

VERBAL BEHAVIOR AND ATTITUDES

by  
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## CHAPTER I

### VERBAL BEHAVIOR: A THEORETICAL OUTLINE

Statement of Problem. This study is concerned with the investigation of the relationships between language and certain other behavioral characteristics of the individual. Students have regarded language in many ways.

Statistical studies have provided counts of word frequency; semanticists have inquired into the nature of "word-fact relationships"; sociological and related studies have considered language as an agent of communication; behaviorists would make language a form of conditioned behavior. It is difficult to classify the studies cited above as well as many others<sup>1</sup> with respect to their assumptions concerning the relationships between language and the individual; such assumptions are often left implicit. It is possible that the frequent failure to formulate hypotheses which would specify the relationship between language and its user is the reason that Pronko has said, "....despite a wealth of interest and of work, there seems to be no corresponding increase in our understanding of linguistic responses."

In this study we first assume that language is functionally related to many other variables in man's behavioral environment. This assumption can mean (1) that language is

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<sup>1</sup>For two psychologically oriented reviews of research on language see:

Pronko, N. H., "Language and Psycholinguistics" (39)  
Sanford, F. H., "Speech and Personality" (42).

merely a carrier of ideas, an overt correlate of thinking, or (2) that a person's vocabulary and the way he has been conditioned to use his words influence his behavior. We have chosen the latter as a working hypothesis because we believe that the latter assumption is more nearly amenable to delineation and experimental attack.

If one assumes that language is more than an overt, peripheral manifestation of thinking, then it follows that hypotheses as to the nature of verbal behavior may be necessary to the adequate understanding of the many psychological phenomena functionally related to it. The assumption that verbal behavior has some substance in its own right can be shown to be probable if it can be demonstrated experimentally that verbal associations, which have been reinforced in past experience, themselves mediate behavior. Taking this hypothesis as a point of departure, we will attempt to delineate certain of its necessary implications in the systematic psychological areas of attitudes, learning and perception and to put them to experimental test.

Certain of the postulates implicit in this hypothesis may be summarized briefly as follows: Attitudes are, in part at least, implicit verbal responses. Attitudes can therefore be measured in terms of implicit verbal associations, if implicit verbalizations can be made explicit. Since implicit word associations have been reinforced in previous learning, they are relatively permanent. Subjects, therefore, cannot inhibit previously reinforced word associations easily. It

follows then, that subjects with strong attitudes of a measurable kind can learn word associations in harmony with existing attitudes faster than word associations contrary to existing attitudes. A further postulate follows: Implicit verbal associations may influence the perceptive process. The objects of experience that are perceived and the manner in which they are perceived may be in part a function of implicit word associations that have been reinforced in past experience.

Validation of the assumptions outlined above would have considerable import for systematic psychological theory. Behaviorists have shown that a considerable portion of the behavior of organisms can be explained in terms of conditioning principles without resort to mentalistic constructs. Their explanations of verbal behavior have been less satisfactory, and where principles of conditioning have been found insufficient, they have sometimes resorted to mentalistic concepts. Behaviorists have frequently proclaimed that language is a form of conditioned behavior; it should be pointed out, however, that not nearly enough experimental evidence is currently available to serve as a basis for the formulation of a comprehensive theory of verbal behavior that can be built into a conditioning framework. It is believed that contributions to a theory of verbal behavior can help make a whole area of behavior previously assumed to be voluntary, amenable to scientific scrutiny. Thus, if the assumptions outlined previously can be shown to be tenable,

such constructs as "attitudes", "concepts" and "ideas" may become definable in terms of verbal associations, making them easier to attack by experimental methods. Obviously the validation of a position so broadly outlined as that above is not possible in the research to be described here. We can only add some increment to its plausibility.

The foregoing paragraphs summarize the essential viewpoint and the problem of this thesis. Experimental work designed to test the hypotheses stated is reported in Chapters II, III, and IV, and the viewpoint and hypotheses are further developed in this chapter.

### IMPLICATIONS

Summary Statement. This is a theoretical study and as such is not purposely oriented to practical applications. But before turning our attention to theory, it is well to consider certain manifestations of such phenomena as perception, attitudes and verbal behavior in the field of cognition as well as more mundane affairs.

The Judgmental Process. Reduced to its essence, a study of attitudes and perception is a study of people making judgments and being guided in action by them; it is a study of situational and personality factors which influence men to make the judgments they do. In the judgmental process, the influence of personality, past experience and language habits are critical. All observers are not led by the same physical evidence to the same picture of the world around them.



Moreover, even if we were physically able to do so, we could not check all our knowledge against sensory experience; we lack the time. As societies become more closely integrated, their members must derive greater proportions of their knowledge second hand from newspaper, radio or library. This is to say that most of our judgments are formulated primarily on the basis of verbal experience. We might choose dozens of commonplace examples to illustrate the point. For example we read from the paper, "John L. sends miners back to work". We believe this statement not because we saw a coal miner go back to work but because we have faith in the integrity of the press.

Attitudes and Knowledge. When we draw from the opinions of others to form our own, it is often difficult to separate fact from the originator's interpretation of fact. Hence we are apt to accept both uncritically. Lacking adequate sensory frames of reference, we are prone to forget that even those who make use of all the operations prescribed by scientific methodology must interpret their facts in keeping with their own systems of concepts. Bertrand Russell (36,p.109), in poking fun at psychologists has observed that,

Animals studied by Americans rush about frantically, with an incredible display of hustle and pep, and at last achieve the desired result by chance. Animals observed by Germans sit still and think, and at last evolve the solution out of their inner consciousness.

Attitudes and Government. Sometimes we are surprised to find that those concepts we have formed through verbal

experience and logical deductions fail to harmonize with sensory evidence. An interesting example of a great thinker in conflict was John Stuart Mill (34). The younger Mill with incisive logic elaborated the laissez faire economic philosophy of Smith and Ricardo, but the older Mill revolted at the factory system with its slums and poverty, the necessary end product of laissez faire.

Differences between the attitudes of individuals and groups are vital in the everyday economic and political life of a democratic society which must continually try to rationalize such differences by peaceful means. This quotation is worth noting.

Government can deal and should deal with blindly selfish men. But that is a comparatively small part--the easier part of our problem. The larger, more important and more difficult part of our problem is to deal with men who are not selfish and who are good citizens, but who cannot see the social and economic consequences of their actions in a modern, economically interdependent community. They fail to grasp the significance of some of our most vital social and economic problems because they see them only in the light of their own personal experience and not in perspective with the experience of other men and other industries. They, therefore, fail to see these problems for the nation as a whole.

The statement was part of an address to Congress (1938) by the late President Roosevelt.

Language and Power. Language is a means of communication but properly tempered it can be made an instrument of power. Often the great leaders have been men who could find the fitting shibboleth to express and crystallize the inarticulate wishes of the populus. Physical defects may

not handicap the politician--nor mental deficiencies either--as long as he can make noises that please the voters. Have we ever had a senator who stuttered? Karl Marx, like Mill, saw the slums and poverty of Western Europe. But he built quite a different philosophy from his experience whose catch-word, "Expropriate the expropriators", fired the imagination of many oppressed Eastern Europeans and set them to action. From the ruins of Russian feudalism a mighty power has arisen to make use of all the tools of science to increase its power. Press and radio broadcast what the regime wants the people to know. "Education" is universal; the first grader must learn the proper use of the dialectic, a conditioning process that is continuous for life. It may well be that the ultimate survival of this organization will depend upon its ability to contradict immediate sensory evidence by verbal experience.

It is apparent from the brief summary statement above that the phenomena we are to investigate are of national and international import. Psychologists have shown increasing interest in these areas, insisting that such constructs as attitudes must be more clearly defined (13, 45). It is therefore felt that a contribution to the better understanding of such phenomena as verbal behavior, perception and attitudes may have both theoretical and practical implications.

## ATTITUDES

Definitions of Attitudes. Attitudes have been defined in various ways. Lapiere (25, pp. 272-274) classifies attitudes

along with sentiments, beliefs, values, etc. as the "mental" component of society. Of belief he says, "Beliefs are symbolic inventions arrived at in much the same way as any other invention, i.e., by trial and error synthesis of antecedent elements."

G. W. Allport (1) says, "An attitude is a mental and neural state of readiness, exerting a directive or dynamic influence upon the individual's response to all objects and situations with which it is related."

Munn (36, pp. 100, 239) defines attitudes as "learned tendencies to respond positively or negatively to objects, situations, persons or ideas."

Britt (5, p. 119) speaks of overt and covert attitudes.

McNemar (33, pp. 289-290), in summarizing a number of definitions of attitudes says,

The common element with most definitions of social attitude is that such an attitude is a readiness or tendency to act or react in a certain manner. No one has ever seen an attitude; an attitude, however real to its possessor, is an abstraction, the existence of which is inferred either from non-verbal overt behavior, or from verbal or symbolic behavior.

Hebb (19, p. 141) identifies an attitude with "an enduring selectivity . . . . (mediated by) a persisting central neural influence that sustains activity in one particular direction."

Sherif and Cantril (45) have pointed to the confusion in defining attitudes. They state that:

Attitudes are learned states of readiness that imply a subject-object relationship. They are more or less enduring states of readiness . . . . .

They range in the number and variety of stimuli to which they are referred . . . . . They have affective properties in different degrees . . . . . Attitudinal activities are judgments . . . . . Words serve as a medium for the formation and expression of attitudes.

Still another definition of an attitude comes from Doob (13) who also insists that attitudes need be more rigorously defined.

An attitude (1) is an implicit response, (2) which is both anticipatory and mediating in reference to patterns of overt responses, (3) which is evoked by a variety of stimulus patterns as a result of previous learning or gradients of generalization and discrimination, (4) which is itself both cue and drive producing, (5) and which is considered significant in the individual's society.

The agreement among the definitions cited above leaves much to be desired. It should be noted that the various definitions disagree more often on points of emphasis than between the assertions made. Some emphasize the affective tone of an attitude, others the antecedent learning activities. Allport, Britt, and Munn emphasize the overt manifestations of attitudes; Doob says that an attitude is an implicit response; Hebb would define an attitude in terms of a persisting series of neural phase cycles.

