AN ABSTRACT OF THE THESIS OF

Darrell Frank Clukey for the degree of Doctor of Education

in Education presented on March 15, 1977

Title: COMPARING THE PERFORMANCE BETWEEN HIGH SCHOOL STUDENTS WITH ESTEEM NEEDS AND THOSE WITH SECURITY NEEDS IN SOLVING A PROBLEM THROUGH INSIGHT IN A VERBAL LEARNING SITUATION

Abstract approved: Redacted for Privacy

Gerald L. Becker

The purpose of this study was to compare the performance between high school students with esteem needs and those with security needs in discovering a two-second delay between correct response and feedback in a paired-associated learning task. Subjects had to determine which one of seven possible responses (digits) to a stimulus (consonant) was correct and then associate that correct response with its appropriate stimulus. The two-second delay confused them about which one of their responses was correct for each stimulus, since the delay caused feedback to coincide with the response following the correct one. Subjects had to discover the two-second delay before they could identify the correct responses and associate them with their appropriate stimuli.

Associating one item with another, e.g., π with 3.1416, is important for students. Even a cursory look at school tests reveals the emphasis schools place on memorizing verbal associations. The importance of this elementary form of learning lies primarily in its being basic to the more complex forms. Because of this importance, teachers should be aware of the characteristics of students that both help and hinder them in memorizing verbal associations.

It is possible, for example, that whether students have a need for esteem or security may be related to their performance in discovering relationships among items within a verbal learning task. Knowing these relationships possibly could help them to memorize the items. It was predicted in this study that subjects with esteem needs would discover the two-second delay sooner than subjects with security needs and therefore perform better at memorizing the stimulus-response pairs in the experiment.

Three variables in student ability to discover the two-second delay were examined. These were (a) esteem versus security needs, (b) type I versus type II information, and (c) practice over trials. Esteem and security needs were differentiated by using Simpson's Index of Psychological Deprivation (IPD), which is based on Maslow's classification of needs. The two types of information were provided through two different methods of feedback. Feedback was either a light coming on (type I), or a presentation of the stimulus-response

pair (type II). There were four combinations of need type and information type. Nine subjects were placed in each group and were given 18 trials to learn six stimulus-response pairs.

The effects of the three variables and their interactions were analyzed with a three-factor mixed analysis of variance design for repeated measures on one factor. Significance was set at the 0.05 level. The analysis indicated that (a) the type of information given to subjects affected their overall performance level, (b) subjects learned as a function of practice over trials, and (c) the rate of learning for subjects was dependent upon the type of information given to them. There was no significant effect of type of need on performance, either alone or in combination with the other two variables.

It was found that type of need, as measured by the IPD, is a characteristic of high school students which neither helps, nor hinders their performance in discovering relationships which could aid them in memorizing verbal associations. This finding, however, only pertains to students from similar cultures. Therefore, teachers should not have to concern themselves with the esteem and security needs of students when teaching them skills for discovering relationships in verbal learning tasks, as long as the students are of the same race and represent similar socio-economic levels and national heritages.

Comparing the Performance between High School Students with Esteem Needs and Those with Security Needs in Solving a Problem through Insight in a Verbal Learning Situation

by

Darrell Frank Clukey

A THESIS

submitted to

Oregon State University

in partial fulfillment of
the requirements for the
degree of

Doctor of Education

Completed March 1977

Commencement June 1977

APPROVED:

Redacted for Privacy

Associate Professor of Education
in charge of major

Redacted for Privacy

Dean of School of Education

Redacted for Privacy

Dean of Graduate School

Date thesis is presented March 15, 1977

Typed by Mary Jo Stratton for Darrell Frank Clukey

ACKNOWLEDGEMENTS

My deepest appreciation goes to Sherrill Whittemore, my wife, who was a constant source of inspiration and encouragement. Although she gave much in the way of professional criticism, her love and concern are a large part of this thesis.

Appreciation goes to Dr. Gerald Becker, who served as committee chairman, and to the committee members Drs. Edward Fuller, Robert Krahmer, Carol Saslow, and Carvel Wood. A special thank you goes to Drs. Becker and Saslow for their continued guidance and assistance throughout the study.

I would like to thank Drs. Donna Cruse and Michael Saslow who listened to many ideas and cared enough to offer suggestions when the study was first begun; Jim Kushmuk who served as the study's experimenter; and the students and faculty of the Oregon Episcopal School in Portland whose cooperation was invaluable.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

COMPARING THE PERFORMANCE BETWEEN HIGH SCHOOL STUDENTS WITH ESTEEM NEEDS AND THOSE WITH SECURITY NEEDS IN SOLVING A PROBLEM THROUGH INSIGHT IN A VERBAL LEARNING SITUATION

I. INTRODUCTION

Memorizing verbal associations is a common task for students. They perform this task in such instances as learning vocabularies, associating events and dates, and using mathematical symbols. This type of task requires students to associate one item with another, e.g., "oui" in French with "yes" in English, the writing of the Constitution of the United States with 1787, or π with 3.1416. Associating one item with another is an elementary form of verbal learning, but it has importance in more complex forms of learning, such as in acquiring concepts and principles (Gagné, 1970). It also has importance in academic achievement, as evidenced by the content of the tests used to evaluate student performance.

Memorizing verbal associations may be a common and important task for students, but it is not always an easy one. The task can be difficult, especially if a student does not understand the relationships which exist among the items to be memorized. The task can become easier, though, when students can discover these relationships and use them to associate the items, since the availability of associations for connecting contiguous items enhances verbal learning (Noble, 1963).

Anatomy students, for example, are required to memorize the names of muscles. Each muscle and its name form an item pair. The muscle, when shown in a drawing or dissected animal, is the stimulus of the pair and its name is the response. The student knows all the possible responses (names) from reading them in the textbook, but the task is to learn to associate the correct response with each given stimulus (muscle) when it is presented.

Memorizing the item pairs (muscle-name) becomes easier when the student discovers the relationships between the muscles themselves and the muscles and their names. Muscles grow in patterns and are named according to the characteristics and functions of the body. Muscle terminology has patterns, too, which reflect these characteristics and functions. Students who have discovered the relationships between these muscle patterns and the terminology used to identify them should be more adept at memorizing the item pairs, because of the availability of associations, than students who have not made the discoveries.

Statement of the Problem

An experiment conducted by Nelson (1971) exemplifies how an undiscovered relationship can hinder the memorization of item pairs. Nelson delayed the feedback which subjects received for giving the correct response to a stimulus in a verbal learning task. This delay

was for two seconds, which was enough time for subjects to give another response after they had given the correct one. Subjects were confused about which one of their responses was correct, since there did not seem to be any pattern to when feedback was being given. The subjects who did not discover the relationship between the correct responses they were giving to stimuli and the feedback they were receiving for making these correct responses were unable to memorize the item pairs. Those subjects who did discover this two-second delay, on the other hand, were able to memorize them.

The purpose of this study was to compare the performance between high school students with esteem needs and those with security needs in gaining insight into the two-second delay and overcoming this obstacle to memorizing the item pairs. Esteem versus security needs was selected as a variable for two reasons. One is the presumed importance of needs in human motivation. This thinking is found in education (ASCD, 1962; Lindgren, 1967; Glasser, 1969; ASCD, 1977) and its related fields of psychology (Goble, 1970; Maslow, 1971; Wilson, 1972) and counseling (Glasser, 1965; Stewart and Warnath, 1965; Blocher, 1966). The second reason is the lack of experimental studies which have examined human needs. Experimentation would provide for more factual knowledge about the role of needs in human motivation. This study, in particular, examined the possible association between human needs and academic learning. Academic learning

was represented here by the solving of a problem in order to memorize verbal associations. Both problem solving and memorizing verbal associations are common forms of academic learning (CRM, 1973).

It can be reasoned that human needs are associated with academic learning, even though there is a lack of experimental evidence to link them. An argument for their being related can be made through the strong evidence linking academic learning and self-concept. It is known that academic achievement is related to self-concept (Purkey, 1970; Hamachek, 1971), and it is thought (Kinch, 1963; Hamachek, 1971; Gordon, 1972) that self-concept develops through people's interactions with their parents, teachers, and other significant persons in their lives as they are growing. The same thing is thought about the satisfaction of human needs. People's needs, it is said, influence their behavior and are satisfied through interactions with others who are significant to them (Maslow, 1968). Because both the development of self-concept and the satisfaction of human needs are thought to be dependent upon people's interactions with significant persons in their lives, it is assumed that they are related. On the basis of this relationship, positive interactions with parents, teachers, and other significant persons are presumed to increase people's chances to develop positive self-concepts and attain greater satisfaction of their basic needs.

The subjects in this study were asked to make responses to a series of stimuli. Stimuli were six randomly selected consonants, and responses were randomly selected from the set of digits 3-9 inclusive. Stimuli and responses were then randomly matched to form stimulus-response pairs. In response to each stimulus, the subjects were asked to say any one of the seven possible digits every two seconds. The two-second interval was paced with a metronome. Subjects knew when they had made a correct response to a stimulus from the feedback which they received. The feedback was either a light coming on, or a presentation of the stimulus-response pair. The assumed obstacle to learning was the delay of this feedback for two seconds after the correct response to a stimulus was given. Because the feedback was delayed two seconds, subjects gave one more response after they had given the correct response. This caused confusion as to which one of the several responses they had given to a stimulus was correct. Before the subjects could learn to associate the correct responses with their appropriate stimuli, they had to determine which responses were correct by discovering the two-second delay between when a correct response was given and when feedback was provided.

Because feedback coincided with the response which followed the correct one, interference possibly could have been the obstacle to learning, rather than delay of feedback, but this was not of concern in this study. The only concern here was that there was an obstacle to learning.

This study examined the effects of three variables on high school student ability to discover a two-second delay between when they gave a correct response to a stimulus and when feedback was provided in a verbal learning task. The three variables were (a) esteem versus security needs, which comes from Maslow's (1954) hierarchy of needs, (b) type I versus type II information, which for now is described simply as two different types of information provided students in helping them to solve the problems, and (c) practice over trials.

Definition of Terms

Paired-Associate Learning

A common form of verbal learning is paired-associate learning. It is considered (Gagné, 1970; Kintsch, 1970; CRM, 1973) to be a representative form of memorizing verbal associations as found in learning a language, musical score, mathematical notation, or historical events and dates.

In experiments dealing with conventional paired-associate learning, items such as digits, syllables, or consonants are memorized as stimulus-response pairs. The student learns to give the correct response for each stimulus presented. For example, a student might be asked to learn a list where digits are paired with syllables: 3-a, 1-c, 5-d, 2-e and so forth. The student is presented with a stimulus, e.g., 3, and is expected to repeat the correct response, "a." Then, whether the response was correct or

incorrect, the student is shown the stimulus-response pair, 3-a, as feedback, and this presentation is followed with a display of the next stimulus, in this case 1. The presentation of all the stimulus-response pairs in the list constitutes a trial, and usually the number of trials the student takes to make a given number of correct responses is recorded as "trials to criterion." This is the conventional, anticipation method of paired-associate learning.

Esteem Versus Security Needs

"Needs" as used in this study was taken from the need gratification theory developed by Maslow (1954). Maslow's theory describes five hierarchical levels of need which are listed below, starting with the lowest level:

(a) physiological needs, e.g., food and water;

(b) safety needs, e.g., order and routine;

(c) belongingness needs, e.g., kindness and love;

(d) esteem needs, e.g., prestige and recognition; and

(e) the need to self-actualize, i.e., to realize one's full human potential and identity.

Maslow (1954) presumed on the basis of clinical experience and the lack of any experimental evidence to the contrary that the needs of safety and belongingness must be satisfied before the esteem needs can become the more potent motivators of behavior; hence, his

reference to needs as being in hierarchical levels. This study referred to Maslow's need levels as types of need, however, because of empirical evidence presented by Simpson (1971). Simpson contends that above the physiological or survival level "...the group of basic needs. . .is most appropriately described as a typology rather than a hierarchy" (p. 106).

Two types of need were considered in this study. One type is esteem needs, which includes both esteem from others and self-esteem. The second type is called security needs, which includes both safety needs and belongingness needs. Subjects were placed into categories of "need" and "no need" for both esteem and security using the Index of Psychological Deprivation (IPD). The IPD is a 32-item questionnaire developed by Simpson (1971) as a measure of high school students' needs using Maslow's (1954) classification scheme. It did not fit the purpose of the study to use all five categories suggested by Maslow's scheme. The study's purpose was to compare the problem solving performance between high school students who strive primarily for safety in friendships, family love, and routine with those who strive primarily for prestige and recognition through accomplishment. This goal was attainable with only two categories.

Type I Versus Type II Information

An analysis of Nelson's (1971) experiment suggests two possible types of information which might be provided students about the correctness of their responses in a paired-associate learning task. Nelson used paired-associate learning to examine two types of feedback, immediate versus delayed, with two methods of feedback. Feedback was either the stimulus-response pair presented to the subject, or a light turned on to indicate that the correct response had been given. The usual procedure when using the anticipation method is to present the feedback irrespective of the correctness of the subject's responses to the stimuli. Nelson altered this procedure. He required his subjects, who were college students, to continue to respond to a stimulus in an exploratory fashion from a given set of possible responses until they said the correct response. Then feedback was given two seconds later.

Four conditions were defined in Nelson's (1971) experiment when the two types of feedback were combined with the two methods of feedback. These four conditions were:

(a) immediate feedback using a stimulus-response pair (I-SR);

(b) immediate feedback using a light (I-Lite);

(c) delayed feedback using a stimulus-response pair (D-SR); and

(d) delayed feedback using a light (D-Lite).

