather it is concluded that the speed of visual recognition is based systematically on intelligence since the educable and trainable groups required progressively more time to produce correct recognition hypotheses than the normal group.

A precondition of social satiation apparently does not increase visual recognition speed of educable retardates. However, social satiation does appear to motivate trainable retardates so treated to more rapid performances.

From the data evaluating the production of stereotyped incorrect recognition hypotheses it is concluded that a precondition of social satiation has an enhancing effect on the production of such responses for both normal and trainable subjects. However, satiated educable subjects produced fewer stereotyped incorrect recognition hypotheses than did non-satiated educables. One reasonable conclusion is that satiated educable subjects are more accuracy oriented than non-satiated educables. One might expect results like this if educable subjects were originally more motivated to
be accurate than subjects of other mental abilities, and this has been reported before (3, 4, 6). Motivation to be accurate certainly seemed true of the satiated educable subjects used in this study. This phenomenon has been explained as the result of educables not having a complete history of failure, but instead having just enough reinforcement through success experiences to motivate them to try to conform to adult expectations in a more consistently accurate manner than either normal or trainable groups. Such a conclusion seems relevant to the results of this study.

The enhancing effect of social satiation, particularly with trainable subjects, is seen in relation to their greatly increased production of stereotyped incorrect recognition hypotheses as compared to their non-satiated counterparts. When satiated, they appear to be considerably less critical than other subject groups of their efforts to conform to the expectations of an adult. They typically attempt to satisfy by their production of stereotyped incorrect responses. They appear to be much more motivated to produce such stereotyped responses than do normal subjects, satiated or not. That non-satiated trainable subjects do not differ significantly from non-satiated normals further
supports the conclusion that satiation as a precondition is a key factor in the motivation of trainable subjects. Response stereotypy is typical of trainables in other behavioral areas; this finding tends to support the idea of trainables being rigid cognitively (2, p. 255).

A visual recognition task apparently is a useful measure of cognitive skills as demonstrated by this study and the work of others (1), particularly using measures of recognition interference, incorrect recognition hypotheses, latency, and stereotypy of response.

The effects of social satiation can be studied efficiently by the use of a visual recognition task such as was used in this study. This conclusion is supported by the evidence that no significant differences were found in the number of correct recognition hypotheses ultimately produced by all subject groups, regardless of mental ability level or satiation condition. There is no confounding effect of excessive difficulty of the criterion task, at least for subjects of the mental ability levels used in this study.

The implications of the fact that only five minutes of intensive social satiation resulted in significantly increased performance from children of three ability levels
are considerable. A five-minute period of intensive social satiation would not appear to be difficult for a classroom teacher to provide for individual children should the necessity arise. While the effects of such satiation undoubtedly would vary depending upon the quality of rapport between teacher and pupil, it seems probably that such satiation would have a significant positive effect in most teacher-pupil relationships.

Suggestions for Further Research

It would be theoretically possible and useful to investigate the effects of motivation of retardates through various reinforcement schemes in other visual recognition studies. This could be done by providing different groups with different kinds of reinforcement during the performance of the criterion task itself. Social reinforcement as opposed to one or more types of material reinforcers should prove valuable, particularly if subject groups include intellectually normal children and at least two levels of child retardates.

Another research project considered valuable would be to do essentially the same study using adults as subjects. The most useful results probably would come from using sub-
jects of one or more intelligence levels above the average, subjects of average intelligence, and retarded subjects as well.

Creating subject skill levels on some relevant basis other than intelligence would also prove valuable. Evaluating the cognitive ability of subjects in the manner followed by Frederiksen (1) and using subjects of differing cognitive ability levels would undoubtedly provide interesting results.

A very fundamental change in the way this present study was done, and possibly an improvement in it, would be to change the manner in which the visual stimuli were made ambiguous. Frederiksen (1) has validly pointed out that some change in criterion behavior might be noted if ambiguous visual stimuli were presented using a masking technique insuring that the visual image was totally present at all times, but simply masked to a greater or lesser degree to provide the desired degrees of ambiguity. This method might be a better measure of cognitive skill than the technique used in the present study since only the tone elements of the visual image were actually present in the earlier, more ambiguous, stages of presentation. Elements of form
were visible relatively late in the presentation period in the present study.

Another profitable investigation would be to evaluate the long-term effects, if any, of differing periods of social satiation as preconditions to a criterion task. The present study investigated a five-minute period as a minimum; future research could determine if this five-minute period of time was lasting in its effect, and for how long.

The effect and duration of effect of longer preconditions of social satiation might be investigated also.
CHAPTER BIBLIOGRAPHY


BIBLIOGRAPHY

Books


**Articles**


Gorlow, Leon, Butler, Alfred, and Guthrie, George M., Correlates of Self-Attitudes of Retardates", American Journal of Mental Deficiency, LXVII (1963), 549-555.


Kounin, J., "Experimental Studies of Rigidity, II; 'The Explanatory Power of the Concept of Rigidity As Applied to Feeblemindedness'", Character and Personality, IX (1941), 166-273.
McAfee, Ronald O, and Clelend, Charles C., "The Discrepancy Between Self-Concept and Ideal-Self As a Measure of Psychological Adjustment in Educable Mentally Retarded Males", American Journal of Mental Deficiency, LXX (1965), 63-68.


**Reports**


Unpublished Materials