Restatement of the Problem. In the definitions cited above and in other treatments of attitudes, one finds scattered references to the relationships between attitudes and verbal behavior. But as a general rule the attitude is the central thing; the accompanying verbal behavior is considered to be only an ephemeral and passive phenomenon--

an ineffectual appendage which, like the tail of a dog, wags when his master "wills" to wag it.

This writer proposes that the problem be approached on a different tack. Attitudes are generally expressed verbally and commonly measured by verbal techniques. A large proportion of our attitudes--attitudes toward morals, religion, communism, etc., etc.--are learned primarily by verbal indoctrination or precept. (How many Americans have seen a member of the Politbureau?) It has been said that attitudes are judgments, that they are determining tendencies that tend to channel our thinking. Thinking involves implicit manipulation of symbols, for the most part verbal ones. It is therefore proposed that Lloyd Morgan's Canon be followed; let the more parsimonious explanation of an attitude be chosen. Attitudes, considered in this light, are one manifestation of verbal behavior. Instead of defining attitudes as implicit responses, we will make the working assumption that attitudes are implicit verbal associations, conditioned and reinforced in past experience, which mediate behavior. This statement of the matter needs to be fitted into a theoretical treatment of verbal behavior.

#### MEASUREMENT OF ATTITUDES BY WORD ASSOCIATIONS

Orientation. Since Watson identified language with "the neuromuscular system in the head, neck, and chest segments" (54, p. 310) a number of psychologists have attempted to develop a theory of language within a behavioristic framework. For

example, Cofer and Foley (12), starting with the premise that language is a form of conditioned behavior, have laid a theoretical groundwork for the application of conditioning principles to language behavior. They refer to the experimentally demonstrated facts that generalization occurs along semantic continua. In a more recent investigation, Razran (40) has explored the relative strengths of a number of semantic and phonetic gradients of conditioning. The following theoretical discussion follows and extends that made by Cofer and Foley. It is divided into three sections, corresponding to the three sets of studies designed and executed to secure evidence as to its tenability. The first section develops the theory to the point required for the measurement of attitudes by means of a verbal association technique. The second section elaborates the theory as required for the study of attitudes in relation to learning. The third further extends the analysis as demanded by the problems suggested in perceptual behavior.

A brief summary of the theoretical development may be made at this point, in order to guide the reader as he surveys the material that follows. Words, or verbal responses, are initially learned in respect to external objects and, later, in respect to one another as well. Thus, many stimulus objects, when presented to a subject, will elicit a verbal response. It is postulated that some of the reinforcement of these object-word associations is social, i.e., shared in a cultural group, whereas other reinforcement may be largely

restricted in terms of the particular experiences to which an individual has been subject. It is further postulated that object-verbal response tendencies as well as the tendency of verbal responses to be emitted in the absence of specific stimulation exist between individuals and within a given individual in different degrees of availability and strength (the reserve concept), and this would mean that certain verbal responses have a great likelihood of being evoked by certain stimuli and that certain verbal responses would have a greater probability of being emitted than would others in a relatively ambiguous external situation. It is also assumed that the giving of a verbal response is not an isolated occurrence but rather that such a response affects other potential responses related to the given response in specifiable ways. Generalization, either in terms of similarity of physical characteristics (primary generalization) or in meaning (mediated generalization), is at least one process that may account for this spread of effect from one verbal response to other responses.

Individual Differences in Language Behavior. Words are symbols which represent objects or concepts. These symbols, and the notions of the relationships between symbols and their referents, are transmitted by the members of each generation to the next as a part of the cultural heritage. Words are socially shared; words implement communication among speech communities to the extent that their connotations are common to its members. Until quite recently the implications



of "misunderstandings" of words between members of a speech community have not been appreciated. Recently, W. Johnson (21, pp. 507-514) has developed two measures, the Extensional Agreement Index and the Intensional Agreement Index, which "express the degree of agreement among N persons in defining a given term." These indices may be thought of as a sort of common denominator--the average social connotation of a word among the members of a specifiable speech community.

As Cofer and Foley (and many others) have observed, a second part of the connotations of a word is personal--a function of the individual's own language experience. Thus, it may be assumed that the connotations of every word known to the subject are a joint function of social conditioning and of a conditioning process unique to personal experience.

The assumption (we might say, the fact) that individual differences in verbal behavior do exist, sets the direction for this study. The development of precise and valid measures of verbal behavior is, however, still a critical problem. Individual differences in verbal behavior have been found in various forms of word association tests; further, measures of written and spoken speech have been developed from the categories of classification long used by grammarians. A summary of certain studies which relate verbal behavior to systematic background and personality factors follows.

Goodenough (18) has found significant differences between men and women on free association tests and has developed a scoring key on the basis of such differences. Significant

differences between free associations of married and professional women are also reported. Foley and McMillan (17) used stimulus words capable of eliciting either medical or legal responses to test free associations of medical and law students. Differences in free associations were found to correspond to differences in professional training. Fehrer et al. (16) report relationships between frequency of use of various parts of speech and occupational preferences. F. Sanford (42) made an intensive study of the language behavior of two subjects. He reported a number of marked differences in language usage. Wendell Johnson et al. (22) report significant differences between spoken language samples of college freshmen with high Intelligence Quotients and schizophrenics of various descriptions, a result not altogether unexpected. Differences are also reported between these two groups in frequency of usage of various grammatical parts of speech in samples of writing. Finally, studies of perception, which will be described later in some detail, indicate different recognition times for words depending upon the attitudes of the subject. While many of these studies are preliminary, a number of the results cited reach a high level of statistical significance.

#### Social and Personal Determinants of Language Behavior.

Social and personal conditioning are shown in responses to free association tests. The type of responses elicited by stimulus words does not vary randomly among the tens of thousands of words of the English language; it is generally

limited to a rather restricted number of words. The number of different response words is, as a general rule, quite limited and not uncommonly a major portion of subjects give the same response word. It is a reasonable assumption that the variety of response words is indicative of personal generalization gradients; the restriction of the variety of responses indicates similarities in social conditioning. The above-mentioned facts may be explained in behavioral terms as follows:

When a stimulus word is presented to a subject, a number of reaction potentials<sup>1</sup> are generated. Such reaction potentials may be competitive and/or mutually reinforcing. They undoubtedly exist in a rather continuous state of oscillation, a phenomenon to which Hull gives considerable attention (20). To extend this line of reasoning, when a stimulus word is presented to a subject he cannot give a response word until--

(1) The S-Word---R-Word reaction potential is above threshold strength.

---

<sup>1</sup>It may be assumed that, when an organism is presented with a stimulus or stimuli, a number of responses are available for evocation. However, these responses will possess differing degrees of evocability at any time, and it is postulated that that response with the greatest availability or evocability will occur. The concept reaction potential refers to this notion of response availability or evocability. It is suggested that the overt responses of the organism give a reasonably valid measure of the presence and the strength of the response or reaction potentials.

The terms "response potential" and "reaction potential" are used to designate behavioral phenomena which we must assume to exist. Terms which have been used by other writers to denote concepts which are similar in many respects are "response tendency", "reaction tendency", "excitatory potential", "behavior tendency" and "behavior potential".

(2) The S-Word---R-Word reaction potential is liminally stronger than that of other competing S-Word---R-Word reaction potentials.

These factors specify the probability of response evocation and the latency of the response if it occurs. Which response word is given is a function of the strength of the S-Word---R-Word reaction potential and of the comparative strength of the competing reaction potentials between the stimulus word and the response word which is eventually given, and the stimulus word and other response words. The strength and number of reaction potentials is determined by prior social and personal conditioning. This hypothesis can be shown diagrammatically as follows:

STIMULUS WORD --	$S_1 + P_1$	-----	Response Word 1
			(elicited)
	$S_2 + P_2$	-----	Response Word 2
	$S_N + P_N$	-----	Response Word N
S	Strength of Social Reaction Potential --S-R (1-N)		
P	Strength of Personal Reaction Potential --S-R (1-N)		

As indicated above, when a stimulus word is presented to a subject a number of possible response words may "come to mind" in the sense that there are many competing reaction potentials. The response word of that S-R pair that has the strongest reaction potential is elicited. The speed with which a response word is elicited is a function of the relative and absolute strength of competing reaction potentials.

If these assumptions are true, the strength of reaction potentials can be measured quite simply by a modification of the free association technique. Consider the triplet:

	building
HOUSE	
	louse

The word house is the stimulus word. The words building and louse are tentative response words. The subject is instructed to "Associate the stimulus word with the response word you find easiest to associate with it by drawing a line from the stimulus word to that response word." Thus, with a given subject, at a given time, determination can be made as to whether the semantic-synonym or phonetic gradient is stronger in this particular triplet.

#### Measurement of Attitudes by a Word Association Method.

Authorities agree that attitudes result from previous conditioning--attitudes are learned. Let the assumption be made, as it was made above, that an attitude is one manifestation of verbal behavior; that an attitude is a name applicable to a syndrome of implicit verbal reaction potentials reinforced by formal and informal social conditioning and by motivated and fortuitous personal experiences. The strength of an attitude is proportional to the strength of the implicit verbal S-R reaction potentials. The number of subjective "facts" held about the object of an attitude is proportional to the variety of verbal responses available. If these assumptions are correct it follows that attitudes can be validly measured by verbal associations. Different attitudes

correspond to differences in the kind of implicit verbal associations and to differences in the strength of implicit verbal reaction potentials. These differences can be measured with the triplet technique illustrated above.

As an example, a stimulus word is followed by two response words so that it can be paired with either. Pairing the stimulus word with one of the response words is indicative of one attitude, pairing it with a second is indicative of another. If religious and economic attitudes are selected as examples, an S-R<sub>1</sub> R<sub>2</sub> triplet might consist of the words:

	gold
STANDARDS	moral

When the subject is instructed to make the preferred association, two implicit S-R reaction potentials are generated, STANDARDS-gold and STANDARDS-moral. The subject associates the stimulus word with the response word whose S-R reaction potential is stronger.