Nelson (1971) does not discuss types of information in his experiment. An examination of his experiment reveals, however, that he provided his subjects with two different types of information about the correct responses to be associated with their appropriate stimuli in the learning task. When the stimulus-response pair was presented as feedback, Nelson was showing his subjects the correct response. So whether feedback was immediate or delayed, his subjects had seen all of the correct responses by the end of the first trial. His subjects then had only to remember these correct responses and learn to associate them with their appropriate stimuli. Immediate feedback with the light also identified for his subjects all of the correct responses by the end of the first trial, since the subjects were presented with the light as soon as they had uttered the correct response. Therefore, under the conditions of I-SR, D-SR, and I-Lite Nelson's subjects were given enough information to know they had given correct responses, plus they knew which one of their responses was correct for each stimulus.

The type of information represented in Nelson's (1971) experiment by I-SR, D-SR, and I-Lite was referred to in this study as type II information. Type II provided the students with enough information through feedback for them to know they had given the correct response to a stimulus. In addition, they knew the correct response,

having only to remember and associate it with its appropriate stimulus.

Another type of information represented in Nelson's (1971) experiment was referred to in this study as type I. Type I provided the students with enough information through feedback for them to know they had given the correct response to a stimulus, but the students could not immediately identify which one of their several responses to a stimulus was correct.

Nelson's (1971) condition D-Lite provided type I information. When the light was turned on for feedback and the feedback received was delayed, Nelson was not showing his subjects which one of their several responses to a stimulus was correct. He was only indicating to his subjects that the correct response had been made. Before his subjects could begin to learn to associate the correct responses with the appropriate stimuli, they had to identify the correct responses by discovering the two-second delay between when a correct response was given and when feedback was provided.

Questions and Hypotheses

Nelson (1971) found no significant difference in performance between groups with conditions I-SR, D-SR, and I-Lite, which received what was called type II information. He did, however, find a significant difference in performance between each of these

three groups and the group with condition D-Lite, which received what was called type I information. Nelson also noted a difference in individual performance among his subjects in the D-Lite group even though the D-Lite group performed significantly worse than the other three. He says of the D-Lite group,

> . . . out of the 20 (subjects), five showed perfect performance part way through the experiment. . ., two were improving slightly on the last few trials, and the remaining 13 were performing no better on the final trials than they did on the initial trials (pp. 221-222).

It seems from Nelson's statement that at least five of his D-Lite subjects had discovered the two-second delay between when they responded correctly to a stimulus and when they received feedback via the light. With this insight, they seem to have been able to determine which responses were correct and associate each correct response with its appropriate stimulus. Within a few trials, these five subjects were demonstrating increased learning performance. Their performance increased until toward the end of Nelson's series of 18 trials they were performing as well as the subjects in the other groups. Because the performance of the other 13 D-Lite subjects did not change noticeably over trials, they probably never discovered the two-second delay.

The difference in performance within the D-Lite group might be related to differences in the needs of individual students. The five students who discovered the two-second delay may have been more motivated

toward academic achievement, because of greater needs for the prestige and recognition which schools give for high performance in verbal learning, than the 13 students who did not discover the two-second delay. People with esteem needs are felt to be more inclined toward being motivated by prestige and individual recognition than are people with security needs (Maslow, 1954; Simpson, 1971).

It was assumed in this study that if high school students must discover that a two-second delay exists between when they give a correct response to a stimulus and when feedback is provided in a paired-associate learning task, then students with esteem needs will perform significantly better than students with security needs over a series of 18 trials. High school students were used because the IPD, which was used to select students with esteem or security needs, was designed for this age group.

Four groups of subjects were used to compare the performance between students with esteem needs and those with security needs in combination with type I versus type II information in a paired-associate learning task over 18 trials. The following results were predicted:

1. The performance of the type II group would approximate the normal learning curve, with no significant difference in performance occurring between the esteem-needs group and the security-needs group receiving type II information.

2. The group combining esteem needs with type I information would perform at the level of chance until insight into the two-second relationship between correct response and feedback was demonstrated by an increase to perfect or near perfect performance.

3. The group combining security needs with type I information would perform at the level of chance over all 18 trials.

Figure 1 represents the results which were predicted to occur in this study.

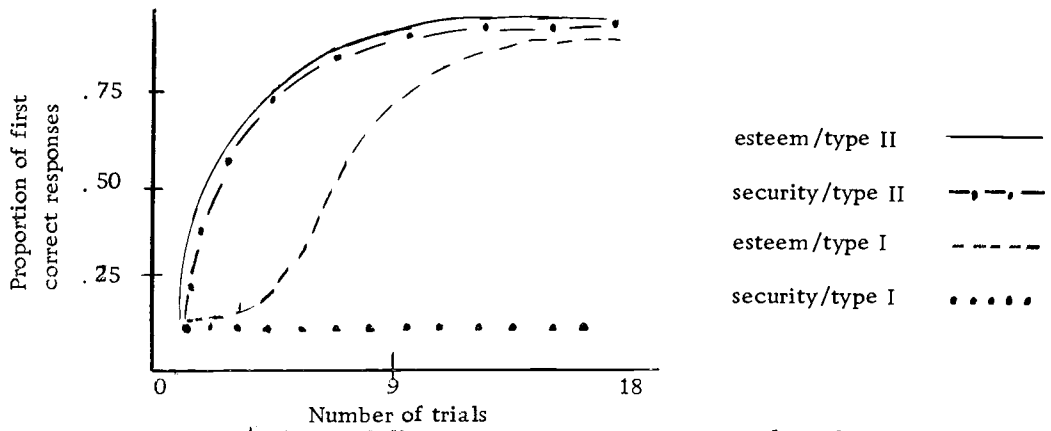

Figure 1. Proportion of first responses expected to be correct on each trial as a function of type of need (esteem vs. security) and type of information provided (type I vs. type II).

Limitations of the Study

1. The population of this study was the student body of an independent, college preparatory, coeducational high school located in a metropolitan area of the northwestern region of the United

States. The school has approximately 125 students in grades 9 through 12. The results gained in this study are limited to similar students.

2. Nelson's (1971) population consisted of college students, whereas high school students were used here. High school students were selected because the IPD was developed for use with this group. The assumption made was that Nelson's procedure is more appropriate for high school students than the IPD is for college students.

3. The IPD, which was used to identify need type, was found to be reliable and valid as part of Simpson's (1971) study for which the IPD was developed. No record was found of others having used the IPD. It was used in this study because it is practical for administering to a large number of students at one time and because it is relevant to the need categories which were used.

Caution should be taken, however, about the trustworthiness of the IPD due to Simpson (1971) obtaining a Kuder-Richardson reliability coefficient of 0.61 (n=232), assuming that 0.70 is an appropriate criterion of acceptance (Bruning and Kintz, 1968). Caution only is recommended, though, because this same sample had a test-retest reliability coefficient of 0.80, and another sample (n=114) had a Kuder-Richardson reliability coefficient of 0.75.

4. About two weeks were needed for all subjects to participate, one at a time, in the paired-associate learning task. Control of subjects discussing the experiment with each other during the testing period was limited to asking them not to discuss the experiment with anyone until all subjects had participated. It helped that no one subject had to be told who the others were. They could only find out accidentally.

Significance of the Study

The difference in performance between the five subjects in Nelson's (1971) D-Lite group and the other 13 subjects in that group seemed to indicate that each of the five subjects demonstrated an ability to solve the problem of the two-second delay, while not one of the 13 subjects was able to do so. Is the ability to solve the problem of the two-second delay related in any way to student characteristics that might differentiate between the two groups and be associated with the students' abilities to solve the problem? If there are characteristics such as these, then identifying them could be of use in teaching problem solving skills, since their identification would aid in planning different instructional approaches for different groups of students.

The importance of teaching problem solving skills in academic learning is discussed by Glaser (1976). He mentions the increased interest that educators and psychologists have in teaching problem solving and other general skills that will help students to learn on their own. These skills would be especially important in the absence of direct instruction by a teacher. The students would need the capabilities for discovering the relationships in the learning task on their own.

Glaser (1976) reminds us that there is little scientific basis for teaching general learning strategies, but contends that

> . . .the processes involved in certain kinds of problem solving are probably similar to the processes involved in learning in the absence of direct or complete instruction, and that instruction in these processes might constitute a means of increasing an individual's generalized learning-to-learn abilities (p. 19).

He hopes that instruction in these problem solving processes may help students to learn more on their own and be less dependent on instructors.

If problem solving skills are taught to increase a student's generalized learning-to-learn abilities, as suggested by Glaser (1976), then it seems reasonable that more should be known about student susceptibility to such instruction. This study tests the possibility of esteem versus security needs as a significant variable in problem solving ability in verbal learning. Evidence gained in

support of the study's stated hypotheses would indicate that high school students with esteem needs are better able to solve problems in verbal learning tasks than students with security needs.

Information about student characteristics that are associated with problem solving abilities is important for planning instruction in general learning strategies. First, there is a need in instructional planning to know about the differences in individual learning characteristics (Cronbach, 1967; Messick, 1970). In addition, there are advantages that students gain in verbal learning by being able to discover relationships in the learning task on their own, rather than having to rely on the teacher to point them out. If students can discover the pattern relationships between muscles and their terminology on their own, they probably will have a better understanding of these relationships than if an instructor has to explain them. Discovery through insight usually implies understanding, but direct instruction does not always produce insight, let alone produce understanding.

This study benefits education by providing information about the problem solving ability of students with different types of need. This is useful information in planning for instruction that will help students become less dependent upon direct instruction by a teacher. This should be a goal of schools as students move closer to managing their own lives as they progress through the grades, and as schools look for more efficient ways to educate.

II. LITERATURE REVIEW

This chapter is a review of the literature which was relevant to this study. There are two categories of information involved. The first contains literature about learning, specifically that about memorizing verbal associations and using insight in problem solving. The second contains literature about human needs, specifically that about Maslow's (1954) hierarchy and the relationship of needs to academic achievement.

Learning

Learning is generally defined as a change in performance or behavior. A very general definition is provided by Goldenson (1970). He states that learning is ". . .a process in which new information, habits, or abilities are acquired; in general, any modification of behavior due to contact with the environment" (p. 686). Another source (CRM, 1973) states that

> Learning is generally defined as any enduring change in an organism's behavior as a result of experience. Some definitions of learning stress the process by which behavior is modified; others stress what is learned (that is, the product of the learning process) (p. 147).

Kintsch (1970) tends to stress the process of modifying behavior in defining learning. He does not attempt to provide a formal definition of learning, but states that

> It is enough to define learning by pointing to commonly agreed instances. . . . The psychology of learning is still a long way from maturity. It has no generally accepted theories or research paradigms. It is still very much in a state of flux and resists explicit definitions. But it is not really necessary to define learning in order to study it (pp.1-2).

For Kintsch, there are too many different processes of learning to agree on a single, comprehensive definition of learning.

Gagné (1970), on the other hand, tends to stress the products of learning. He states that

> Learning occurs. . .when certain observable changes in human behavior take place that justify the inference of learning. . . . Learning is a change in human disposition or capability, which can be retained, and which is not simply ascribable to the process of growth. The kind of change called learning exhibits itself as a change in behavior, and the inference of learning is made by comparing what behavior was possible before the individual was placed in a 'learning situation' and what behavior can be exhibited after such treatment. The change may be, and often is, an increased capability for some type of performance. It may also be an altered disposition of the sort called 'attitude,' or 'interest,' or 'value.' The change must have more than momentary permanence; it must be capable of being retained over some period of time. Finally, it must be distinguishable from the kind of change that is attributable to growth, such as a change in height or the development of muscles through exercise (pp. 3-4).

There are eight types of learning described in the Kintsch (1970) and Gagné (1970) references. These are signal learning, stimulus-response learning, chaining, verbal association, discrimination learning, concept learning, rule learning, and problem solving. This review discusses two of these types of learning, verbal association and problem solving, because of their relevance to the study.

Verbal Association

Gagné (1970) points out that verbal behavior is a complex process in people. It involves a tremendous variety of simple sounds and sound patterns linked together in complex chains with all their subtle resemblances and differences. He further points out that the memorizing of verbal associations is the most elementary kind of verbal behavior, but that elementary as it is it does play a role in more complex forms of learning.

Procedures. There are several procedures used in experiments dealing with memorizing verbal associations. Three common procedures are free recall, serial learning, and paired-associate learning. Subjects in free recall experiments are given a list of items and later asked to recall as many items as possible in any order. The results are described by such methods as plotting the mean number of correct responses over trials, or by plotting trials to criterion, where the ordinate is the mean number of subjects reaching criterion for each trial. The process for free recall is to learn associations between all of the items.

Serial learning uses each item as both stimulus and response. The items are always presented in the same order, and subjects learn to anticipate the next item from its association with the preceding one, since they recall them in the same order for each trial.

Besides learning the items in the list, the process involves learning the associations which chain the items together in the correct order and being able to discriminate between the items, since discrimination between items facilitates learning.

In paired-associate learning, subjects learn a list of stimulus-response pairs and then give the response of an item-pair when given the stimulus. In the process of the learning task, subjects must learn what the responses are as well as what their association is with the proper stimulus.

Variables. A variety of experimental evidence has accumulated around memorizing verbal associations using these three procedures. Most of this evidence comes from the study of variables which are related to the lists being learned, while little involves learner variables. Gagné (1970) mentions two learner conditions for optimal learning of verbal associates, but these are merely statements that the learner must be able to discriminate the stimulus as such, and that the more associations that subjects have available to them the more readily they are able to chain verbal associates.

Learner characteristics which would be relevant to this study, such as level of self-esteem, were not found as variables in any experiments dealing with memorizing verbal associations. There are, however, a few studies of verbal learning where other subject variables are considered. None of these studies was relevant to this

one, except to show the kinds of subject variables which are usually considered in verbal learning. For example, Baumeister and Berry (1970) did a study where one variable was retarded versus normal subjects. Slow versus fast learners was a variable in a study by Richardson (1972), and Hale and Taweel (1974) used younger versus older children.

If you think about lists and the individual items in them, whether the items are digits, consonants, nonsense syllables, or words, there are several conditions about them which are evident. First, there are similarities and dissimilarities between items in the list, i.e., intralist similarity. Second, some items may be more meaningful to a subject than others, or maybe some items conjur up images more readily for the subject than others do. Finally, although other conditions could be mentioned, some words may be used in the language more frequently than others and therefore would be more familiar.

In studies of intralist similarity, Miller (1958) found that high intralist similarity facilitated free recall, as did Horowitz (1961) and Whitman and Garner (1962). It appears that less information must be remembered as similarity becomes greater among list items. However, Underwood and Goad (1951) and Underwood and Richardson (1956) found that high intralist similarity hindered serial learning. Gibson (1942) also found this to be true for paired-associate learning.

Underwood (1953) and Underwood, Runquist, and Schulz (1959) showed that increasing similarity in both the stimulus and response for paired-associate learning increased learning difficulty. But if only response items increase in similarity, then learning of the response is facilitated, even if the overall effect of similarity is negative. It seems, therefore, that high similarity can help as well as hinder paired-associate learning.

It can be determined from these and similar studies that similarity among items is an important factor in learning. However, a general statement that intralist similarity either helps or hinders the memorizing of verbal associations cannot be made. It can be said, though, that in paired-associated learning fewer trials are needed for learning lists with low intralist similarity than with high (Underwood and Goad, 1951; Underwood and Richardson, 1956). Therefore, in this study, to facilitate the best possible performance within the fewest number of trials, a list with low intralist similarity gave an advantage in displaying a rapid upward turn in the learning curve, once insight was gained.

It is generally concluded that meaningfulness affects the memorizing of verbal associations. For example, McGeoch (1930), using free recall of nonsense syllables, determined that the number of items recalled was a positive function of the association value of the items. Also, Cieutat, Stockwell, and Noble (1958) found the

effects of response meaningfulness to be greater than the effects of stimulus meaningfulness.

The exact nature of the effect that meaningfulness has on memorizing verbal associations is determined partly by the learning task under consideration and by how meaningfulness is measured. For example, when retention was measured by both free recall and recognition (Gibson et al., 1964) it was found to be better for meaningful items than for pronounceable items using free recall. However, for recognition the reverse was true; pronounceability was more powerful than meaningfulness as a variable in learning.

Underwood and Schulz (1960) reported that for trigrams, e.g., NFL, TWA, FBI, and CIA, learning increases with meaningfulness. Noble (1952) found with vowel-consonant-vowel combinations that increasing the meaningfulness of both the stimulus and response increased performance. It seems that as meaningfulness is increased there is less to learn, so performance is better.

Paivio (1969) showed that the meaningfulness of a word is highly correlated with its potential to arouse images. If imagery varies independently of meaningfulness, its effects upon learning are undiminished. On the other hand, if meaningfulness is varied independently of imagery, the effects upon learning are reduced to zero. Therefore, he concluded that concreteness seems to be a more basic variable in learning than meaningfulness.

Another variable in the manipulation of meaningfulness is stimulus frequency. Gibson et al. (1964) found that items which are both frequently used and meaningful are easiest to remember. This was irrespective of pronounceability of the item. Related to this is the work of Miller and Selfridge (1950). They concluded that meaningful material is easy to learn not because of meaningfulness per se, but because it preserves the short range associations that are familiar to the subjects. In other words, the familiarity of the immediately preceding units in a sequence enhances the learning of the material. This is exemplified by their finding some kinds of nonsense to be as easy to recall as meaningful passages. If the nonsense preserves the short range associations of the language, then the nonsense is easier to learn.

Meaningfulness and imagery are two variables which seem to have opposite effects on paired-associate learning. Cieutat, Stockwell, and Noble (1958) found the effects of response meaningfulness to be considerably larger than the effects of stimulus meaningfulness. However, Paivio (1969) found that the imagery value of the stimulus is more powerful in its effects on learning than the imagery value of the response. Noble (1952) also found that increasing meaningfulness in the stimulus and response together increases performance.

It not only appears that all learning is not the same, but that even one type of learning, memorizing verbal associations, has no one set of variables which can be said to either help or hinder it. It generally is found that variables in the material to be learned affect learning differently depending upon the procedure being used. The effects of variables such as similarity, meaningfulness, and imagery are dependent upon the procedure used in memorizing the association. This fact is so clear in the literature that Kintsch (1970) risks saying, "There is no such thing as verbal learning, only paired-associate learning, free recall, or other procedures" (p. 27). Each procedure has its own peculiar set of variable combinations needed for the most efficient learning to occur.

The conclusion reached here is that the results of this study should not be generalized much beyond paired-associate learning where low intralist similarity, low stimulus meaningfulness with high response meaningfulness, and high stimulus imagery with low response imagery would appear to be one combination of variables which is advantageous to rapid learning.

Problem Solving

Problem solving is the kind of learning commonly associated with thinking (Gagné, 1970). It ". . . is an inferred change in human capability that results in the acquisition of a generalizable rule which

is novel to the individual, which cannot have been established by direct recall, and which can manifest itself in applicability to the solution of a class of problems" (Gagné, 1966, p. 132).

Each of the points in Gagné's definition is manifested in the problem solving task required of students in this study.

1. Inferred change in human capability: This is evident by the learning curve rising significantly above the level of chance.
2. Acquisition of a generalizable rule: This is the students' discovery that the correct response is the one immediately preceding the response that coincides with reinforcement.
3. Novel to the individual: This is guaranteed by the rule (see number 2 above) being novel to this learning task, in which the students have never before participated.
4. Cannot have been established by direct recall: This is guaranteed by definition, since "recall" implies previous learning. The learning task is unique for students, and therefore the rule could not have been learned previous to their participation in the experiment.
5. Can manifest itself in applicability to the solution of a class of problems: This is guaranteed by the students needing to use the rule to determine which of the seven possible responses is the correct one for each stimulus in the six item-pairs.

Gagné (1970) states that

> The individual steps involved in problem solving may be many, and therefore the entire act may take some time. Nevertheless, it seems evident that the solution is arrived at 'suddenly,' in a 'flash of light' (pp.61-62).

This "flash of light" is what is commonly called insight in the literature (Manis, 1966; Gagné, 1970; Goldenson, 1970). It is a sudden discovery ". . . which transforms a problem situation into a solution situation" (Gagné, 1970, p. 228).

Goldenson (1970) describes insight as ". . .an apparently sudden grasp of relationships that leads to the solution of a problem or the achievement of understanding" (p. 617a). Manis (1966) says that when a person is in a problem solving situation he may

> . . .move rapidly from a state in which he does not know the solution to the problem into a second state in which he knows the solution well, with no intermediate transitions such as we often encounter in learning situations. This rapid spurt in performance is the main characteristic of <u>insight</u>--an almost instantaneous reorganization of the elements of a problem situation, leading to successful solution (p. 80).

Insight is a hypothetical mental process, i.e., a construct, which cannot be seen. It can, however, be seen when a discovery is made. In this study, discovery was used as an indication of insight and was determined through an increase in student performance in memorizing verbal associations.

Dewey (1910) provides an early look at the traditional characteristics of problem solving. These characteristics follow a four-step

pattern: motivation, delimitation, hypothesis, and testing. Essentially, these four steps show that a person must first see or define the problem. Then, the essential features of the problem must be organized so it can be handled adequately. Third, tentative solutions are formed, and finally, these possible solutions are tested until one is verified.

These characteristics are still evident after nearly 70 years. Glaser (1976), for example, reports that he and L. B. Resnick, in a paper which is still in press, have developed a model of problem solving. This model has three interacting phases which are very similar to Dewey's four-step pattern. Their model's phases are identified as:

> (a) problem detection, in which the inapplicability of 'usual routines' for solving a problem is noted and a problem or goal is formulated. . . .
>
> (b) feature detection, in which the task environment (the external situation, which includes both physical and social features) is scanned for cues that might lead to appropriate actions. . . .
>
> (c) goal analysis, in which goals are successively reformulated, partly on the basis of external task cues, in order to yield soluble subgoals that contribute eventually to solution of the problem as presented. . . (p. 19).

Students in this study faced a problem when they realized that their last response was not the correct one. The last response they gave to a stimulus was the one which had feedback coinciding with it, but it was not the one for which the feedback was being given. The

response preceding the last one was the one which was correct, since feedback was delayed for two seconds and coincided with the next response. The responses were being given by the subject every two seconds in rhythm with a metronome. There were only seven possible responses available to the subject, and the subject knew what they were. The subject could give the responses in any order.

It was assumed that the subjects were trying to solve the problem. They more than likely wanted to overcome the obstacle which was confronting them in the learning task. The problem for students receiving type II information should have been easy to solve, since they were shown the correct item-pairs for feedback. Students receiving type I information should have had a more difficult time solving the problem, since they were not shown the correct item-pairs. Students receiving type I information probably delimited the information they had to form tentative solutions, and then tested these solutions on each new trial. On each trial, the type I subjects probably gathered a little more information about the relationship between the stimulus and its correct response until insight was suddenly gained into the two-second delay and the obstacle to learning was overcome. At that point in the series of trials the learning curve should have left the level of chance and turned upward.

Two Models of Learning

There are two models of learning which were relevant to this study. A brief discussion of them is provided to show the basis on which the assumption was made that students would use insight to solve the problem of the two-second delay in feedback. One is the incremental or linear model (Bush and Mosteller, 1955) in which learning is seen as a gradual process until the association is made. The second is the all-or-none, two-state Markov model (Bower, 1961) in which learning an association is seen as occurring all at once. In other words, an item is either learned or not learned. It is never partially learned.

A comparison of both models reveals that each generates the same learning curve, so this is not helpful in differentiating between them (Kintsch, 1970). However, the models do show a difference in subject behavior on trials before the last error. The Markov model predicts no improvement in response probability up to the trial of the last error. This is referred to as the stationary prediction. According to the linear model, however, performance on trials before the last error is not stationary. The probability of a correct response rises continuously with each trial. In studies by Kintsch (1965) and Bower (1961, 1962), the Markov model was supported. However, the experiment, in order to be successful, must be limited to easily

discriminable stimuli and only two response alternatives, with subjects being told the response alternatives.

Latency studies also support the Markov model. The latent period in learning associations is the interval which occurs between a stimulus and its response. Millward (1964) found that response latencies did not change much up to the last error, but after the trial of the last error they decreased rapidly to an asymptotic value. Findings summarized by Suppes, Groen, and Schlag-Rey (1966) also showed that latencies were high initially and stayed high until the item was learned. Also, the point at which latencies changed dramatically was also the point at which response probability changed and galvanic skin responses declined in magnitude (Kintsch, 1965).

In support of the incremental model, Rock (1957) did an experiment in which he assumed that if associations are formed by a process of gradual strengthening based on repetition, then it should be easier to form an association between items which have already been presented together on one or more previous trials, but which the subject has not yet been able to get right, than between items presented together for the first time. The results of his experiment favored the Markov model, but he felt that three factors favored the control group: (a) item familiarity, (b) the use of a recall test, and (c) the removal of missed items from the list of the experimental group, even though they may have been correct up to then. However,

he felt that one factor did favor the experimental group. Their list became less difficult with each trial through the removal of missed items, which were probably the more difficult ones since they were not learned the first time around.

Rock's summary statements support the all-or-none theory. He argues that most subjects succeed in learning only a few pairs per trial, probably forming an association on the spot with the aid of a mneumonic device. He feels that repetition is important only for learning additional associations and for strengthening the ones previously formed.

It seems from these studies that what is happening in the learning of associations is neither all Markov, nor all incremental model. It appears that information is gained with each repetition until an association can be made. Once the association is made, further repetition provides more information about it, keeping it from extinction or loss through interference by providing more associative bonds. Kintsch's (1970) argument that reinforcement is an information gathering process, rather than a response strengthening process, would support this contention.

When the two-second delay was introduced as an obstacle to memorizing the associations in this study's paired-associate learning task, the assumption was being made that a problem situation had been introduced and that insight into the two-second delay was required

to solve it. The assumption that insight was used to solve the delay problem is based on the Markov model which says that the subjects did not gradually learn about the delay on repeated trials, but rather processed information until they instantaneously discovered the delay. This sudden discovery or insight was to be revealed by an upward turn in the learning curve as it rose rapidly from the level of chance in performance.

Human Needs

Human needs are often presented as an integral part of motivation and personality theories (Chaplin and Krawic, 1968). According to Simpson (1971), there are the biological orientations to human needs as found in Freudian psychology (Freud, 1938), and the cultural orientations as espoused by Horney (1937) and Fromm (1955). Simpson makes reference to there being as many different lists of needs as there are psychologists to formulate them. She argues, however, that Maslow's (1954) hierarchy seems to bridge the gap between biology and culture, while still remaining general enough to describe human motivation with some power. Simpson describes the hierarchy as holistic and dynamic in its consideration of the complete person as part of a total environment; an environment whose continuing changes influence the development of that person.

Maslow's Hierarchy

Maslow's (1954) theory of needs is an extension of Goldstein's (1939) theory of motivation. Goldstein argued that self-actualization is the one single human motivation and that all other drives such as hunger, sex, or recognition arise from it. Maslow agreed with Goldstein on the importance of self-actualization in motivation, but extended Goldstein's motivation theory to include what Maslow called a hierarchy of needs. Maslow's hierarchy includes physiological needs, safety needs, belongingness needs, esteem needs, and the need to self-actualize. Maslow contended that the most potent need at any moment is the one which dominates behavior and demands satisfaction. The ultimate goal of all behavior, however, is to self-actualize, i.e., to free one's self from lesser drives and attain one's fulfillment of human potential as a unique person.