Experimental Predictions. If the preceding theoretical analysis is correct, a set of triplets such as those illustrated above can be used to measure the relative strength of two attitudes. This assumption can be tested experimentally by comparison of indices of attitudes arrived at by the triplet device with other valid attitude measures.

The preceding theoretical analysis requires that a further assumption be made. If a subject holds two equally strong attitudes in the respects being measured, many of the S-R<sub>1</sub>, S-R<sub>2</sub> reaction potentials will be approximately equal in

strength. The subject will therefore take longer to "decide" which response word to associate with the stimulus word for it must be assumed that a liminal difference between the strengths of the two reaction potentials is necessary before one can evoke a response in the presence of the other. Therefore people whose attitudes are about equally strong in both respects measured will require longer to complete the test than those who hold one attitude much more strongly than the other.

The analysis just concluded suggests that attitudes may be measured by word association techniques and, further, that certain time differences should be apparent among different kinds of subjects. Tests of these possibilities are reported in Chapter II.

#### ATTITUDES AND LEARNING

Further theoretical analysis is contingent upon experimental validation of the predictions that follow from considerations outlined in the preceding section. Assuming that these predictions are borne out, the following assumptions as to the nature of an attitude may be taken as working hypotheses: An attitude is a type of verbal behavior characterized by implicit verbal associations reinforced by prior conditioning. The overt manifestations of attitudes are overt verbal responses which may be measured in terms of their type and their latencies.

We will return to this way of thinking of attitudes after briefly summarizing several statements in regard to the

relationship between attitudes and learning.

Doob (13) says:

. . . . The arousal of an attitude involves two traditional problems in psychology--perception and learning. The two can only be separated for purposes of analysis. Perception indicates that the individual is responding because he has previously paid attention to or been oriented toward certain stimuli that affect his sense organs and affect his attitude. Learning emphasizes the reasons in the past history of the individual which have brought about the bond between the stimulus pattern and the attitude.

Krech (23) says:

. . . . These three characteristics of attitudes--the integrative aspect, the responsiveness of the attitudes to experience, and the cognitive aspect--almost compel the suggestion that attitudes might logically be regarded as problem attempts--attempts by the individual to solve some of the problems confronting him in his social world. This is not a matter of saying, in more elaborate terminology, that attitudes are influenced by learning, but rather that attitudes are the very stuff that learning is made of--at least in the social segment of the individual's personality. An attitude is the integration of learned modes of response.

The above formulation immediately suggests that we apply to the study of attitudes the theory and techniques of the psychology of learning . . . . The theoretical and experimental psychologist need not drop his techniques and principles acquired in the investigation of learning when he approaches the study of man and attitudes.

Bruner and Goodman (6) say, "Attitudinal activities are judgments . . . . attitudes will some day be closely linked with the psychology of learning and conditioning." These and other writers have placed emphasis upon the relationship between attitudes and learning. The statement that attitudes and learning are functionally related is, however, capable of three interpretations. Writers frequently fail to specify



whether they mean that (1) attitudes are learned (2) attitudes influence immediate learning, or (3) attitudes are learned and influence immediate learning also. Certainly sufficient experimental and "common sense" evidence exists to support the conclusion that attitudes are learned. But the statement that attitudes influence immediate learning does not necessarily follow from the fact that attitudes are learned and, in fact, attempts to test the hypothesis that attitudes influence immediate learning have frequently failed to yield positive results. This point will be discussed in some detail in Chapter III. If it is true that attitudes affect immediate learning, the influence of attitudes may operate in one or both of these ways:

1. A subject having a strong positive attitude of a specified sort can learn experiences and verbal material in harmony with such an attitude better than experiences and verbal material which conflict with the existing attitude.

2. A subject having a strong positive attitude of a specified sort will tend to choose to learn experiences and verbal material in harmony with that attitude rather than experiences and verbal material opposed to it.

A major portion of this thesis is devoted to a test of the first hypothesis which is described in Chapter III. Part of Chapter IV will be devoted to testing the second hypothesis.

A verbal theory of attitudes provides a handy means of stating the above considerations explicitly. Furthermore,

when they are so stated, implications for testing them experimentally become fairly obvious. A statement follows:

The verbal associations that have been strengthened by pre-experimental reinforcements exhibit the permanency that characterizes the learning process. They cannot be inhibited "at will". They therefore affect immediate learning in the following manner:

Experimental Predictions. A strongly held attitude is characterized by an associative context in which the associative reaction potentials are relatively strong and very likely the number of responses available is large. In the learning process, when a paired associate in harmony with a strongly held existing attitude is presented to subjects, the appropriate response to the stimulus word if not previously reinforced in past experience, is easily provided by mediated generalization since it is not far removed from the stimulus word along semantic gradients. On the other hand, if the same paired associate is presented to subjects who are neutral or negative toward the attitude in question, the implicit semantic gradients are weaker and the associative connections between the stimulus and response words are more indirect. The prediction would therefore follow that subjects can learn paired associates in harmony with an existing attitude faster than paired associates neutral or contrary to an existing attitude.

## PERCEPTION

Traditional and Behavioral Studies of Perception. It is obvious that only a very restricted area of perceptual phenomena can be considered in this treatise. Attention is directed to a number of experimentally demonstrated perceptual phenomena which are immediately relevant to the preceding discussion of verbal behavior.

Recent studies of perception strongly indicate that some central force is producing experimental results which cannot be explained in terms of indices of sensory sensitivity.

Traditional experimental studies of perception have been concerned primarily with the properties of the stimulus field. These studies have explored the way in which certain stimuli and stimulus patterns are perceived and the perceptual correlates of temporal, spatial, and intensity changes in the stimulus field. Bruner and Goodman (6) have classified the wealth of data of this sort under the heading of formalistic studies of perception. The emphasis is upon the stimulus and the perceiver has been regarded only as a necessary, if sometimes unpredictable and hence troublesome, participant in the process.

It is hardly necessary to point out that "the perceiver" so regarded has no flesh and blood counterpart in reality. He is, rather, an homme moyen--an abstracted average who brings to the laboratory two healthy eyes, ears and hands, reasonably adequate receptor and response mechanisms. Many

have pointed out the wide divergence between man so taken, and the homosapiens as he actually is, differing one from another as to past experience, sensory processes, attitudes, emotions, and in numerous other respects.

The above is intended as a statement of fact. No criticism of the pioneering work of the structuralist students of perception is intended. They have provided the present-day investigators a legacy of experimental data and experimental know-how that may be used as a point of departure for current investigations. Without knowledge of the relationship between changes in the stimulus and perception, the inquiries of the present-day investigators into the projective nature of perception would be less meaningful. Nor is it quite fair to imply (as many current writers seem to have done) that all nineteenth century investigators were unaware that the subject has something to do with the perceptual process. The following collection of remarks from Helmholtz (4, pp. 228-307) indicate that he clearly understood that the perceiver is much more than a passive mechanism:

Perception may contain many experimental data not represented in the stimulus . . . . . The aspects of perception not arising immediately in the stimulus are additions that accrue to perception in accordance with its development in past experience. They develop by association and repetition, i.e., conscious states are telescoped and reduced until the perceptual process is largely or entirely unconscious. . . . . Since unconscious inferences cannot be prevented by conscious reasoning, they are irresistible. By "mental experimentation" we discover which sensations cannot be changed by

will and attribute to the object those that cannot. For true scientific knowledge we must abstract from imaginal supplements what unconscious inference adds.

It is plain from the concise statements above that Helmholtz knew that personal determinants were operative during the act of perceiving although he may not have known what they were.

A representative selection of research studies bearing on the projective nature of perception, especially studies germane to experiments described in this thesis, will be reviewed.

1. Bruner and Goodman (6) and Bruner and Postman (8) have shown that perceptual accentuation is correlated with psychological needs.

2. Postman, Bruner and McGinnies (37), using attitudes as the independent variable, have demonstrated differential recognition times for words as a function of attitudes. They selected six words judged to be representative of each of the six values of the Allport-Vernon Study of Values. The words were exposed tachistoscopically for brief intervals, and recognition times were determined. Recognition times for words representative of preferred values were found to be significantly shorter than recognition time for words representing non-preferred values. As, upon successive presentations of words, exposure times were increased, subjects were encouraged to try to identify the word before they were certain they could recognize it. These successive approximations by the subject to the proper word were recorded. It

was found that in such "guesses" subjects tended to make more covaluant and structural responses to words representative of the preferred value and more nonsense and contra-valuant responses to words signifying non-preferred values. Similar results are reported by Vanderplas and Blake (50) in a repetition of this experiment in which the same stimulus words were presented vocally. Results in this case, although significant, are not nearly so clear-cut. From the charts presented, there appear to be reversals of the reported trend (i.e., some subjects reacted rapidly to non-preferred words) but these are not discussed in the report.

McGinnies (30), using the Allport-Vernon Study of Values, has found a shorter word association time for words in the preferred value area. He also found that covaluant responses were given more frequently to preferred value words, contra-valuant responses more frequently to non-preferred value words.

McGinnies (29) has demonstrated "perceptual defense" to socially objectionable words in terms of slower recognition times to such words when they were presented tachistoscopically.

McLeary and Lazarus (32), in a recent interim report, present findings of considerable theoretical import.

GSR evidence is presented to indicate that at tachistoscope exposure speeds too rapid for conscious discrimination (as measured by the subject's inability to report what stimulus was presented), the subject is still capable of responding in a discriminatory way.

While only five subjects had been run at the time of the report, the reported level of significance of differences is less than 1%.

The well-known experiment of Carmichael, Hogan and Walter (11) demonstrates that verbal experience can produce markedly differential effects upon the reproduction--and therefore the perception--of ambiguous figures.