Self-actualization is a concept which occurs frequently in psychological literature, although other terms may be used, e.g., self-consistency (Lecky, 1961), phenomenal self (Snygg and Combs, 1949), self-realization (Horney, 1950), and fully functioning person (Rogers, 1961). Maslow (1954) did some of the first in-depth studies into the characteristics of what he called the self-actualized person in an attempt to better delineate the concept. He identified people who he thought were self-actualized and reported that they were

characterized by their: realistic, problem-centered orientation to life; self-acceptance and need for privacy; appreciation for others, which allows them to develop intimate relationships with a few especially loved people; identity with mankind, but also an autonomous and independent nature; nonhostile humor and a great fund of creativeness; resistance to conformity; and experiencing of deep and profound spiritual peaks in their lives.

More recent attempts to characterize the self-actualized person are similar in nature to Maslow's (1954) attempt at characterization. Drews (1966), for example, states that

> . . .all self-actualized individuals have certain qualities in common; a fundamental stability, a sense of direction and purpose, an independence of thought and action, a capacity to carry out commitments to self and others, an openness to new experiences, a richness of imagination and motivation to learn (p. 109).

Another example of the generality with which self-actualization is defined is found in an article by Bonney (1969).

> It seems certain that the most overall characteristic of (self-actualizers) is that they are doing better than most in realizing all aspects of their being. They are coming close to fulfilling their human promise. They are working with and for their innate potentials (p. 143).

Needs and Motivation

Need Gratification Theory. A basic tenet of Maslow's (1954, 1968) theory of need gratification is that people are motivated by

needs. He calls this theory, "...the most important single principle underlying all healthy human development," and says that, "...the single holistic principle that binds together the multiplicity of human motives is the tendency for a new and higher need to emerge as the lower need fulfills itself by being sufficiently gratified" (p. 55). He states that people are motivated by the need to grow and become what they are capable of becoming (Maslow, 1968).

Security and esteem are two types of need identified by Maslow (1954). Simpson (1971) describes security needs as those which motivate people toward having others take care of them, feeling safe about the future, overcoming loneliness, having lots of friends, and leading a life which is regular and routine. People with security needs are concerned about such things as being left alone in the world, maintaining religious dogma, worrying about the uncertainties of the future, receiving bodily harm, and maintaining close ties with family and friends. She describes esteem needs as those which motivate people toward having others recognize them for their achievements, possessions, and positions in life, receiving love from others who are very close and special to them, receiving praise for accomplishments, and being sure of themselves. People with esteem needs are concerned about such things as being used by others, not being accepted for themselves, having very close and true friends, feeling inferior and useless, and being able to provide for others.

It appears that adolescents with security needs would be motivated by different aspirations than those with esteem needs. Adolescents with security needs might be said to aspire to friendships, group memberships, safety, belongingness, and regularity in their lives. Those with esteem needs might be said to aspire to recognition, achievement, love, and respect.

Need gratification theories gained renewed prominence in the study of behavior and motivation during the 1950's. From about 1935 to 1955, the primary-drive theories, e.g., Hull (1952) and Spence (1956), dominated developments in this field. The primary drives such as hunger, pain, and sex were thought to be the motives of behavior. Behavior, it was believed, resulted entirely from the need to reduce such stimuli. The 1950's, however, saw greater recognition given to non-physiological needs as motives because of theorists such as Maslow (1954) and the results of newer experimental research dealing with behavior and motivation.

Hebb (1955) was an early reviewer of this research. He mentioned several experiments which examined risk taking and problem solving. He thought that behaviors such as these were difficult to reduce to primary drives. Some of the experiments he mentioned are those of Whiting and Mowrer (1943) and Berlyne (1950) which noted a tendency in animals to seek stimulation from fear-provoking objects. He mentioned that Valentine (1930) reported this in children and

Woodworth and Marquis (1947) in adults. He reported, too, that "... problem solving situations have some attraction for the rat, more for. . .monkeys, and far more for man" (p. 250).

Conclusions reached by Harlow (1953) in his work with monkeys and Bexton, Heron, and Scott (1954) in their work with humans in nonstimulating environments support need gratification theory. Harlow found that monkeys will work harder to satisfy their curiosity than they will for food and water. Bexton, Heron, and Scott found that people need more than the satisfaction of all of their primary drives. They provided subjects with board, room, and $20.00 per day to lie in bed and do nothing. But even with a life of ease ahead of them, few of the experimental subjects could tolerate this nonstimulating environment for more than a few days. There were many subjects in that nonstimulating environment who began to lose mental capacities such as concentration.

Other studies with results which support need gratification are those involving people's interactions with their environments. Woodworth (1958) says that the environment is the most fundamental element in motivation because it must be present in order for people to deal with it. Experiments with rats and monkeys suggest that people deal with their environments through activity (Kagan and Berkun, 1954; Hill, 1956), exploration (Berlyne, 1950, 1955; Dember,

1956), and manipulation (Harlow, 1950; Harlow, Harlow, and Meyer, 1950; Harlow, Blazek, and McClearn, 1956).

Kagan and Berkun (1954) investigated the prediction that reducing the drive to be active would serve as a reinforcement for an acquired instrumental response; the assumption being that a reduction in drive would be a sufficient condition for reinforcement. They used rats who had previously been trained to press a bar for obtaining food. The experimental rats were permitted instead to run in an activity wheel as reinforcement for pressing the bar, and a significant difference in rate of bar pressing occurred between experimental and control groups. The authors concluded that "...the opportunity to run in an activity wheel is an adequate reinforcement for the instrumental response of bar pressing" (p. 108).

The purpose of Hill's (1956) experiment was to provide evidence for the existence of an activity drive. He placed rats in confinement and nonconfinement situations in order to determine a relationship between activity deprivation and subsequent activity. He found that activity increased as a function of hours of confinement, and concluded that an activity drive does exist.

Berlyne (1950) was interested in the exploration drive. He tested a theory of curiosity which held that (a) when an organism is presented with a novel stimulus it will approach and explore the stimulus, and (b) as this stimulus continues and the organism

continues to explore it, then curiosity will diminish. He tested the theory by first allowing rats to eat and drink until full and then placing them in a box with cubes and cylinders under several conditions. The rats would explore novel stimuli much more than stimuli previously encountered, which indicated the presence of motivation due to curiosity about novel situations.

Berlyne's 1955 series of experiments which examined exploration due to curiosity (Berlyne, 1955) extended his first efforts in this area (Berlyne, 1950). He wanted to investigate a rat's approaches to specific items of its environment rather than the exploration which may be brought about by the environment as a whole. He found that (a) the more complex the stimuli the more exploration that occurred, (b) most exploration occurs within the first minute after a novel item is introduced, and (c) old items introduced to the environment do not produce as much exploration as new items. The important conclusion of Berlyne's experiments, though, is that well fed and watered rats are motivated to explore new environments and items just to satisfy their curiosity. The more complex that these environments and items are the better.

Dember (1956) attempted to demonstrate that exploration of novel stimuli is due to the curiosity motive. He let rats have their fill of food and water and then placed them in a T-maze. On the first trial the rats were presented with one white and one black arm of the maze, neither of which they could enter. On the second trial the

rats encountered a change from black to white or white to black in one of the arms. Dember predicted that the rat would enter the arm that had been changed, and he found this to occur; thus supporting the theory that rats will explore novel situations to satisfy their curiosity.

The manipulation drive was an important discovery made by Harry F. Harlow and his associates during the early 1950's. Harlow, Harlow, and Meyer (1950) investigated the performance of monkeys on mechanical puzzles whose manipulation was accompanied by no extrinsic reward. Rhesus monkeys were presented with a mechanical puzzle consisting of a pin, hook, and hasp which could be opened only in that order. There were two situations: one without food, and one with food. The investigators stated, "...significant learning was attained and efficient performance maintained without resort to special or intrinsic incentives" (p. 231). The monkeys worked to solve the puzzle even when their efforts were not rewarded. In fact, the situation with food was less facilitative in learning than the situation without food. Harlow and his associates concluded that (a) a strong, persistent manipulation drive exists to account for learning and continued manipulation of the puzzle, (b) the performance task has its own intrinsic reward, and (c) drives of this class are a form different from and just as important as homeostatic drives.

Harlow (1950) continued the previous study (Harlow, Harlow, and Meyer, 1950) by introducing a more complex puzzle. He found

his monkeys again attaining a high level of efficiency in solving the puzzle without rewards of food, water, or other external provisions, plus they could solve even more complex problems under intrinsic motivational conditions. But,

> Since mature subjects were used. . .it is obvious that no definitive answer can be given as to the origin and development of the postulated manipulation drive. We cannot exclude the possibility that the internal, homeostatic drives may have played some role in the development of the drive or in the facilitation of manipulation behavior. Furthermore, we have no information as to how the incentives. . .capable of eliciting this drive may have changed with either maturation or experience (p. 293).

In answer to Harlow's questions, Harlow, Blazek, and McClearn (1956) wanted to determine (a) the influence of drives and incentives on the development of manipulation motives, and (b) the influence of maturation on responsiveness to manipulatory incentives. They used infant Rhesus monkeys in a set of four experiments involving the manipulation of hook and eye units, pins and rings, hasps, and a variety of strings for pulling. The investigators found manipulation motives appearing early in the monkey's life. Even by 30 days of age there is a strong tendency toward manipulation. This behavior tends to increase with age and experience. Harlow and his associates concluded that "...manipulation behavior is self-sustaining and that it is not elicited by conditioning to any identifiable internal drive state, such as hunger, or some learned incentive, such as food" (p. 448).

The several studies cited above lend credence to the idea that humans are motivated by more than the need to reduce the stimulation of primary drives. People are said to have non-physiological needs which also must be gratified. Maslow (1954) has integrated both kinds of needs in his hierarchy and exploring and manipulating the environment appear to be ways in which people actively pursue their gratification.

Needs and Self-concept. It was reasoned in Chapter I that there is a relationship between needs and self-concept. As children interact with their environments, they receive information about themselves from parents, teachers, and other significant people. From this information, they form concepts about their selfs (Kinch, 1963; Hamachek, 1971; Gordon, 1972). This "self," according to Hamachek (1971), is a combination of two things: the attitudes, feelings, and perceptions that people have of themselves, and an active group of processes such as thinking, remembering, and perceiving. The viewpoint one has about his or her self is called the self-concept.

The degree of success that children have in gratifying needs is probably related to what they learn about their selfs from interactions with significant people in their lives. Purkey (1970) has said,

> If the child's experiences with important people in his life are good, and if he is accepted unconditionally, then he can begin to expand as a person. The development of his capacity to love is facilitated by his being loved and by being surrounded by people who love each other. His

> intelligence is increased by being exposed to an enriched and varied perceptual environment. His emerging self is enhanced by treatment which tells him that he is wanted, liked, valued, healthy--in other words, a "good" baby. For good or ill, the child is molded by the repeated behavior of the significant people in his life (p. 31).

If an environment enables children to gratify their needs and enjoy healthy growth, then these children probably will have more positive self-concepts than children whose environment is stifling their growth by not satisfying their basic needs.

> As a general rule, we can say that any behavior of significant people that causes a young child to think ill of himself, to feel inadequate, incapable, unworthy, unwanted, unloved, or unable is crippling to the self. Where respect and warmth are missing, where the child's questions go unanswered, where his offers to help are rejected, where his discipline is based on failure and punishment, where he is excluded from his parents' emotional life, and where his basic rights are abused, there his self is undermined (Purkey, 1970, p. 33).

Purkey's two statements point out the environment's importance in gratifying children's needs. Children receive information about themselves from their environment, particularly from those in it who are significant to them. As long as the environment is meeting their needs, children continue to grow as healthy human beings who are developing positive self-concepts. If the environment should stifle their growth, however, the information they receive about themselves is going to be more negative and they will tend to develop more negative self-concepts. By adolescence, then, those children who have had positive interactions with their environments should have

more positive self-concepts and greater satisfaction of their basic needs than those children who have had negative interactions.

Needs, Self-concept, and Academic Achievement. Raymond B. Cattell has long been known for his development of factor analytic theories in the study of personality (Chaplin and Krawiec, 1968). His work over the years has generated a vast amount of information about personality. There are two terms within this information which when taken together appear to be similar to a combination of self-concept and human needs. These terms are "self-sentiment" and "superego" (Cattell and Child, 1975).

Self-sentiment is the ability to contemplate one's own self. It is a set of attitudes and interests which develop with the self-concept and play a central role in organizing personality. It has to do particularly with maintaining self-respect, responsibility, good social reputation, and increasing knowledge. People who strive to control their impulses and know themselves better are said to have high self-sentiment.

Cattell has developed "self-sentiment" by using a concept which integrates Freud's (1938) "ego" and "superego" (Chaplin and Krawiec, 1968). For this reason, superego is a term which he uses. He has determined that people who are high in superego strive to satisfy their sense of duty, end all vice, be unselfish, and avoid impropriety.

In Cattell's (Cattell and Child, 1975) conclusion, given below, he uses self-sentiment and superego to describe academic achievers and offers an approximation toward an eventual construct which will embody needs and self-concept in studies of academic achievement. Self-sentiment by definition implies a viewpoint about one's own attitudes, interests, and feelings (i.e., self-concept), but by description it implies a set of needs that people strive to gratify, especially when superego is considered, too. The need to self-actualize is, as yet, an unexplored part of the development of self and self-concept, but Cattell may be opening up this area in relating self-sentiment and superego to academic achievement:

> The specific dynamic trait structures which figure most prominently with the criterion of high achievement (are) integrated superego and integrated self-sentiment. . . . The characteristics of high disposition to seek social prestige and status coupled with high conscientiousness are ready-made for the demands of our Western educational systems. . . .A thumbnail sketch of the stereotyped successful scholar, with an insatiable appetite for probing new fields, diligently undertaken in secluded places (labs, libraries, private studies, etc.) in anything but comfortable conditions does not seem too far removed from the profile obtained for high school achievers (p. 203).

Cattell (Cattell and Child, 1975), like Purkey (1970) and Hamachek (1971), has described the high school achiever from the results of experimentation, but unlike Purkey and Hamachek he has done it more in terms of needs and motivation than in terms of attitudes and feelings.