Summary of Behavioral Aspects of Perception. While marked sensory differences between individuals were apparent in a number of the above experiments, responses differed also in a systematic manner to stimuli which were physically very nearly similar. These behavioral differences were functionally related to existing attitudes and to verbal stimuli; they cannot be explained in terms of sensory sensitivity. (In this thesis no attempt is made to differentiate between attitudes and values. In current psychological usage, the term "value" is frequently given a broader connotation than the term "attitude". We hold that for purposes of this treatise, the distinction is unnecessary.)

It is clear that some autonomous central process or processes are at work. A central process cannot be observed directly. Let us summarize accounts of controlled observations of certain of its (or their) manifestations.

1. When a subject is presented with stimulus words representative of a preferred attitudinal or value area as contrasted with a non-preferred value area:

a. His verbal responses occur faster.

b. His pre-solution responses are more frequently similar in meaning to the stimulus words. Contravaluant or nonsense verbal responses are more often given as responses to stimulus words of the non-preferred value area.

c. He can recognize words in harmony with his preferred values at shorter exposure times.

The words "selective sensitivity" and "value resonance" have been given to this class of phenomena.

2. When psychologically threatening words as contrasted with neutral words are presented, the activity of the autonomic nervous system increases before the words can be recognized.

3. Word labels presented in close contiguity with ambiguous figures mediate the reproduction process.

4. Most of the behavior described above is not conscious in so far as the term "consciousness" is used to denote voluntary or wilful behavior.

Psychologists are in general agreement that descriptive behavioral facts such as the above need to be based upon intra-organismic conceptual models if the objections of science are to be fully realized.

#### THE VERBAL RESERVE

Need for a Broader Explanatory Construct. It is proposed that an adequate theory of verbal behavior can contribute materially toward the explanation of the facts



summarized above as well as others related to them. Our earlier analysis will be extended accordingly. We have heretofore spoken of S-R paired associates, i.e., of single stimulus words paired with single response words. Obviously any theory that confines itself to such atomistic phenomena can be applicable to only a relatively small segment of verbal behavior. It cannot be inclusive of the wide range of verbal phenomena common to everyday affairs. Adults make use of from ten to fifty thousand words with considerable facility. To provide a broader base for this theory of verbal behavior, we suggest the construct VERBAL RESERVE<sup>1</sup>. For this construct we are indebted to numerous sources, the two most prominent of which are Skinner's (46) hypothetical Reflex Reserve, and Cofer and Foley's (12) theoretical discussion of mediated generalization.

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<sup>1</sup>The concept, response or reaction potential, was previously introduced to describe the situation in which a given stimulus or pattern of stimuli evokes a reaction. However, reaction potentials will also exist, and in varying degrees of strength, in the relative absence of stimulation. To these reaction potentials as a group we give the name "verbal reserve". This concept also connotes an organization or set of systematic relationships among at least some of the response potentials constituting it.

An Elaboration of the Construct<sup>1</sup> The verbal reserve is conceived to be a rather flexible network of implicit response potentials. It was observed earlier that response potentials are implicit but that they are indirectly measurable in terms of the number, type, and latency of overt verbal responses under specified stimulus situations. In general, the stronger the response potential of a word or of a particular chain of verbal associations, the greater the probability that such a word will be implicitly associated with other words and/or evoked. A verbal reserve is conceived to be a syndrome of implicit verbal responses. These implicit responses upon being evoked indicate the characteristic verbal habits and behavior of the individual. Reserves of verbal responses vary from individual to

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<sup>1</sup>In order to orient the reader in respect to the material that is to follow, the following discussion presents a theoretical system of constructs which were developed in part subsequent to experimental investigations. As this part of the chapter was being written, encouraging results were being obtained from the learning experiment (Chapter III) along with other experimental data that had not been predicted. These results appeared to be related to the summary of evidence (page 28) concerning the projective components of perception. To explain these results and the perceptual phenomena, it became apparent that the response potential construct must be extended. The construct, Verbal Reserve, was developed but before it could be applied to the experimental evidence and to the perceptual phenomena, a number of more basic constructs had to be dealt with. When the theory was expanded as seemed necessary, it had become so broad that with the exception of one small part, it could not be tested experimentally. The theory is outlined in the following pages to illustrate its possibilities in accounting for perceptual and related phenomena. The analysis which follows is therefore highly speculative, being supported by experimental evidence only in so far as it is consistent with experimental results currently available.

individual in respect to the number of responses available, the manner in which their response potentials have been reinforced and the strength of the response potentials that constitute the verbal reserve. The construct, verbal reserve, is needed to account for experimental evidence summarized under category 1, page 27. Furthermore this construct is consistent with the commonplace observation that individuals differ in their inclinations to discuss certain topics with greater enthusiasm and/or in greater detail than others.

The Learning of Verbal Responses and Verbal Response Habits. Implicit verbal associations are not randomly distributed but are ordered into various sequences by prior social and personal experience, for each person in a somewhat different way. Two obvious methods of learning word-to-object relationships are these:

- (1) The individual learns to associate words with perceivable stimulus objects and stimulus situations.
- (2) The individual learns to associate words with the signs of stimulus objects. Some of these signs are other words that are associated in some way with the same stimulus or with physically similar stimuli or stimulus situations.

The assumption seems reasonable that the more often the word-object or word-sign associations has been made, the greater the response potential of the word when the individual perceives its referent. The principle distinction between the first and second types of associative learning

is that in the case of the second, it is not necessary that the object itself be in the environment. In the next section, we turn to a third aspect of verbal behavior, verbal associations that occur when neither objects nor their signs are present.

Autonomous Semantic Generalization. Psychologists are often hard put to account for consistencies in human performance by clearly defined theories and constructs. It is proposed that such consistencies may be explained, in part at least, in terms of verbal phenomena subsumed under the not entirely satisfactory descriptive term we have been forced to coin--autonomous semantic generalization.

(1) Autonomous semantic generalization by implicit or overt recitation: By purposeful recall we can reinforce<sup>1</sup> verbal associations either of the order  $W_1..W_2..W_n^2$  or of the order  $W_1..W_2..W_3..W_4..W_1..W_2..W_3..W_1$ . etc. either implicitly or by overt verbalization of such sequences.

(2) Autonomous semantic generalization by incidental reinforcement: One particular set of verbal associations may be reinforced without deliberate intent if one or more words in its implicit associative sequence or chain also

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<sup>1</sup>We can find no satisfactory psychological action-word to convey the operations we wish to describe. The word "reinforce", is used to emphasize the repetitive nature of this process. A further denotation of the word reinforcement--reduction of a tension state--is not applicable to the use of the word in this context. As he continues, the discriminating reader will appreciate that the processes being described may as often lead to an increase in tension state as a decrease.

<sup>2</sup> $W_1..W_2..W_n$  denotes word association sequences.

(a) forms a part of another associative chain, or (b) by semantic gradients can easily be associated with a word in that chain. Thus, while "thinking" along the semantic gradients of one context of words, we may chance upon a word that has been previously reinforced frequently in a different verbal context. We may then shift our thoughts from the original to the second context.

The Reserve Concept and "Selective Perception". It should be noted that after particular verbal relationships have been continually reinforced by any type or combination of methods of learning or reinforcement postulated previously, response potentials may become very strong. For example, in daily intercourse, reinforcement by recitation is a very common occurrence. It is postulated that those syndromes of response potentials which are strongest exercise several influences upon the subject which will be discussed in this and in the next sections.

Strong syndromes of reaction potentials lower the sensory threshold of the subject, which is to say they change his "set". The probability then increases that the individual will perceive preferentially (1) specifiable objects and/or classes of objects denoted by implicit verbal associations, and (2) specifiable verbal symbols which have been repeatedly conditioned to such external objects. The perceptual threshold for "neutral" objects and their verbal symbols is higher since the implicit verbal associations that stand for "neutral" objects have not been reinforced as often

and/or as vividly in verbal contexts. This is "selective perception", a phenomenon measurable as a relationship between the subject and external objects or their symbols.

The Reserve Concept and Attitudes. The reserve concept is easily applicable to certain characteristics of attitudes. We mention two:

- (1) An attitude is characterized by an affective tone.
- (2) Objects or situations that elicit a strong attitude give rise to similar behavior patterns in the individual whenever he is confronted with such stimuli.

In the terminology of verbal behavior, the intensity with which an attitude is held is directly proportional to the strength of response potentials between implicit words or symbols whose referents the individual classifies more or less as one. We would say that an attitude is represented by a verbal reserve whose response potentials are stronger than the response potentials of the verbal associations that represent subjectively neutral classes of objects and/or situations. The stronger response potentials "take over". Somehow they seem to mediate an increased tonus in the whole individual. They make his behavior more predictable in the sense that it is apt to be relatively rigid and emotional rather than flexible and judgmental. This statement is entirely in accord with the findings of Cantril (10) who reports that, "The more extreme an attitude in its direction, the more intensively it is likely to be held." A verbal theory of attitudes has obvious implications for the

understanding of such constructs as "drive", "motivation", and emotion. These implications will not be delineated at this time.

The Reserve Concept and Thinking. Strong syndromes of reaction potentials tend to capture the "thoughts" of the subject. This postulate is merely an extension of those above, the only difference being that no environmental cues need be present for such behavior to take place. The mechanics by which this phenomenon occurs are immediately apparent upon consideration of circular semantic generalization by incidental reinforcement. A considerable number of words in the language are common to a number of associative contexts. When an individual, in thinking of objects of a relatively neutral associative context, comes to a word which is also a part of a second, emotionally charged context, it is altogether possible that his thoughts will "wander" into the stronger associative context. The probability is roughly proportional to the strength of the reaction potentials of the two associative contexts. The external stimulus situation, however, may exert a number of reinforcing or inhibiting influences. Hence, it would be very difficult to specify a probability of "associative shifting" in precise mathematical terms. An example would be an emotion-provoking incident which we "can't get off our mind". This statement of matters may have implications for clinical problems.

Assimilation to the Verbal Context. A physical stimulus, especially a subjectively ambiguous physical stimulus, will tend to be interpreted into an existing perceptual context. This phenomenon is explainable at the level of verbal behavior in terms of the mechanisms postulated above. In past experience implicit verbal associations have been reinforced in certain patterns or sequences. The subject therefore tends to assimilate the stimulus into his own syndrome of response potentials. Presolution attempts at assimilation may result in covaluant, nonsense, or contravaluant responses, depending upon the syndromes or verbal associations that characterize the individual perceiver. As Bruner and Postman (7) have pointed out, perception is hierarchical. From the experiments of McGinnies (29) and those of McLeary and Lazerus (32), we may postulate a pre-conscious phase characterized by the reinforcement of implicit response potentials resulting in covaluant, nonsense or contravaluant responses depending on whether the relationship between subject and stimulus is positive, neutral, or negative. If the relationship between subject and stimulus is either strongly positive or strongly negative, that is to say, if the stimulus is associated into a verbal context characterized by strong reaction potentials, a concomitant increase in the activity of the autonomic nervous system will occur. From this analysis it would be assumed that any emotion-provoking stimulus, whether positive or negative would, in the act of perception, increase the activity of the autonomic nervous system.



## SUMMARY

The theory of verbal behavior outlined in the preceding pages is an extension of Cofer and Foley's theoretical development of the concept, mediated generalization. We have assumed that verbal behavior, i.e., verbal habits, have substance in their own right and that these habits are relatively permanent. If these assumptions hold true, hypotheses as to the nature and function of verbal behavior will be necessary to the adequate understanding of other behavior related to it.

By making use of the theoretical construct Response potential, we have outlined experimental methods to test postulates that follow from the above statements. We have noted that the concept, Response potential, does not provide sufficient scope to explain certain experimental evidence as to the projective nature of perception in terms of a theory of verbal behavior. Therefore the concept Verbal Reserve has been suggested and elaborated to broaden our theoretical development of verbal behavior.

An account of experimentation directed toward testing certain of the postulates outlined in this chapter is contained in Chapters II, III, and IV where three investigations are described and reported as follows:

Chapter II--Measurement of the relative strength of attitude by verbal associations.

Chapter III--An investigation of the effect of attitudes upon immediate learning.

Chapter IV--An investigation of the selective nature of perception using attitudes measured by word associations as the independent variable.

Experimental results will be interpreted in light of current systematic theory as well as the constructs concerning verbal behavior which have been elaborated in this chapter.

## CHAPTER II

### MEASUREMENT OF ATTITUDES BY A SIMPLE WORD ASSOCIATION TECHNIQUE

#### INTRODUCTION

Review of Theory. The development of the Word Association triplets for the measurement of attitudes will be discussed in this chapter. Let us first review briefly the theoretical considerations that the work to be described here is designed to test.

It has been assumed that as a result of social and personal conditioning, people who differ in attitudes learn to associate words in a different manner. It is assumed that by making use of such differences, attitudes can be measured. For example, let a stimulus word be followed by two response words so that it can be paired with either.

BE     ethical  
         aggressive

The subject is instructed to "associate the stimulus word with the response word you find easiest to associate with it by drawing a line from the stimulus word to that response word." It is assumed that under this condition two conflicting response potentials are activated. One represents the associative strength of the stimulus pair, BE-ethical, the other the strength of the pair BE-aggressive. It is assumed that the stronger response potential will predominate, determining which response word will be chosen.

Thus the individual with a strong religious attitude will tend to make the association, "BE-ethical"; the individual with the strong power-oriented attitude will tend to make the association, "BE-aggressive".

Experimental Predictions. It is predicted that the relative strength of two attitudes can be validly measured by the development of a set of triplets, so selected that one attitude is indicated by the pairing of the stimulus words with one set of response words and that a second attitude is indicated by the pairing of the stimulus words with a second set of response words.

One further prediction follows: No response can occur until one of the response potentials is liminally stronger than the other. Therefore individuals whose attitudes are of nearly equal strength will require longer to complete the word association task than individuals who hold either attitude much stronger than the other.

The development of the Word Association method for the measurement of attitudes will be described in this sequence:

- (1) Selection and description of attitudes used.
- (2) Development of succeeding WA forms.
- (3) Timing of responses; evidence of reliability and validity of WA forms.

#### RELIGIOUS AND POLITICAL-ECONOMIC ATTITUDES

Criteria for Selection. Consideration was given to the criteria by which attitudes should be selected. The following were decided upon:

(1) The attitudes selected should elicit the interest of college undergraduates.

(2) The subjects should be reasonably familiar with them.

(3) The attitudes must be sufficiently general so that each can be divided into a number of more specific but inter-correlated attitudes.

(4) So that the triplet technique can be validated, attitudes that recognized authorities have already tried to measure should be selected.

(5) They should be uncorrelated.

(6) Other things being equal, those should be selected which are most closely related to basic personality variables.

While it appeared that no attitudes fit these six criteria perfectly, it was decided finally to use religious as compared with political and economic attitudes. For the original concept of a six value system inclusive of these attitudes, we are indebted to Eduard Spranger (48); for attempts to make these concepts specific, to measure and validate them, we are indebted to Allport and Vernon (52). Selection of these three values allows comparison of scores on word association triplets with scores on the Allport-Vernon Study of Values. The political, economic and religious scales of the Allport-Vernon Study of Values appear to have a considerable degree of validity; further, a number of research studies have shown the reliability of these scales to be relatively high (24, 41).

### Characteristics of the Religious and Political-

Economic Attitudes. The political and economic values were combined in this study for logical reasons and because Lurie (24) and others have found them to be highly correlated. The political and economic<sup>1</sup> values that the word association triplets are intended to represent follow Spranger's deductive outline closely. The religious<sup>1</sup> values do not. For the most part, they are built around the institution of the Christian church and those Christian dogmas, rituals, and rules of conduct to which--a priori--most college students have been exposed at one time or another. As such, they represent a compromise between "liberal" religious concepts derived from various source materials and the firmly established and conventional attitudes of those who hold a literal belief in biblical precepts.

The source materials used in the development of word association triplets are indicated in the bibliography by an asterisk.

A list of the characteristics of R and PE attitudes abstracted therefrom to give them more concrete meaning follows:

#### Political-economic Attitudes

1. Uses expediency as criteria of judgment of business practices and personal conduct.
2. Hedonistic--pleasure and luxury loving.

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<sup>1</sup>The letters R and PE will be substituted for the adjectives "religious" and "political-economic" in the remainder of this thesis.

3. Thinks of Sunday as a day of rest.
4. Thinks of mundane, practical, and useful economic values.
5. Interested in acquiring and accumulating material goods.
6. Has an extensive, ready vocabulary of economic and monetary terms.
7. Believes in survival of fittest; laissez-faire in economics.
8. Believes in reward through work on earth.
9. Seeks power and prestige.
10. Interested in present-day affairs of government officials.
11. Familiar with office equipment, materials, payment of wages, etc.
12. Looks to economic future.
13. Believes inventions helpful to society.
14. Emphasizes self-confidence rather than trust in God or prayer.
15. Believes in conquest over nature.
16. Likes competition.

#### Religious Attitudes

1. Prone to make moral judgments of business practices and personal conduct.
2. Acquainted with biblical rules of conduct and dogmas.
3. Is familiar with church rituals, terminology, etc.
4. Attends church on Sunday or thinks of church attendance.
5. Thinks of cosmos, universe.
6. Believes in freedom of religion and religious worship.
7. Believes in high ideals, spiritual values, morality.
8. Thinks of Bible as a spiritual revelation.
9. Believes in punishment or reward in another world.
10. Believes in personal salvation.
11. Is familiar with Biblical people and parables.
12. Believes in world peace by disarmament.
13. Believes clerical profession is helpful to society.
14. Believes in God.
15. Believes in efficacy of prayer.
16. Altruistic.
17. Believes in and is guided by concept of inner sin or conscience.
18. Believes in contemplation in solitude.
19. Makes acquisition of personal goods secondary to ethical values.

The Word Association triplets were developed by the writer from these characteristics; from internal validation of successive forms; and by consultation with faculty and graduate students.

#### DEVELOPMENT OF WORD ASSOCIATIONS

The Word Association Triplet. The objective of this work was the development of word associations to represent the religious (R) and political-economic (PE) attitudes. A stimulus word was selected which the subject could associate with either a "religious" word or a "political" or "economic" word that followed it. Each triplet was designed to represent a potentially conflicting religious and a political-economic idea. For example: one triplet consists of the stimulus word SEEK followed by the response words "salvation" and "preeminence".

It was assumed that a group of triplets so formulated would distinguish between R and PE subjects.

Word Association Form 1. Form 1<sup>1</sup> consisted of 24 stimulus words paired with 48 possible response words. It was developed from "hunches" and from analysis of the attitudes incorporated in the Allport-Vernon Study of Values. This form was administered to 13 psychology graduate students

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<sup>1</sup>Word Association Form 7, the final form developed in this experiment, is presented on Table 1 on p. 45. Subsequent to this entry, the letters WA will be substituted for word association or word association form. WA Forms 1, 2, 3, 4, 5, and 6 are appended on pp. 141, 142, 143, 145, 147 and 149 as separate tables.



TABLE 1. WORD ASSOCIATION FORM 7

	SPOON	silver cup		SUNDAY	rest church
	VALUES	spiritual economic	18.	FRIENDS	happy cultured
	MAKER OF	universe millions	19.	PREPARE FOR	prosperity judgment
	SPOUSE	sociable intelligent	20.	NEW	testament opportunities
	WAGES OF	workers sin	21.	PRAISE	workers executives
	SELF	realization preservation	22.	PERSONAL	reverence initiative
	GOOD	manners companions	23.	STATELY	majestic pompous
	RESPECT	humility efficiency	24.	LIE	expedient immoral
	MOVIES	musical dramatic	25.	EVERPRESENT	god taxes
10.	MASS	production catholic	26.	CAR	cadillac jalopy
	CREATOR OF	heavens fashions	27.	HIGH	earnings ideals
12.	BOOK	text novel	28.	BELIEVE IN	saviour self
	BENEFACTOR	inventor clergyman	29.	FAILURE	admit forget
14.	CLOTH	suit thread	30.	PRINCIPLES OF	morality utility
15.	SAVE MY	money soul	31.	DESIRE	peace of mind prestige
16.	SUCCESS BY	striving prayer	32.	ENJOY	work play

TABLE 1. WORD ASSOCIATION FORM 7 (continued).