Purkey (1970) has found a persistent and significant relationship between self-concept and academic achievement in his review of self-concept studies. This finding suggests a relationship between needs and academic achievement, too, since both self-concept and needs are thought to develop through interactions between people and the significant persons in their lives (see Chapter I and previous section on needs and self-concept).

The relationship between self-concept and academic achievement has been well documented by Purkey (1970) and Hamachek (1971). Purkey states that

> Judging by the preponderance of available research, it seems reasonable to assume that unsuccessful students, whether underachievers, nonachievers, or poor readers, are likely to hold attitudes about themselves and their abilities which are pervasively negative. They tend to see themselves as less able, less adequate, and less self-reliant than their more successful peers (p. 22).

> A composite portrait of the successful student would seem to show that he has a relatively high opinion of himself and is optimistic about his future performance. He has confidence in his general ability and in his ability as a student. He needs fewer favorable evaluations from others, and he feels that he works hard, is liked by other students, and is generally polite and honest. Judging by their statements, successful students can generally be characterized as having positive self-concepts and tending to excel in feelings of worth (pp. 19-20).

Hamachek concluded that

> There is substantial evidence to link both a student's school behavior and achievement to his feelings about himself. As a general statement, high self-concept students do better than low self-concept students, although this is

> not always so. The possession of a high positive self-concept does not cause good or high academic achievement, but it does seem to be related to it (p. 218).

Wilber B. Brookover (Brookover, Patterson, and Thomas, 1962; Brookover, Thomas, and Patterson, 1964; Brookover and Erickson, 1969) has done extensive experimental investigation into the relationship between the self-concept and academic achievement. His interest has been in examining (a) the differences in self-concept between high and low achievers, (b) the relationships between general self-concept of ability and self-concept of ability in specific school subjects, and (c) the effect of significant others on self-concept development.

Brookover developed two methods of measurement for use in his investigations. In the early 1960's, when he began his studies, the exploration of self-concept and academic achievement was a relatively new area of investigation, so he developed his own instrument for measuring self-concept. This instrument is called the "Self-concept Scale of Ability," and is used to measure both general self-concept of ability and self-concept of ability in specific school subjects. Brookover also pioneered a method for determining academic achievement. This method used high and low grade point average (GPA) in combination with high and low intelligence quotient (IQ). The resulting 2x2 matrix identifies overachievers, high achievers, low achievers, and underachievers.

The results of Brookover's studies coincide with his original interests. He found that (a) self-concept of ability is a significant factor affecting school achievement, (b) there is a probability that self-concept of ability can be differentiated into specific school subject self-concepts, and (c) concept of ability is positively related with the image that the subjects perceive significant others to hold for them.

Merville C. Shaw (Shaw, Edson, and Bell, 1960; Shaw and McCuen, 1960; Shaw and Alves, 1963) is another investigator of the self-concept and academic achievement relationship who made a considerable contribution during the 1960's. He was principally concerned with questions about over- and under-achievement. Like Brookover, he used GPA and IQ as measures of academic achievement, but he chose the Sabin Adjective Checklist as a measure of self-concept. He used the checklist primarily because of the wide coverage of personality characteristics to which subjects respond. However, Shaw thought that the checklist may have been too subjective of a measure, and he went later to Bill's Index of Adjustment and Values, which he considered to be more objective. With both instruments, though, Shaw found a direct association between self-attitudes and academic achievement when ability levels are equal.

Fink (1962a, b) is also an early contributor to knowledge about self-concept and its relationship to academic achievement. Fink,

like Shaw, was interested in whether or not self-concept was a factor in academic under-achievement. He was interested in determining that intelligence is not the only variable affecting high and low academic achievement, especially when students with high IQ's do not do well in school. He found a relationship between adequacy of self-concept and level of academic achievement, but like Shaw he had to do the experiment twice; once using clinical judgment as the measure of self-concept, and once with a more objective instrument, the California Psychological Inventory.

The Brookover, Shaw, and Fink studies reviewed here are representative of early investigations into the relationship between self-concept and academic achievement, specifically into the relationship between self-concept and over- and under-achievement where intelligence is considered, too. In fact, Brookover, Patterson, and Thomas (1962) conclude, "... self-concept of ability functions independent of measured intelligence in predicting school achievement" (p. 75). This conclusion was also reached by Jones and Strowig (1968) and Jones and Grieneeks (1970) who found perceptions of self to be equal to or better than intelligence and aptitude as predictors of future academic success in high school and college.

All of the Brookover, Shaw, and Fink studies used GPA and IQ as measures of academic achievement, but between them they used several measures of self-concept. This is quite representative of

the wide variety of self-concept measures used in self-concept studies. A thorough review of self-concept measures is provided by Wylie (1974).

In conclusion, the satisfaction of needs and the development of self-concept are related because they both are dependent upon interactions between people and the significant persons in their lives. This conclusion is supported by the literature reviewed in this section dealing with human needs. As children grow in an environment of parents, teachers, friends, and relatives, the needs that they have as people are satisfied to the extent that the significant people in their lives provide them with food, shelter, love, recognition, knowledge, and so forth. At the same time, they are also learning feelings, attitudes, and beliefs about themselves from these persons. By adolescence, then, the degree to which people's needs have been satisfied should be related to the perceptions they have about themselves, and therefore to their level of academic achievement. For example, high school students with negative self-concepts probably do not have their basic needs satisfied to the extent of others with more positive self-concepts. Therefore, students with the more positive self-concepts are the ones more likely to have better perceptions about themselves, higher levels of academic achievement, and a greater need for esteem, since they are probably more

motivated than students with security needs (as defined in this study) by the prestige and recognition received from parents, teachers, and others for high academic achievement.

III. PROCEDURES

Population and Sample

The study's population was the student body of an independent, college preparatory, coeducational high school with grades 9 through 12. The school is a non-public, non-parochial, self-supporting institution which provides academic preparation for boys and girls who are planning to attend college. It has an enrollment of about 125 students, and is located in a metropolitan area of the northwestern region of the United States.

There were 36 students selected from the population by using Simpson's (1971) Index of Psychological Deprivation (IPD). The IPD is a 32-item, written questionnaire which was developed by Simpson to categorize adolescents as either having a need or not having a need in any of the first four categories of human need as conceptualized by Maslow (1954). Maslow identified these human needs as physiological needs, safety needs, belongingness needs, and esteem needs. Esteem needs are identified on the IPD as esteem from others and self-esteem. Maslow's fifth category, self-actualization, was not used.

Those students who showed a need for safety or belongingness or both, but not for esteem, were the subjects in this study who had

security needs. The subjects with esteem needs were those students who showed a need for esteem from others or self-esteem or both, but not for security needs. Figure 2 represents the groups from which students were selected to be subjects. They were selected on the basis of need as identified by their scores on the IPD.

	Students who show <u>need</u> for safety and/or belongingness	Students who show <u>no need</u> for safety and/or belongingness
Students who show <u>need</u> for esteem from others and/or self-esteem	No subjects from this category	SUBJECTS WITH ESTEEM NEEDS
Students who show <u>no need</u> for esteem from others and/or self-esteem	SUBJECTS WITH SECURITY NEEDS	No subjects from this category

Figure 2. Need categories for subject selection.

The IPD was administered in a single session at the school. There were 97 students who chose to participate. The directions

were the same for all of the students, since they were printed on the cover of the IPD.

Student anonymity was maintained during the scoring of the IPD by using a detachable name strip, plus scoring was done and results were tabulated by only one person. The strip and the IPD had matching numerals for later identification of subjects.

One of the intents of the study had been to randomly select 20 subjects from those students who had security needs and 20 subjects from those students who had esteem needs, but there were not enough students in either category to do this. Each category had only 18 students. The population was too small to find enough students in each category to randomly select the sample, so all students in each category were used for subjects.

Because subjects could not be selected at random from the two categories of need, data about subject variables other than need were collected. The subjects' sexes, ages, grade point averages, and scores on achievement and ability tests were recorded. It would have been ideal to have been able to match subjects on the basis of these data, but again the sample was too small. Instead, the data were used for making comparisons between the two need groups.

The 18 subjects in each category of need, esteem and security, were randomly divided into two groups. The randomization was done by first giving a number, 1 through 18, to each subject in each category. Then a number was located blindly in a table of random numbers, and from this starting number nine consecutive different

numbers, as found in the table, were selected. Those subjects in each of the two categories of need who had one of the nine selected numbers received type I information. The others received type II.

Paired-associate Learning Task

Each of the 36 subjects participated in a paired-associate learning task. Paired-associate learning requires the subject to learn a list of stimulus-response pairs by first learning the responses and then associating each response with a given stimulus item. When the experimenter presents a stimulus item, the subject either responds correctly with the appropriate response for that stimulus, or incorrectly with an inappropriate response for the stimulus presented. The experimenter then presents the stimulus-response pair to the subject for feedback. A trial constitutes one presentation of all the stimulus-response pairs to be learned by the subject.

The procedures used in this study differed in two ways from the conventional method described above. The subjects did not know the correct response to each stimulus prior to the experiment, and they had to give the correct response before feedback was provided. This was possible because the subjects knew that the correct response to each stimulus was one of seven numbers they had been shown.

Stimuli were a set of randomly selected consonants, and responses were a set of digits selected randomly from the seven

numbers 3 through 9. Appendix A contains the item pairs and a description of how they were formed.

For each stimulus presented, the subjects responded with any one of the seven possible responses every two seconds, paced with a metronome. The subjects were told what the seven possible responses were, and that they could give the responses in any order and repeat them as often as desired. Feedback occurred two seconds after the correct response was given, which means feedback coincided with the next response. None of the students knew in advance that feedback was being delayed. After the learning task had been explained to them (see Appendix B), they were told only to make the feedback occur as soon as possible.

Two types of feedback were used to provide the two types of information required in this study. Type II information was provided by using the stimulus-response pairs for feedback. Two seconds after the correct response was given, the subjects were shown the stimulus-response pair. The subjects then knew they had given the correct response, plus they knew what it was.

Type I information was provided by using a light for feedback. The light was turned on by the experimenter two seconds after the subjects gave the correct response to a stimulus. When the light came on, the subjects knew they had given the correct response, but they did not know for sure which one of their several responses to

the stimulus was correct. They could only assume that their last response, which coincided with the light coming on, was the correct one. Until further trials occurred, they did not know otherwise.

Once further trials did occur, the subjects soon realized that their last response was not the one for which feedback was being given. They had to discover the two-second delay between the correct response and feedback before they could identify the correct response for each stimulus and learn to associate the two.

Six stimulus-response pairs were used to allow for learning to occur as easily and quickly as possible once the correct responses were known. Any more than six pairs might have made the learning task too long to accomplish within 18 trials. Each of the four groups of nine subjects received 18 trials on the six-item list. The list was always presented in the same order to further facilitate memorizing the pairs.

One experimenter was used with all 36 subjects. The experimenter knew only enough about the experiment to present the standard set of directions, stimuli, and feedback to each subject and record the results. A memory drum with a light beside it was used for stimulus presentation and feedback.

It took about two weeks for all of the subjects to participate. During that time, they were asked to speak to no one about the experiment, plus none of the subjects were told who the

other subjects were. The two different weeks during which the subjects participated occurred about one month apart, because the original plans went awry. The intent had been to use a second, but similar, school in order to have a larger population and therefore draw a sample of 40 subjects as described previously. The second school, although cooperative, did not draw enough participants to make their inclusion in the study worthwhile. It was decided to use all 36 possible subjects available at the original school.

All subjects could choose to not participate at any time, although none did. Every subject who was selected completed the paired-associate learning task. Also, they all had the opportunity to ask questions and have the entire study explained to them at its completion. Several took this opportunity.

Instrumentation

The type of needs that students had was determined by using Simpson's (1971) Index of Psychological Deprivation (IPD) (see Appendix C). The IPD is based on Maslow's (1954) hierarchy of needs, and was developed as a means of determining the level at which an adolescent is functioning in the hierarchy. Simpson narrowed an original pool of 55 items to the 32 used in the IPD by having seven judges[1] rate the

---

[1] Joel Arnoff, Harrison Gough, C. Marshall Lowe, Jean Mcfarlane, and Anne Roe, who are all clinical psychologists; Jeanne Knutson, who is a political scientist; and Dr. Simpson.

items as to which ones indicated psychological deprivation and the level of deprivation they best matched. Content validity was established through the judges' ratings of the items, with agreement by five of the seven being the criterion for item selection. Kuder-Richardson reliability was 0.61 (n=232) and 0.75 (n=114). For test-retest, reliability was 0.80 (n=232, two weeks).

Each of the IPD's 32 items is placed in one of five categories. Each of these categories forms a subindex, whose scores were recoded into "need" and "no-need" categories according to the following criteria: (a) safety needs as scores equal to or greater than 5; (b) belongingness needs as scores equal to or greater than 5; (c) esteem from others needs as scores equal to or greater than 3; and (d) self-esteem needs as scores equal to or greater than 3. The first subindex of the IPD, physiological needs, was not used for subject selection in this study.

During her study, Simpson (1971) found significant correlation between the IPD and Bendig's shortened version of the Taylor Manifest Anxiety Scale (Taylor, 1953; Hoyt and Magoon, 1954; Bendig, 1956). This same manifest anxiety scale was given to subjects in this study. She also found that, "In every case, the mean anxiety scores of those who were characterized by a psychic need differed significantly . . . from those without these needs" (p. 105). Simpson concludes from

her evidence that the IPD items are related to levels of psychic distress and can differentiate between types of need as categorized by Maslow.

IV. RESULTS

Date Sources and Analyses

There were two sources of data in this experiment. There were the data from Simpson's (1971) Index of Psychological Deprivation (IPD) and the data from the paired-associate learning task. The IPD data were used to group students into categories. Students were identified from their scores on the IPD as having either esteem needs, security needs, or no needs. The data from the paired-associate learning task were used to compare group performances in discovering the two-second delay between a correct response and feedback in a verbal learning task.

Two tests were conducted on the IPD data. These tests were used by Simpson (1971) to determine the trustworthiness of the IPD. They were conducted in this study to provide information about the IPD for future use, especially since no use of the IPD was found beyond that of Simpson's (1971). Kuder-Richardson reliability (Bruning and Kintz, 1968) for the IPD in this study was 0.65 (n=97). Simpson (1971) obtained reliability coefficients of 0.61 (n=232) and 0.75 (n=114). The Pearson product-moment correlation (r) (Bruning and Kintz, 1968) between the subjects' IPD scores and their scores on Bendig's shortened version of the Taylor Manifest Anxiety Scale (Taylor, 1953; Hoyt and Magoon, 1954; Bendig, 1956) was 0.432 in

this study. This value of r was significant at the 0.05 level and compared with Simpson's (1971) value of 0.418 ($p < 0.05$) for r. A t-test performed on the r of 0.432 yielded a significant value of t at the 0.05 level which indicated that the relationship between the IPD and manifest anxiety scores was real and not due to chance variation (Bruning and Kintz, 1968).

Analyses were made by using the data from the paired-associate learning task. These data (see Appendix D) were considered as interval data, since the differences between them were equal and permitted application of arithmetic operations. These differences were considered to be equal because stimulus-response pairs were randomly formed and should have been equally difficult for the subjects (see Appendix A).

The experimental data were analyzed by using a three-factor mixed analysis of variance design for repeated measures on one factor (Bruning and Kintz, 1968). The three factors were type of need, type of information, and performance over time, with performance over time receiving the repeated measures. The analysis of variance design permitted examination of type of need effects in combination with type of information effects, including examination of performance variations over a series of trials. Significance was set at the 0.05 level.

A third set of data was also collected on the subjects. Since the population was smaller than originally expected, there were not enough participants to either randomly select subjects from each of the two need groups, or match subjects on the basis of selected variables. Therefore, there were subject variables other than esteem versus security needs which could have contributed to any difference in performance between subjects. Because of this possibility, an attempt was made to determine if any significant differences existed between the two groups in age, grade point average, intelligence, and sex. To determine this, the mean age and grade point average of each of the two groups were compared by using a t-test for a difference between two independent means (Bruning and Kintz, 1968). The same test was used to analyze the difference between mean scores from standardized tests of subject achievement and ability in school. Finally, a test for significance of a difference between two proportions (Bruning and Kintz, 1968) was used to determine if there was any significant difference between the number of males versus the number of females in each group.

The reason for the small population, which required the collection of the third set of data, was the lack of students from one of the two schools originally proposed for the study. The two schools were both independent and had similar student bodies. Their combined enrollment was about 350 students in grades 9 through 12. It had

been expected that about 270 students would have chosen to participate. However, only 97 students from one school and 18 from the other actually chose to be in the study. In the school with 97 participants, there were 36 possible subjects distributed equally between the esteem and security need groups. In the school with 18 participants, there were four possible subjects with security needs, but none with esteem needs. Since these four students could not have been matched with an equal number of students with esteem needs, they were dropped from the study along with the remainder of the 18 participants from that school.

Tabulations and Findings

The analysis of variance presented in Table 1 revealed three significant effects for two types of need in combination with two types of information presented to the subjects with practice over trials. It was found that (a) the type of information given to the subjects (type I versus type II) affected their overall performance level, (b) subjects learned as a function of practice over trials, and (c) the rate of learning for subjects was dependent upon the type of information given to them. There was no significant effect of need on performance, either alone or in combination with the other two variables.

Tables 2 and 3 present analyses of subject variables other than type of need. These analyses were made to examine possible

Table 1. Analysis of Variance for Subject Need Type in Combination with Type of Information Presented with Practice over Trials.

Source	SS	df	ms	F	p<.05
Total	3196.48	647			
Between subjects	1904.65	35			
Need	53.96	1	53.96	3.46	ns
Information	1337.59	1	1337.59	85.85	<.05
Need x information	14.54	1	14.54	<1	ns
$Error_b$	498.56	32	15.58		
Within subjects	1291.83	612			
Trials	465.78	17	27.40	29.15	<.05
Trials x need	22.60	17	1.33	1.41	ns
Trials x information	275.32	17	16.20	17.23	<.05
Trials x need x information	18.19	17	1.07	1.34	ns
$Error_w$	509.94	544	0.94		

Table 2. Analysis of Subject Variables: t-test.

Subject variable	Esteem needs			Security needs			df	t	p<.05
	$\bar{x}$	sd	n	$\bar{x}$	sd	n			
Age	16.09	1.27	18	15.77	1.15	18	34	.796	ns
Grade point average	2.97	0.67	18	2.94	0.55	18	34	.146	ns
Freshman achievement[a]	56.29	5.41	7	56.50	5.86	6	11	.067	ns
Sophomore ability[b]	60.25	10.87	4	60.60	6.84	5	7	.059	ns
Junior & senior verbal ability[c]	50.28	7.27	7	47.00	15.40	6	11	.505	ns
Junior & senior mathematical ability[d]	54.86	8.15	7	50.50	11.41	6	11	.801	ns

[a]Freshman achievement scores: Metro Area Achievement Tests (given Fall 1976).

[b]Sophomore ability scores: School and College Ability Tests (given Fall 1976).

[c]Junior and senior verbal ability scores: Scholastic Aptitude Test (given Fall 1976).

[d]Junior and senior mathematical ability scores: Scholastic Aptitude Test (given Fall 1976).

Table 3. Test for Significance of Difference between Proportion of Males and Proportion of Females from Total Number of Participants in Each of Two Need Groups.

Need Group	Proportion		z	$p < .05$[a]
	Males	Females		
Esteem	0.194	0.183	0.196	ns
Security	0.139	0.217	1.42	ns
No need	0.667	0.600		

[a] A z of $\pm$ 1.96 is significant at the 0.05 level using a two-tailed test.

differences between the two need groups in age, grade point average, school ability, and sex. Table 2 shows that on the basis of age, grade point average, and available standardized test scores, there were no significant differences between the group with esteem needs and the one with security needs. Table 3 shows nonsignificant z-scores for both the esteem-needs group and the security-needs group. This indicated that there was no significant difference between the number of males and the number of females used in either group in proportion to the total number of male and female participants in the study.

Results and Summary

There were three results predicted in this study. They are described below with the results which actually occurred. The data from the experiment are presented in Appendix D and Table 4. Appendix D presents the frequency with which correct responses were given as first responses by each subject during each trial in the paired-associate learning task. Table 4 is a listing of the proportion of first responses which were correct on each trial for each of the four experimental groups.

First, it was predicted that the performance of the type II group would approximate the normal learning curve, with no significant difference in performance occurring between the esteem-needs group receiving type II information. This result occurred. The

Table 4. Proportion of First Responses being Correct per Trial per Group.

Group	Trial								
	1	2	3	4	5	6	7	8	9
Esteem/type II	.07	.22	.41	.52	.52	.69	.72	.72	.76
Security/type II	.17	.30	.35	.44	.70	.57	.67	.80	.80
Esteem/type I	.17	.20	.17	.15	.15	.13	.24	.15	.15
Security/type I	.11	.17	.22	.28	.28	.31	.35	.26	.30

	Trial								
	10	11	12	13	14	15	16	17	18
Esteem/type II	.80	.81	.85	.85	.91	.85	.91	.91	.93
Security/type II	.87	.83	.94	.96	.98	.96	.93	1.00	1.00
Esteem/type I	.22	.22	.15	.06	.19	.07	.15	.19	.19
Security/type I	.30	.39	.31	.30	.41	.35	.33	.43	.46

information in Table 1 indicates that type of need, overall, did not significantly affect subject performance in learning. Table 4 shows that the two learning curves for all subjects receiving type II information approximated the normal learning curve.

Second, it was predicted that the group combining esteem needs with type I information would perform at the level of chance until insight into the two-second delay between correct response and feedback was demonstrated by an increase to perfect or near perfect performance. This result did not occur. The information in Table 1 indicates that there was no significant effect of need on rate of learning over trials, even when type of need was interacting with different types of information. Table 4 shows that the learning curve for the subjects with esteem needs who received type I information remained near the level of chance over all 18 trials.

Third, it was predicted that the group combining security needs with type I information would perform at the level of chance over all 18 trials. This result did occur. The information in Table 1 indicates that there was no significant effect of need on rate of learning over trials, even when interacting with different types of information. Table 4 shows what appeared to be a higher performance level for security/type I than for esteem/type I, but this apparent difference was not significant (see Table 1). The apparent difference was probably due to two security/type I subjects who seemed to have

solved the two-second delay problem, while none of the esteem/type I subjects seemed to have done so (see Appendix D).

In summary, two of the three predicted results of the study occurred. Those subjects who received type II information (i.e., a presentation of the stimulus-response pair for feedback) showed performance which approximated the normal learning curve. This had been predicted. Not all of the subjects who received type I information (i.e., a light coming on for feedback) performed as predicted, however. Both the group with security needs and the one with esteem needs which received type I information performed near the level of chance over all 18 trials. This had been predicted for the group with security needs, but not for the one with esteem needs. It had been predicted that the group with esteem needs which received type I information would have been performing near a level of perfect performance by the end of the series of trials.

V. INTERPRETATIONS

This study compared the performance between high school students with esteem needs and those with security needs in solving a problem through insight in a verbal learning situation. Previous chapters have discussed the problem with which the study dealt, the literature in the areas of learning and human needs, the procedures which were used to collect data, and the results of the data analyses. The purpose of this chapter is to discuss the results of the study, present the conclusions which were reached and their implications, and make recommendations about further efforts in examining the relationship between human needs and academic learning.

Discussion of the Results

The results of this study are discussed in two parts. The first pertains to Simpson's (1971) Index of Psychological Deprivation (IPD) and its ability to differentiate groups of students into different levels of academic performance. The second pertains to the effects that the variables of need type, information type, and practice had on subject performance in the experiment.

Index of Psychological Deprivation

Simpson (1971) developed the IPD as a reliable instrument which was valid in differentiating students into groups so that the several

groups had different needs ala Maslow (1954). She found that the values and beliefs held by these groups with different needs differed significantly between the groups. Although Simpson (1971) was able to use the IPD to differentiate students into groups with different needs and different values and beliefs, the IPD was ineffective in the present study at differentiating students into groups with different needs and different levels of academic performance. There was no difference in learning performance between groups with different needs, nor was there any difference in age, sex, grade point average, and school ability between the two groups. If needs are associated with academic performance, then there should have been a significant difference in grade point averages. The group with esteem needs should have had a higher mean grade-point average than the one with security needs, but it did not.

One reason for the IPD not differentiating students into groups with different levels of academic performance may be a relationship which seems to exist between needs and culture as demonstrated by Simpson (1971). She found a relationship between needs, values, and beliefs within a population which comprised several socio-economic levels, races, and national heritages. This study found no relationship between needs and academic performance within a population which was composed of students who probably represented a single culture. The students in this study were of the same race and

represented similar national heritages and socio-economic levels. A population formed from a mixture of socio-economic levels, races, and national heritages may be required in using the IPD to differentiate students into groups with different needs that demonstrate significantly different levels of academic performance. If this is true, then the difference in levels of academic performance probably would be due more to culture than to need. In that case, need would not be a variable which would be appropriate for use in studies of academic performance. A performance difference between groups would be due more likely to culture than to type of need. This possibility was supported by the results of this study where subjects who seemed to represent a similar culture were not differentiated by the IPD into different levels of academic performance.

Another reason for the IPD not differentiating students into different levels of academic performance may be that academic performance is not related to all dimensions of need. In this study, two types of need, esteem and security, were used. Type, however, may be only one dimension of need. It may be that need can also be measured on other dimensions. Another possible dimension of need, for example, could be level. It may be that levels of need satisfaction are associated with academic performance. After all, it is levels of self-concept, rather than types of self-concept, which have been found

to be associated with academic performance (Purkey, 1970; Hamachek, 1971).

Variables

A comparison between the performance of subjects with esteem needs and those with security needs indicated that type of need, as differentiated by the IPD, had no significant effect on performance in this study. Those subjects with esteem needs did no better than those with security needs in discovering the two-second delay between the correct response they gave to each stimulus in the paired-associate learning task and the feedback they received which indicated that the correct response had been given. This result seemed to indicate that type of need is a variable which is not associated with academic performance in a high school population similar to the one used in this study. It seems that students from similar populations who have a need for esteem are not going to do any better academically than students who have a need for security.

Further comparisons between subject performances indicated that type of information had a significant effect on learning in this study. Those subjects who received type II information (i.e., a presentation of the stimulus-response pair for feedback) learned significantly better than those who received type I information (i.e., a light coming on for feedback). This significant difference in

performance indicated that of the two different types of information being given to subjects one type, type II, was more beneficial to learning in the experiment than the other. Subjects who received type I information did not learn as well as subjects who received type II information. Presenting the stimulus-response pair for feedback is typical in paired-associate learning experiments and has been demonstrated as being beneficial to learning (Kintsch, 1970), so this result was not unusual.

The interaction between type of information and practice over trials also had a significant effect on performance in the experiment. Subjects learned as a function of practice over trials, and the rate of learning was dependent upon the type of information received by the subjects. Subjects who received type II information learned at a higher rate than subjects who received type I information. Those who received type II information achieved near-perfect performance, while those who received type I information remained near the level of chance over all 18 trials.

Conclusions

It is important that students be able to memorize verbal associations. Associating one item with another is common in academic learning, as even a cursory look at academic tests reveals. This importance which schools place on memorizing verbal associations is

justified in part by the fact that this elementary form of learning is basic to the more complex forms of learning (Gagné, 1970).

It was thought in this study that educators should be aware of those student characteristics that both help and hinder students in memorizing verbal associations. What, for example, are the characteristics of students that are advantageous to their discovering the relationships which exist among the items to be memorized in verbal learning tasks? This is important since it is possible that discovering such relationships on their own can make these tasks easier for them.