33.	PROTECT	worship savings	49.	SWIM	pleasure exercise
34.	FREEDOM OF	enterprise religion	50.	MIRACLES OF	finance loaves
35.	LIFE OF	integrity luxury	51.	LUXURIES	unnecessary desirable
36.	GOOD	wine books	52.	DEFY	authority convention
37.	TWELVE	apostles cabinet members	53.	LOOSE	change morals
38.	DENOMINATION	currency church	54.	CLERICAL	ministry typist
39.	FUTURE	afraid hope	55.	STANDARDS	gold conduct
40.	BE	righteous aggressive	56.	EAT	home restaurant
41.	LOVE	sentimental elemental	57.	GIVE	blessed take
42.	FEAR OF	depression hell	58.	REWARD	working heaven
43.	SEEK	preeminence salvation	59.	MIDNIGHT	lights darkness
44.	MUSIC	serene expressive	60.	TEN	dollars commandments
45.	INTERNATIONAL	disarmament business machines	61.	GIVE IN	lose tactful
46.	PROBLEMS	frustrating challenging	62.	BECOME	ethical forceful
47.	UNITY	trinity monopoly	63.	MONEY	charity interest
48.	TREE	leaf forest	64.	BUILD	character bridges

Name \_\_\_\_\_

Date \_\_\_\_\_ Class \_\_\_\_\_

and to 15 undergraduate students, a total of 28 subjects in the sample. Responses of the 8 respondents having the highest scores on the political-economic<sup>1</sup> scale (and therefore the lowest scores on the religious scale) were item analysed.<sup>2</sup> On the basis of this analysis, five triplets were discarded, and three were retained but in a changed form for use in Form 2. An encouraging sign in the preliminary trial was that with the exception of 4 male students of the undergraduate group, Form 1 distinguished between groups with very little overlap. Undergraduates had higher scores on religious values than graduate students. Nineteen triplets were retained as a nucleus for the development of Form 2.

Word Association Form 2. WA-2 consisted of 37 triplets of which 6 (numbers 5, 10, 15, 20, 25, and 30) were neutral; i.e., not obviously related to religious or economic attitudes. The neutral triplets were inserted because in the administration of WA Form 1, a number of subjects said almost immediately, "Oh, I know what you're driving at!" and some few marked almost all R or all PE associations. The influence of the context upon verbal behavior has been clearly

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<sup>1</sup>Word Association Form 1 and succeeding WA Forms were arbitrarily scored in terms of the number of times the stimulus word was associated with the religious response word. Thus, with the exception of occasional papers in which a subject failed to respond to one or two triplets, the number of PE associations (and hence the PE scores) bears a perfect inverse relationship to the number of R associations.

<sup>2</sup>An item analysis of Word Association Form 6 is presented on page 48 to illustrate the method of analysis used.

TABLE 2. ITEM ANALYSIS OF WORD ASSOCIATION FORM 6.

Item	Stimulus Word <sup>1</sup>	Responses				Separation <sup>2</sup>
		R Group		PE Group		
		R	PE	R	PE	
1	Celestial	8	7	6	9	2
*3	Values	7	8	1	14	6
4	Prayer	15	0	12	3	3
6	Trust	15	0	12	3	3
7	Wages of	5	10	1	14	4
9	Self	6	9	1	14	5
11	Creator of	12	3	1	14	11
12	Mass	9	6	1	14	8
14	Save my	14	1	4	11	10
16	Success by	8	7	0	15	8
17	Sunday	15	0	6	9	9
18	New	9	6	1	14	8
19	Personal	4	11	0	15	4
21	Enjoy	7	8	1	14	6
22	Everpresent	14	1	4	11	10
24	Insult	12	3	12	3	0
26	Believe in	12	3	4	11	8
27	Principles of	14	1	5	10	9
28	Freedom of	14	1	6	9	8
29	Twelve	13	2	4	11	9
30	Denomination	14	1	7	8	7
31	Fear of	12	3	1	14	11
33	International	11	4	4	11	7
34	Luxuries	5	10	1	14	4
35	Loose	10	5	4	11	6
36	Clerical	7	8	3	12	4
38	Give	12	3	2	13	10
39	Reward	15	0	1	14	14
40	Become	12	3	6	9	6
42	A Life of	14	1	6	9	8
43	Desire	15	0	4	11	11

<sup>1</sup>For response words, see Table 1, page 45.

<sup>2</sup>Separation is computed in terms of the number of associations by which one criterion group exceeded the other in the direction predicted. For example, note the triplet:

VALUES      spiritual  
              economic

From item 2 of the table it will be noted that 7 members of the R group made the association, VALUES-spiritual, and that only one member of the PE group made that association. Conversely, 14 members of the PE group made the association VALUES-economic, only 8 members of the R group made that association. In either case the separation is 6, i.e., 7-1 or 14-8.

shown by A. Judson<sup>1</sup>. The practice of interspersing the list with neutral triplets, was continued throughout the development of succeeding forms.

WA Form 2 was administered to 49 intermediate psychology students, to 6 students in a veteran's housing project and 5 of their wives, a total of 60 subjects.

The associations of the 12 subjects having the highest religious scores and of the 12 subjects having the lowest religious scores were item analysed. An item analysis of a later word association form, WA-6 is presented in Table 2 page 48. Discrimination power of each item was noted in terms of its correlation with this internal criterion. On the basis of this analysis seven triplets having the lowest discrimination power were eliminated, twenty-four were retained for WA-3.

Word Association Form 3. WA-3 consisted of 40 R-PE and 5 neutral triplets. This form was administered to 38 elementary and 19 intermediate psychology students along with the Allport-Vernon Study of Values. Scores on the two measures were correlated. It was decided to score only those responses of the Allport-Vernon in which subjects had to state their relative preference for (1) a religious and a political item, (2) a religious and an economic item, or (3) (with certain items in part II) a religious, political

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<sup>1</sup>Doctoral dissertation now in process of preparation at the University of Maryland.

and economic item. Specifically, items 3, 9, 18, and 24 of part I and items 1, 2, 5, 7, 11, 12, 14, and 15 of part II of the Allport-Vernon Study of Values were scored. (The method of scoring is explained in Table 29, page 151.) The correlation between WA-3 and the Allport-Vernon Study of Values was  $.68 \pm .08$ .

The 12 papers having the greatest number of religious associations and the 12 papers having the greatest number of political-economic associations on WA-3 were item analysed. Ten triplets which correlated poorly with the internal criterion and which did not correlate with scores on the Allport-Vernon were eliminated. The remaining thirty triplets were retained for WA-4.

Word Association Form 4. Seventeen new triplets were added to make WA-4 which consisted of 47 R-PE triplets and 21 "neutral" triplets. It was administered with the Allport-Vernon Study of Values to an introductory psychology class ( $N = 68$ ). Correlation between WA-4 and the Allport-Vernon Study of Values scored as described previously was .69. The 12 papers having the greatest number of R associations and the 12 papers having the greatest number of PE associations were item analysed. Five triplets that did not correlate with this internal criterion were discarded.

The correlations between scores on WA Forms 3 and 4 and scores on religious and political-economic values of the Allport-Vernon Study of Values were high and consistent. Assuming that the Allport-Vernon has minimal validity, it appears

highly probable that the word association technique of attitude measurement has some degree of validity also. The prediction that attitudes can be measured by word associations can be assumed to have been verified. Therefore a number of subsequent procedures in the development of word association forms were dictated by the requirements of the learning experiment.

#### SEPARATION OF THE TRIPLET LIST FOR THE LEARNING EXPERIMENT AND DEVELOPMENT OF SUBSEQUENT WORD ASSOCIATION FORMS

Summary Statement. From this point on, development of word association triplets and the learning experiments (to be explained in Chapter III) ran concurrently. A preview of subsequent use of the WA triplets is provided below to clarify the manner in which the work described in the remainder of this chapter fits into the execution of the preliminary and final learning experiments.

After item analysis of WA 4, 41 triplets which correlated with the internal criterion were available for use. These were divided into two groups, one of which was used in the preliminary and final learning experiments, the second being used to select criterion subjects for the learning experiments. The groups of triplets used in the preliminary and final experiments were designated Paired Associates Lists 5 and 6 (PA-5, PA-6) respectively.<sup>1</sup> The WA triplets used to

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<sup>1</sup>The designation PA is used because each triplet was divided into two paired associates. The designations PA-5 and PA-6 are used to indicate the close experimental relationship between these lists and WA Forms 5 and 6.

select subjects for the preliminary and final learning experiments were designated WA Forms 5 and 6 respectively. WA-5 was used to select criterion groups to be tested in learning the paired associates of PA list 5; WA-6, to select criterion groups to be tested on the learning of the paired associates of PA List 6.

When the final learning experiment had been completed, all (16) of the triplets used in that experiment (PA-6) and those items from WA-6 which had correlated highly with the internal criterion were combined to make WA Form 7, the final word association form. The test-retest reliability of this form was computed twice; the prediction as to time to complete the test was also checked twice.

The uses of WA Forms 5 and 6 were dictated by the requirements of the preliminary and final learning experiments, as was the construction of WA-6. For purposes of continuity, a description of the division of WA-4 and of the subsequent development of WA-5 and 6--actually an integral part of both this chapter and next--is contained in this chapter. The development of the successive WA forms showing the division of WA-4 and the combination of PA-6 and WA-6 is presented in Table 5, page 63.