Nelson's (1971) study was used as an example of how an undiscovered relationship can hinder the memorization of verbal associations. The relationship which had to be discovered was a two-second delay between the correct response and feedback in a paired-associate learning task. Some of Nelson's (1971) subjects discovered the two-second delay and others did not. The purpose of this study was to determine if type of need was a variable which could differentiate the two groups of subjects.

The results of this study indicated that type of need, as measured by the IPD, was not associated with whether or not students discovered the two-second delay. The performance of the group with esteem needs did not differ significantly from that of the group with security needs. Neither did the two groups differ in any of the

other subject characteristics which were measured. The two groups were statistically similar.

The possibility of an association between esteem versus security needs and problem solving in a verbal learning task was not supported. It was found that type of need, as measured by the IPD in a culturally similar population, is a characteristic of high school students which neither helps, nor hinders their performance in discovering relationships which could aid them in memorizing verbal associations. Therefore, on the basis of this study's results, teachers should not have to be concerned with the esteem and security needs of students from similar cultures when teaching them the skills necessary for discovering, on their own, the relationships in verbal learning tasks.

Implications

Educators have realized for some time now that academic performance is not a function of intelligence alone. One characteristic of students which has been found to be associated with academic performance is the level of self-concept held by students (Purkey, 1970; Hamachek, 1971). Students with high self-concepts perform better academically than students with low self-concepts, so schools have become more concerned with developing positive self-concepts in students.

Along with their efforts in developing positive self-concepts, schools have come to be concerned with all areas of human development. The importance which schools have always placed on basic skills in academic areas is only part of a broader goal of knowledge, attitudes, and skills required for life functions that has come to include values, needs, and emotions, too (ASCD, 1977). This concern for all areas of human development requires that studies be done of the relationships between academic performance and the development of values, needs, and emotions. These relationships must be studied in order to plan for academic instruction that will build upon cultural and psychological characteristics that enhance student performance instead of detract from it.

This study explored the relationship between esteem versus security needs and problem solving in a verbal learning task. Its results provided implications for educational efforts which consider both academic performance and values, needs, and emotions in school programming. Such programming often has been designed to "meet the needs" of students. "Needs" in this context, however, is defined much more broadly than "needs" as used in this study. Just the same, the results of this study did suggest some things about instructional planning which is concerned with psychological needs and academic performance. The results suggested that whether a student has a need for prestige and recognition (esteem), or for group

stability (security) does not have to be a concern when planning instruction for teaching students how to discover relationships between items, if students are culturally similar. If such students are to be taught these kinds of problem solving skills so they can learn more on their own, as suggested by Glaser (1976), then consideration does not have to be given to their basic psychological needs as defined by Maslow (1954) and measured by the IPD.

A second implication was that need as a learning variable may have several dimensions. Type of need, as measured by the IPD, did not show a relationship with academic performance. Some dimension of need, however, must be associated with academic performance because of the relationship between need and self-concept through their mutual dependence upon interactions between people and those who are significant to them, and self-concept's association with academic performance. Since it is level of self-concept which is associated with performance, then maybe there are levels of need satisfaction which can be identified which possibly have a relationship with performance, too.

Finally, there was one implication of this study which should not be ignored. Need may not be a variable at all in academic performance unless associated with culture. Needs were found to be associated with values and beliefs in Simpson's (1971) study when subjects were drawn from a population which comprised several

socio-economic levels, races, and national heritages, but they showed no relationship with academic performance in this study when subjects were drawn from a population which was composed of culturally similar students. It may be that students would have to be drawn from a mixture of cultures before esteem versus security needs becomes a significant variable in academic performance.

Recommendations

There are two areas of research which were suggested by the findings of this study. These should be undertaken before any further efforts are made to examine the association between human needs and academic performance. One would be to examine the relationship between needs and culture, which was demonstrated by Simpson (1971), to determine if needs can be used as a culture-free variable; and if so, what is the relationship of needs, culture, and academic performance? A second area of research would be to examine the nature of needs to determine if more than one dimension of need exists; and if so, what are they, and what are their relationships with academic performance?

BIBLIOGRAPHY

ASCD 1962 Yearbook Committee. 1962. Perceiving, behaving, becoming: a new focus for education. Washington, D.C., Association for Supervision and Curriculum Development. 256 p.

ASCD 1977 Yearbook Committee. 1977. Feeling, valuing, and the art of growing: insights into the affective. Washington, D.C., Association for Supervision and Curriculum Development. 311 p.

Baumeister, Alfred A. and Franklin M. Berry. 1970. Single-letter cue selection in the paired-associate learning of normal children and retardates. Journal of Experimental Child Psychology 9:400-410.

Bendig, A.W. 1956. The development of a short form of the manifest anxiety scale. Journal of Consulting Psychology 20:384.

Berlyne, D.E. 1950. Novelty and curiosity as determinants of exploratory behavior. British Journal of Psychology 41:68-80.

Berlyne, D.E. 1955. The arousal and satiation of perceptual curiosity in the rat. Journal of Comparative and Physiological Psychology 48:238-246.

Bexton, W.H., W. Heron, and T.H. Scott. 1954. Effects of decreased variation in the sensory environment. Canadian Journal of Psychology 8:70-76.

Blocher, Donald H. 1966. Developmental counseling. New York, The Ronald Press Company. 250 p.

Bonney, Merl. 1969. Self-becoming as self-growth. Theory into Practice 8:143-148.

Bower, G.H. 1961. Application of a model to paired-associate learning. Psychometrika 26:255-280.

Bower, Gordon H. 1962. An association model for response and training variables in paired-associate learning. Psychological Review 69:34-53.

Brookover, Wilbur B. and Edsel Erickson. 1969. Society, schools, and learning. Boston, Allyn and Bacon. 149 p.

Brookover, Wilbur B., Ann Patterson, and Shailer Thomas. 1962. Self-concept of ability and school achievement: the relationship of self-images to achievement in junior high school subjects. U.S. Office of Education, Cooperative Research Project No. 845. East Lansing, Office of Research and Publications, Michigan State University. 104 p.

Brookover, Wilbur B., Shailer Thomas, and Ann Patterson. 1964. Self-concept of ability and school achievement. Sociology of Education 17:271-278.

Bruning, James L. and B.L. Kintz. 1968. Computational handbook of statistics. Glenview, Illinois, Scott, Foresman and Company. 269 p.

Bush, Robert R. and Frederick Mosteller. 1955. Stochastic models for learning. New York, John Wiley and Sons. 365 p.

Cattell, Raymond B. and Dennis Child. 1975. Motivation and dynamic structure. New York, John Wiley and Sons. 287 p.

Chaplin, James P. and T.S. Kraweic. 1968. Systems and theories of psychology. 2nd ed. New York, Holt, Rinehart and Winston. 624 p.

Cieutat, Victor J., Fredric E. Stockwell, and Clyde E. Noble. 1958. The interaction of ability and amount of practice with stimulus and response meaningfulness (m, m') in paired-associate learning. Journal of Experimental Psychology 56:193-202.

CRM Books. 1973. Educational psychology: a contemporary view. Del Mar, California, Communications Research Machines. 457 p.

Cronbach, Lee J. 1967. How can instruction be adapted to individual differences. In: Learning and individual differences, ed. by Robert M. Gagne, Columbus, Ohio, Charles E. Merrill Books. p. 23-39.

Dember, William N. 1956. Response by the rat to environmental change. Journal of Comparative and Physiological Psychology 49:93-95.

Dewey, John. 1910. How we think. Boston, D.C. Heath and Company. 224 p.

Drews, Elizabeth Monroe. 1966. Self-actualization: a new focus for education. In: Learning and mental health in the school, ed. by Walter B. Waetjen and Robert R. Leeper, Washington, D.C., Association for Supervision and Curriculum Development. p. 99-124.

Fink, Martin B. 1962a. Self-concept as it relates to academic underachievement. California Journal of Educational Research 13:57-62.

Fink, Martin B. 1962b. Objectification of data used in under-achievement-self-concept study. California Journal of Educational Research 13:105-112.

Freud, Sigmund. 1938. The basic writings of Sigmund Freud. ed. by A.A. Brill. New York, Modern Library. 1001 p.

Fromm, Erich. 1955. The sane society. New York, Holt, Rinehart and Winston. 370 p.

Gagné, Robert M. 1966. Human problem solving: internal and external events. In: Problem solving: research, method, and theory, ed. by Benjamin Kleinmuntz, New York, John Wiley and Sons. p. 128-148.

Gagné, Robert M. 1970. The conditions of learning. 2nd ed. New York, Holt, Rinehart and Winston. 407 p.

Gibson, Eleanor J. 1942. Intra-list generalization as a factor in verbal learning. Journal of Experimental Psychology 30:185-200.

Gibson, Eleanor J., Carol H. Bishop, William Schiff, and Jesse Smith. 1964. Comparison of meaningfulness and pronunciability as grouping principles in the perception and retention of verbal material. Journal of Experimental Psychology 67:173-182.

Glaser, Robert. 1976. Components of a psychology of instruction: toward a science in design. Review of Educational Research 46:1-24.

Glasser, William. 1965. Reality therapy: a new approach to psychiatry. New York, Harper and Row. 166 p.

Glasser, William. 1969. Schools without failure. New York, Harper and Row. 235 p.

Goble, Frank G. 1970. The third force: the psychology of Abraham Maslow. New York, Grossman Publishers. 201 p.

Goldenson, Robert M. 1970. The encyclopedia of human behavior: psychology, psychiatry, and mental health. Garden City, Doubleday and Company. 2 vols. 1472 p.

Goldstein, Kurt. 1939. The organism. New York, American Book Company. 533 p.

Gordon, Ira. 1972. Children's views of themselves. Washington, D.C., Association for Childhood Education International. 40 p.

Hale, Gordon A. and Suzanne S. Taweel. 1974. Age differences in children's performance on measures of component selection and incidental learning. Journal of Experimental Child Psychology 18:107-116.

Hamachek, Don E. 1971. Encounters with the self. New York, Holt, Rinehart and Winston. 264 p.

Harlow, H.F. 1953. Mice, monkeys, men, and motives. Psychological Review 60:23-32.

Harlow, Harry F., Margaret K. Harlow, and Donald R. Meyer. 1950. Learning motivated by a manipulation drive. Journal of Experimental Psychology 40:228-234.

Harlow, Harry F., Nancy C. Blazek, and G.E. McClearn. 1956. Manipulative motivation in the infant Rhesus monkey. Journal of Comparative and Physiological Psychology 49:444-448.

Hebb, Donald O. 1955. Drives and the C.N.S. (conceptual nervous system). Psychological Review 62:243-254.

Hill, Winfred F. 1956. Activity as an autonomous drive. Journal of Comparative and Physiological Psychology 49:15-19.

Horney, Karen. 1937. The neurotic personality of our time. New York, W.W. Norton and Company. 299 p.

Horney, Karen. 1950. Neurosis and human growth. New York, W.W. Norton and Company. 391 p.

Horowitz, Leonard M. 1961. Free recall and ordering of trigrams. Journal of Experimental Psychology 62:51-57.

Hoyt, Donald P. and Thomas M. Magoon. 1954. A validation study of the Taylor Manifest Anxiety Scale. Journal of Clinical Psychology 10:357-361.

Hull, Clark L. 1952. A behavior system. New Haven, Yale University Press. 372 p.

Jones, John G. and R. Wray Strowig. 1968. Adolescent identity and self-perceptions as predictors on scholastic achievement. Journal of Educational Research 62:78-82.

Jones, John G. and Laurabeth Grieneeks. 1970. Measures of self-perception as predictors of scholastic achievement. Journal of Educational Research 63:201-203.

Kagan, Jerome and Mitchell Berkun. 1954. The reward value of running activity. Journal of Comparative and Physiological Psychology 47:108.

Kinch, John W. 1963. A formalized theory of self-concept (research note). American Journal of Sociology 68:481-486.

Kintsch, Walter. 1965. Habituation of the GSR component of the orienting reflex during paired-associate learning before and after learning has taken place. Journal of Mathematical Psychology 2:330-341.

Kintsch, Walter. 1970. Learning, memory, and conceptual processes. New York, John Wiley and Sons. 498 p.

Lecky, Prescott. 1961. Self-consistency: a theory of personality. 3rd ed. U.S.A., Shoe String Press. 275 p.

Lindgren, Henry Clay. 1967. Educational psychology in the classroom. 3rd ed. New York, John Wiley and Sons. 686 p.

Manis, Melvin. 1966. Cognitive processes. Belmont, California, Wadsworth Publishing Company. 122 p.

Maslow, Abraham H. 1954. Motivation and personality. New York, Harper and Brothers Publishers. 411 p.

Maslow, Abraham H. 1968. Toward a psychology of being. 2nd ed. Princeton, New Jersey, D. Van Nostrand Company. 240 p.

Maslow, Abraham H. 1971. The farther reaches of human nature. New York, The Viking Press. 423 p.

McGeoch, John A. 1930. The influence of associative value upon the difficulty of nonsense-syllable lists. Journal of Genetic Psychology 37:421-426.

Messick, Samuel. 1970. The criterion problem in the evaluation of instruction: assessing possible, not just intended outcomes. In: The evaluation of instruction: issues and probable problems, ed. by M.C. Wittrock and David E. Wiley, New York, Holt, Rinehart and Winston. p. 183-202.

Miller, George A. 1958. Free recall of redundant strings of letters. Journal of Experimental Psychology 56:485-491.

Miller, George A. and Jennifer A. Selfridge. 1950. Verbal context and the recall of meaningful material. American Journal of Psychology 63:176-185.

Millward, Richard. 1964. Latency in a modified paired-associate learning experiment. Journal of Verbal Learning and Verbal Behavior 3:309-316.

Nelson, Thomas O. 1971. Extinction, delay, and partial-reinforcement effects in paired-associate learning. Cognitive Psychology 2:212-228.