Criteria for Division of WA-4. Prior to the learning experiment, one necessary condition had to be established: Valid conclusions as to immediate learning cannot be drawn unless the effect of past learning can be parceled out or held constant. Specifically, it must be demonstrated that



the associations-to-be-learned are not implicit in the students' pre-experimental associative context as free associations. To guard against this factor the stimulus words used in WA-4 were presented to 165 students in an elementary psychology class for free associations. It was found that 19 of the stimulus words elicited 2 or more free associations which were the same as one or both of the response words in the triplets; 5 one such free association; 17 elicited none. The 17 stimulus words which had elicited no responses similar to those used in the triplets and the 5 which had elicited only one were combined to make a pool of 22 triplets. WA-4 was item analysed. By reference to the item analyses of WA Forms 2, 3, and 4, 16 triplets (PA-5) were selected which had consistently correlated well with the internal criterion. In this list of triplets, 14 of the stimulus words had not elicited the same free association as either triplet response word.

The discrimination power of the 16 triplets selected for the learning task was computed by summation of the frequency with which members of the criterion groups from the item analysis of WA-4 had associated the stimulus word with R and PE response words. These frequencies are presented below:

16 STIMULUS WORDS	---R-Responses made	12 R subjects - 153
		12 PE subjects - 39
	---PE-Responses made	12 R subjects - 53
		12 PE subjects - 138

Word Association Form 5. WA-5 consisted of the 19 triplets whose stimulus word had elicited 2 or more of the triplet response words in the free association check described in the previous section, the 6 "discards" from the pool of 22 triplets, and 4 new triplets, a total of 29 R-PE triplets. WA-5 was used to designate criterion groups for the preliminary learning experiment. Its use in this respect will be described in detail in the next chapter.

Word Association Form 6. WA-6 may be taken as an example of the integration of the word association attitude measurement technique with the learning experiments. It may be said here that although the results of the preliminary learning experiment were in the direction predicted, they were not sufficiently large to be significant. In an attempt to increase this difference, a group of subjects who had learned the most R paired associates and another group of subjects who had learned the most PE paired associates were used as criterion groups against which the triplets in WA-5 were item analysed. The 24 triplets which correlated most highly with the learning of R or PE paired associates were retained for WA-6. Five new triplets were added which were judged to be similar to items which had discriminated between R and PE learners.

WA Form 6 consisted of 31 R-PE triplets and 13 neutral triplets. It was used in conjunction with the Allport-Vernon Study of Values to select criterion attitude groups from 319 students in a number of elementary psychology

classes. All of these students were new (second term) psychology students who had not been exposed to any of the previous WA Forms.

Word Association Form 7. The 319 elementary psychology students to whom the WA-6 was administered were listed alphabetically by class. The papers of the first 15 subjects who had marked from 22 to 27 PE associations and of the first 15 subjects who had marked 22 to 27 R associations were item analysed. On the basis of this analysis, seven items were discarded. The results of this analysis, item by item, are presented in Table 2, page 48. The 16 triplets (PA-6) which had been used in the final learning experiment were combined with the 24 remaining after item analysis of WA-6 to make WA-7. A copy of WA-7 is presented in Table 1, pages 45 and 46.

WA-7 was administered to an elementary psychology class and to an intermediate psychology class for two purposes:

- (1) To check the prediction as to completion time.  
(See below.)
- (2) As the first test of a test-retest reliability check.

#### EXPERIMENTAL PREDICTIONS

Completion Time. Prediction: It has been predicted from theoretical considerations that subjects holding attitudes of very nearly equal strength will require longer to complete the word association task than will subjects who

hold either attitude much stronger than the other. An account of a test of this experimental prediction follows.

**Timing of Responses.** Subjects were instructed that papers would be given out face down and to keep them face down until the experiment was explained. Experimental instructions were given and the experimenter started all subjects simultaneously. Subjects were instructed to look at the blackboard immediately after having completed WA Form 7, and to record their times from the running time record being kept there.

**Selection of Criterion Groups for Comparison of Time Required to Complete WA Form 7.** WA Form 7 was scored in the usual manner, i.e., on the basis of the number of R associations. Arbitrary cutting scores of 27 and 13 were used to divide subjects from each class into two groups. A score of 27 or more indicates that the subject made more than twice as many R as PE associations. A score of 13 or less indicates that the subject made 27 or more PE associations, hence more than twice as many PE associations as R associations.

**Position Tendency.** In checking the times required to complete WA-7 it was noted that a few students of the elementary psychology class had reacted to a position tendency to a large degree by associating the stimulus word with the top response word. The papers of all students who had made more than two-thirds of their marks to the top response word were omitted from the check for time differences. This trend

was not taken into account in the computation for significance of time differences among students of the elementary psychology class.

Analysis of Response Times. The papers of the subjects whose scores met the criteria explained above (the high R and the high PE groups) were combined and designated "Strong Attitude Group". The papers of the remaining subjects were designated "Middle Group". Sixteen students (7 R, 9 PE) from the elementary psychology class were in the "Strong Attitude Group". Forty-one students were in the "Middle Group". In the intermediate psychology class there were 28 students, (10 R and 18 PE) in the "Strong Attitude Group" and 46 in the "Middle Group". In both cases the time difference between groups is significant at less than the 5% level. The results are summarized in detail in Tables 3 and 4. Thus the theoretical prediction was confirmed.

Reliability. The assumptions upon which this study is based are contingent upon the assertion that implicit word associations are relatively permanent. One obvious check upon the permanence of such associations is a reliability check of the word association method of attitude measurement. The reliability of WA-7 was therefore computed twice.

The WA Form 7 was readministered to an elementary psychology class four weeks after the initial administration. In the retest a somewhat different administration procedure was used, subjects being allowed to take as much time as they

TABLE 3. SECONDS REQUIRED TO COMPLETE WORD ASSOCIATION  
FORM 7 BY R AND PE SUBJECTS OF AN ELEMENTARY  
PSYCHOLOGY CLASS AS CONTRASTED WITH A MIDDLE  
GROUP IN SAME CLASS.

NOTE: The strong attitude group contains 16 subjects who made 27 or more either religious or political-economic associations to the stimulus word. The middle group contains the remainder of the class, 41 subjects.

Seconds	Group	
	Strong Attitude	Middle
240	-	1
230	-	2
220	-	2
210	1	5
200	1	6
190	3	3
180	-	5
170	4	3
160	2	4
150	2	5
140	2	1
130	1	1
120	-	1

Computations

$$\bar{X} = \sum fX/N; \quad = \sqrt{\sum fX^2/N - \left(\frac{\sum fX}{N}\right)^2}$$

$$\bar{X}_{R-PE} = 168.1$$

$$\bar{X}_{Middle} = 185.2$$

$$R-PE = 20.2$$

$$Middle = 28.9$$

$$CR = \bar{X}_{R-PE} - \bar{X}_{Middle} \bigg/ \sqrt{\frac{N_1 + N_2 (\sum X_1^2 + \sum X_2^2)}{N_1 N_2 [(N_1 - 1) + (N_2 - 1)]}}$$

$$T = 2.10$$

$$P = .05$$

TABLE 4. SECONDS REQUIRED TO COMPLETE WA FORM 7 BY R AND PS  
SUBJECTS OF AN ADVANCED PSYCHOLOGY CLASS AS CONTRASTED  
WITH A MIDDLE GROUP IN SAME CLASS

NOTE: The strong attitude group contains 28 subjects who made 27 or more either Religious or Political-Economic associations to the stimulus words. The Middle group contains the remainder of the class, 46 subjects.

Seconds	Group		Seconds	Group	
	Strong Attitude	Middle Group		Strong Attitude	Middle Group
330	-	1	225	1	-
325	-	-	220	2	-
320	-	-	215	-	4
315	-	-	210	2	2
310	-	-	205	2	5
305	-	-	200	2	4
300	-	1	195	1	1
295	-	2	190	1	2
290	-	1	185	1	1
285	-	-	180	1	3
280	-	-	175	2	3
275	-	-	170	5	1
270	-	1	165	1	2
265	-	-	160	1	3
260	2	-	155	2	1
255	-	3	150	-	-
250	-	-	145	1	-
245	-	-	140	-	1
240	-	-	135	1	-
235	-	2	130	-	-
230	-	2			

Summary: Computation of statistics was performed by the method given in Table 3.

Strong Attitude  
Group

$$\bar{X} = 185.6$$

Middle  
Group

$$\bar{X} = 210.4$$

$$T = 2.48$$

$$P = < .02 > .01$$

wished to complete the associations. The test-retest reliability was found to be .81. One week after the administration of WA-7 to an intermediate psychology class, it was re-administered. In this case the same administrative procedure was used for both test and retest. Test-retest reliability was found to be .87. Thus, the reliability of WA-7 compared favorably with the reliability of the general run of attitude scales. If the assumption can be made that the Allport-Vernon Study of Values has minimal validity, the correlations with the Allport-Vernon (.68, .69) would indicate a certain degree of validity for the triplet technique of attitude measurement.<sup>1</sup>

#### NOTES ON USE OF THE TRIPLET TECHNIQUE

Two possible sources of bias should be reckoned with and avoided in the construction of this type of attitude scale.

Need for "Neutral" Paired Associates. The tendency of some subjects to make an attitude shift somewhere in the list and start marking all associations of one kind or the other has already been noted. Placing neutral triplets

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<sup>1</sup>We have other scattered bits of evidence to indicate that the WA technique has minimal validity; we make no attempt to specify the degree. In Chapters III and IV we will refer to the use of WA triplets to specify criterion R and PE groups. We will mean that subjects in these groups are "religious" and "political-economic" subjects only as defined by the particular attitude measure or measures used to select them.



liberally through the list lessens this tendency a great deal. In the final form no more than two R-PE triplets are put in successive order.

Position Tendency. Throughout the word association forms, a consistent tendency to mark upward from the stimulus to the response word was noted. This trend was found significant at the 5% level of confidence, the upper response word being associated with the stimulus word about 10% of the time more often than the lower. To prevent this trend from invalidating the test, half of the religious response words were made the top response word, half the bottom response word. The order was randomized so that R and PE response words are in no consistent alternating order.