Noble, Clyde E. 1953. An analysis of meaning. Psychological Review 59:421-430.

Noble, Clyde E. 1963. Meaningfulness and familiarity. In: Verbal behavior and learning: problems and processes, ed. by Charles N. Coger and Barbara S. Musgrave, New York, McGraw-Hill Book Company. p. 76-119.

Paivio, Allan. 1969. Mental imagery in associative learning and memory. Psychological Review 76:241-263.

Purkey, William W. 1970. Self-concept and school achievement. Englewood Cliffs, New Jersey, Prentice-Hall. 86 p.

Richardson, Jack. 1972. Stimulus selection in associative learning. In: Human memory: festschrift in honor of Benton J. Underwood, ed. by Carl P. Duncan, Lee Sechrest, and Arthur W. Melton, New York, Appleton-Century-Crofts. p. 155-187.

Rock, Irvin. 1957. The role of repetition in associative learning. American Journal of Psychology 70:186-193.

Rogers, Carl R. 1961. Client-centered therapy. Boston, Houghton Mifflin Company. 560 p.

Shaw, Merville C., Kenneth Edson, and Hugh M. Bell. 1960. The self-concept of bright underachieving high school students as revealed by an adjective checklist. Personnel and Guidance Journal 39:193-196.

Shaw, Merville C. and John T. McCuen. 1960. The onset of academic underachievement in bright children. Journal of Educational Psychology 51:103-108.

Shaw, Merville C. and Gerald J. Alves. 1963. The self-concept of bright academic underachievers: continued. Personnel and Guidance Journal 42:401-403.

Simpson, Elizabeth L. 1971. Democracy's stepchildren: a study of need and belief. San Francisco, Jossey-Bass. 240 p.

Snygg, Donald and Arthur W. Combs. 1949. Individual behavior: a new frame of reference for psychology. New York, Harper and Brothers Publishers. 386 p.

Spence, Kenneth W. 1956. Behavior theory and conditioning. New Haven, Yale University Press. 262 p.

Stewart, Lawrence H. and Charles F. Warnath. 1965. The counselor and society: a cultural approach. Boston, Houghton Mifflin Company. 400 p.

Suppes, Patrick, Guy Groen, and Madeleine Schlag-Rey. 1966. A model for response latency in paired-associate learning. Journal of Mathematical Psychology 3:99-128.

Taylor, Janet A. 1953. A personality scale of manifest anxiety. Journal of Abnormal and Social Psychology 48:285-290.

Underwood, Benton J. 1953. Studies of distributed practice: VIII. Learning and retention of paired nonsense syllables as a function of intralist similarity. Journal of Experimental Psychology 45:133-142.

Underwood, Benton J. and David Goad. 1951. Studies of distributed practice: I. The influence of intra-list similatiry in serial learning. Journal of Experimental Psychology 42:125-134.

Underwood, Benton J. and Jack Richardson. 1956. The influence of meaningfulness, intralist similarity, and serial position on retention. Journal of Experimental Psychology 52:119-126.

Underwood, Benton J., Willard N. Runquist, and Rudolph W. Schulz. 1959. Response learning in paired-associate lists as a function of intralist similarity. Journal of Experimental Psychology 58:70-78.

Underwood, Benton J. and Rudolph W. Schulz. 1960. Meaningfulness and verbal learning. Chicago, J.B. Lippincott Company. 430 p.

Valentine, C.W. 1930. The innate bases of fear. Journal of Genetic Psychology 37:394-419.

Whiting, John W.M. and O.H. Mowrer. 1943. Habit progression and regression --a laboratory study of some factors relevant to human socialization. Journal of Comparative Psychology 36:229-253.

Whitman, James R. and W.R. Garner. 1962. Free recall learning of visual figures as a function of form of internal structure. Journal of Experimental Psychology 64:558-564.

Wilson, Colin. 1972. New pathways in psychology: Maslow and the post-Freudian revolution. New York, Taplinger Publishing Company. 288 p.

Woodworth, Robert S. 1958. Dynamics of behavior. New York, Henry Holt and Company. 403 p.

Woodworth, Robert S. and Donald G. Marquis. 1947. Psychology. 5th ed. New York, Henry Holt and Company. 677 p.

Wylie, Ruth C. 1974. The self-concept: a review of methodological considerations and measuring instruments. Rev. ed. Lincoln, University of Nebraska Press. Vol. 1. 399 p.

APPENDICES

APPENDIX A

SELECTION OF ITEM PAIRS

The following steps were taken to select the six pairs of consonants and digits used in the paired-associate learning task administered in this study.

1. All of the letters of the alphabet were listed in alphabetical order (see below).
2. The vowels were crossed out (see below).
3. All of the consonants were numbered consecutively.

~~a~~	g 5	l 9	q 13	v 17
b 1	h 6	m 10	r 14	w 18
c 2	~~i~~	n 11	s 15	x 19
d 3	j 7	~~o~~	t 16	~~y~~
~~e~~	k 8	p 12	~~u~~	z 20
f 4				

4. A two-digit numeral (88, section 17-29) was blindly selected in a table of random numbers[1]:
5. The first six, applicable numerals were selected from the list beginning with number 88 (see below).

88 85	92 65	50 <u>05</u>	55 75
82 64	48 06	78 80	69 53
<u>07</u> 94	43 86	94 25	41 95
<u>17</u> <u>18</u>	76 24	32 79	06 55
<u>06</u> 37	90 61	93 00	52 55
			63 <u>14</u>

[1] Arkin, Herbert and Raymond R. Colton. 1962. Tables for statisticians. New York, Barnes and Noble. p. 142. (First thousand).

6. The numerals 3, 4, 5, 6, 7, 8, and 9 were listed.

7. A one-digit numeral (4, section 29-32) was again blindly selected in a table of random numbers (see above reference).

8. The first six, applicable numerals were selected from the list beginning with number 4 (see below).

48 89
23 35
48 62

9. Each of the six digits to be used in the item-pairs was numbered (see below).

3 1
4 2
5 3
6 4
7
8 5
9 6

10. Each of the six consonants to be used in the item-pairs was numbered (see below).

g 1
h 2
j 3
r 4
v 5
w 6

11. A one-digit numeral (0, section 21-24) was again blindly selected in a table of random numbers (see above reference).

12. Alternate, appropriate numbers were selected from the list, beginning with zero, with the first number selecting the

consonant of the item-pairs, the second number the digit, and so on (see below).

06 55	90 52
52 55	30 72
63 14	52 23
31 57	56 67

13. The following pairs of numerals were chosen in this manner:

6-5
5-2
3-1
4-3
1-6
2-4

Representing these item-pairs to be used in the study:

w-8
v-4
j-3
r-5
g-9
h-6

APPENDIX B

PROCEDURE FOR PAIRED-ASSOCIATE LEARNING TASK

Equipment

1. Metronome
2. Light with foot contolled switch
3. Memory drum
4. Table with two chairs
5. Example card
6. Response card

Instructions

The following instructions were given to each student by the experimenter. The instructions are nearly the same for students who received type I information as they are for students who received type II.

1. Type II. In this activity, I am asking you to memorize a list of letter and number combinations. This card (example card) shows an example of a letter and number combination. There are six combinations like this one to be memorized.

Let me explain to you how this activity will be done. I will show you a letter in this window (memory drum). As you can see there is an "a" showing in the window. There is a number that goes with "a." It is one of these (response card) seven numbers. You can say any of these numbers in any order. All I ask is that you say each number you want in time with the clicks you hear from this

metronome. You should say a number each time you hear a click. When you say the correct number that goes with the letter in the window, I will show you the letter and number together in the window like this. We will then go on to the second letter and do the same thing. Your job is to learn which numbers go with which letters so that you can get the letter and number combinations to show as quickly as possible each time in the window. We will go through the list of six letters 18 times. Are you ready to begin?

2. Type I. In this activity, I am asking you to memorize a list of letter and number combinations. This card (example card) shows an example of a letter and number combination. There are six combinations like this one to be memorized.

Let me explain to you how this activity will be done. I will show you a letter in this window (memory drum). As you can see there is an "a" showing in the window. There is a number that goes with "a." It is one of these (response card) seven numbers. You can say any of these numbers in any order. All I ask is that you say each number you want in time with the clicks you hear from this metronome. You should say a number each time you hear a click. When you say the correct number that goes with the letter in the window, I will turn on the light like this. Your job is to learn which numbers go with which letters so that you can get the light to come on as quickly as possible. We will go through the list of six letters 18 times. Are you ready to begin?

APPENDIX C

INDEX OF PSYCHOLOGICAL DEPRIVATION

The items from Simpson's (1971) Index of Psychological Deprivation which were used in this study are listed below.

Safety Needs

1. One of the nice things about marriage is having someone to take care of you.
2. I like to work for someone who can really tell me what to do.
3. You can't tell what will happen to you just walking down the street.
4. It's really important to know what you're going to be doing next month, next year, and in the future.
5. Sometimes I've worried about not having a roof over our heads.
6. I want to be able to count on having enough money for food, shelter, and clothing--all the things I really need.
7. A person who leads an even, regular life in which few surprises happen really has a lot to be grateful for.
8. I've lost at least one person who looked after me.

Belongingness Needs

1. I am lonely.
2. One nice thing about a family is feeling that you are all part of the group.
3. It's more important to have good friends than money in the bank.
4. I wish I had more friends than I do.
5. The most important thing about a job is working with people you really like.

6. I like the idea of belonging to groups where everybody knows each other really well.

7. Basically, the world we live in is a pretty lonesome place.

8. I feel as if I'm left out of a lot of fun that friends have together.

Esteem-from-others Needs

1. Nobody pays any attention to my opinions.

2. I want a nice home and nice things that other people will admire.

3. The most important satisfaction in life is being able to do something so well that everyone looks up to you.

4. The most important thing about a job is having people look up to you.

5. It really makes you mad how you never get any appreciation for a job well done.

6. Somewhere in the world there must be someone who will love me.

Self-esteem Needs

1. I'm proud of a lot of the things I do.

2. I'm not as nice looking as most people.

3. I'm ashamed of myself very often.

4. I get about as much praise as I want.

5. Usually I am quite sure of myself.

APPENDIX D

PAIRED-ASSOCIATE LEARNING TASK: FREQUENCY OF CORRECT RESPONSES GIVEN AS FIRST RESPONSES PER SUBJECT PER TRIAL

Subject	Trials																	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Group 1: Esteem needs/type II information																		
1	0	0	2	4	2	4	4	5	4	3	5	4	6	5	5	6	6	6
2	0	2	5	4	6	6	6	6	6	6	6	6	6	6	6	6	6	6
3	0	0	2	4	4	5	6	6	5	6	6	6	6	6	6	6	6	6
4	0	2	2	2	1	2	2	1	2	3	1	2	2	4	2	2	1	3
5	1	2	3	3	4	5	5	6	4	5	6	6	5	6	6	6	6	6
6	1	1	2	1	1	3	2	2	3	3	2	4	4	4	4	5	6	5
7	0	3	4	5	6	6	6	6	6	6	6	6	6	6	6	6	6	6
8	1	1	1	3	2	4	5	4	6	6	6	6	6	6	6	6	6	6
9	1	1	1	2	2	2	3	3	5	5	6	6	5	6	5	6	6	6
Group 2: Security needs/type II information																		
10	0	2	3	1	5	4	6	6	5	6	6	6	6	6	6	6	6	6
11	0	1	1	1	3	2	1	4	3	3	5	5	5	5	4	5	6	6
12	1	1	3	2	4	4	5	6	5	5	3	5	6	6	6	5	6	6
13	4	2	0	2	3	3	2	4	4	5	4	6	6	6	6	4	6	6
14	2	2	1	1	4	2	2	3	6	6	5	6	6	6	6	6	6	6
15	0	1	2	3	4	2	4	4	4	5	4	6	5	6	6	6	6	6
16	1	5	5	5	6	6	6	6	6	6	6	6	6	6	6	6	6	6
17	1	0	1	5	5	4	5	5	5	6	6	6	6	6	6	6	6	6
18	0	2	3	4	4	4	5	5	5	5	6	5	6	6	6	6	6	6

(Continued on next page)

Appendix D. (Continued)

Subject	Trials																	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Group 3: Esteem needs/type I information																		
19	2	1	1	0	2	1	2	1	2	2	0	1	1	0	0	2	1	1
20	2	3	1	1	0	1	1	1	1	1	1	0	0	2	1	0	0	2
21	0	0	1	1	1	0	1	0	0	1	2	2	1	1	1	1	0	1
22	1	2	1	2	1	1	2	2	0	3	4	0	0	1	0	0	1	0
23	1	0	1	0	0	1	1	1	1	1	0	0	0	0	0	0	1	1
24	1	0	1	2	0	2	1	1	2	1	1	1	1	1	1	2	2	2
25	1	1	1	0	2	0	3	1	0	1	2	2	0	2	0	2	2	1
26	0	3	1	2	2	0	1	0	1	1	1	0	0	1	1	1	2	1
27	1	1	1	0	0	1	1	1	1	1	1	2	0	2	0	0	1	1
Group 4: Security needs/type I information																		
28	0	1	1	1	0	2	1	0	1	2	2	0	1	1	2	1	2	2
29	0	0	0	2	0	2	4	1	0	0	0	1	1	2	1	0	0	2
30	1	0	2	3	5	6	6	6	6	6	6	6	6	6	6	6	6	6
31	1	0	3	3	3	1	2	2	1	1	2	3	2	4	1	0	4	3
32	2	2	3	2	0	2	1	0	0	2	3	0	2	1	2	2	1	4
33	0	0	1	0	1	0	1	1	1	0	3	0	1	1	0	1	0	1
34	1	1	0	1	0	1	2	0	1	2	1	1	1	3	1	2	0	1
35	1	3	0	1	2	0	1	1	3	3	4	5	2	4	4	5	6	5
36	0	2	2	2	4	3	1	3	3	0	0	1	0	0	2	1	4	1