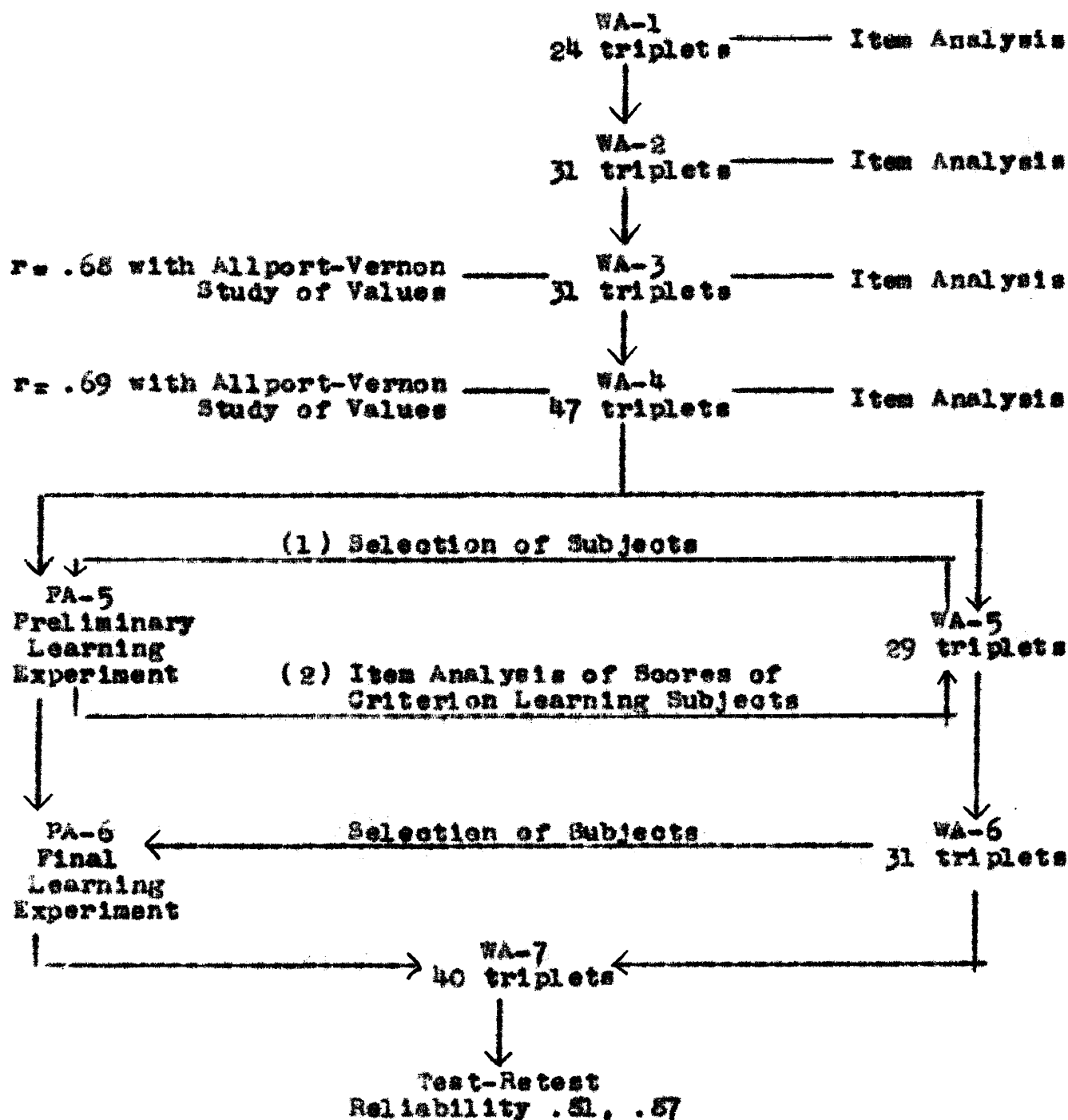
#### SUMMARY

The basic assumption of the theoretical analysis outlined in Chapter I and reviewed in the introduction to this chapter is that verbal habits have some substance in themselves, that they have a certain degree of permanence. We have delineated certain consequences that necessarily follow from this assumption. The assumption of the reality of implicit response potentials served as a basis for the development of word association triplets for use in the measurement of attitudes.

Triplet lists were developed by successive internal validations of WA Forms. Pending verification of the prediction that attitudes can be measured by word associations, the religious and the political and economic scales of the

Allport-Vernon Study of Values was used as a standard for the validation of the word association technique. This assumption was tentatively validated in terms of the correlations with the Allport-Vernon of .68 and .69. The word association triplets were then made to serve two functions: (1) One group was divided into paired associates which were used as learning material in the learning experiments to be described in the next chapter. (2) The other group was used to select criterion subjects for the learning experiment. The 40 triplets which had been found most effective in successive validations of WA Forms were combined as WA-7, the final form of the series. The reliability coefficients for WA-7 were .81 and .87 in two test-retest reliability checks. The prediction that subjects who hold two attitudes in approximately equal strength will require longer to complete the WA task than will subjects who hold either attitude more strongly than the other was twice tested and verified ( $p = <.04, >.02$ ). In summary, all assumptions made at the beginning of this chapter having been verified, we are now prepared to inquire into the nature of the relationship between attitudes and learning.

TABLE 5. DIAGRAM OF SEQUENTIAL DEVELOPMENT OF WORD ASSOCIATION TEST.



## CHAPTER III

### ATTITUDES AND LEARNING

#### INTRODUCTION

Statement of Problem. It was pointed out in Chapter I that if attitudes affect immediate learning, their influence may operate in either or both of two ways:

(1) A subject holding a strong positive attitude of a specified sort can learn experiences or verbal material in harmony with such an attitude better than experiences or verbal material which conflict with the existing attitude.

(2) A subject having a strong positive attitude of a specified sort will tend to choose to learn experiences and verbal material in harmony with that attitude rather than experiences and verbal material opposed to it.

The testing of the first of the above hypotheses is explained in this chapter; the testing of the second in Chapter IV. The first hypothesis has been put to test several times with varying and frequently not very definite results. A summary of several such experiments is given below.

Review of Pertinent Experimental Evidence. Sharp (44) has used a paired associates technique similar to that to be described in this chapter to test learning and retention of pleasant and unpleasant associations among psychoneurotic and mildly psychotic subjects. More trials were required to learn neutral paired associates than either pleasant or unpleasant paired associates. Pleasant material was retained

much better than neutral and unpleasant material, the differences increasing in magnitude with time.

Levine and Murphy (26) selected two groups of college students, five in each group. One group was strongly pro-communist; the other strongly anti-communist. Both groups learned a pro-communist and an anti-communist prose passage. Retention was scored in terms of the number of "ideas" correctly recalled. The results were that each group retained better the ideas in harmony with its own pre-experimental attitude. The difference is statistically significant and increases with time.

Watson and Hartmann (53) claim to have shown differences between atheists and theology students in retention of arguments in favor of and opposed to the existence of a personal God. Their statistical treatment of data is questionable and, to this writer at any rate, their findings are neither clear cut nor conclusive.

Of the considerable number of experiments in this field, Edwards' (15) investigation of learning of political subject matter deserves special attention. By attitude measurement, Edwards selected criterion groups of pro-New Deal and anti-New Deal subjects. Subjects were instructed that they would be read a prose passage following which they would be tested for their memory for its contents. The passage consisted of 23 pro-New Deal and 23 anti-New Deal statements. After the passage was read, subjects were given a recognition test with instructions to check any statement they had heard.

Edwards found that both groups of subjects tended to check more statements in harmony with their existing attitudes. The difference is highly significant.

McGeoch (28, pp. 370-371) has evaluated the results of a number of experiments similar in certain respects to those cited above. McGeoch says;

A majority of the experiments which have compared the retention value of lists of words rated for affective tone have found retention to decrease in the order of P-U-I. However, the differences have often been small; there have been exceptions to the direction stated; and, the influence of differences in degree of learning cannot always be estimated . . . . Many of the results in this field have been interpreted in terms of the Freudian theory of repression of the unpleasant, although most of the differences have been too small to support any hypothesis very strongly.

Summary of Experimental Results. If the influence of affective tone and/or attitudes upon immediate learning is to be considered, none of the experiments cited above lends itself to unequivocal interpretation for several reasons:

(1) The experiments were not designed to provide a measure of the amount of material in the particular experimental task which had been learned prior to the experiment. For example, in the experiment by Levine and Murphy, part of the learning reported to have taken place during the experiment may have consisted only of repetition by the subjects of what they "knew" about Russia prior to the experiment. It is just possible that Edwards' recognition method of measuring learning, in the particular type of experiment employed, measured existing attitudes more accurately than

it did learning.

(2) Sharp's findings in his studies of psychoneurotic and slightly psychotic subjects may or may not be representative of the behavior of normal subjects.

(3) Scoring of ideas is difficult. Arbitrary definitions have to be formulated somehow; the validity with which the number of ideas in any prose passage can be counted may be far from perfect.

#### Requirements for a Valid Test of Immediate Learning.

It becomes immediately apparent that a number of serious problems are involved in the development of a valid test of the effect of attitudes upon immediate learning. To test the first hypothesis cited at the beginning of this chapter, these objectives must be approximated if possible: a learning experiment must be devised which (1) will not be suspect as an attitude test, and (2) in which it can be shown that learning occurs during the experiment itself, and (3) it must lend itself to objective and precise scoring.

After item analysis of WA-4 (see Chapter II), 41 triplets that correlated with the test as a whole were available. The triplet technique had consistently correlated highly with the religious and the political and economic scales of the Allport-Vernon Study of Values. The assumption could therefore reasonably be made that the triplet words were representative of religious and political-economic attitudes and that they differentiated between R and PE groups. Certain of the WA-4 triplets were therefore selected as the

learning material. Each triplet was made into two paired associates by pairing each stimulus word with its R and PE response words. For example, STANDARDS <sup>gold</sup> <sub>conduct</sub> became STANDARDS-gold and STANDARDS-conduct.

Having decided that paired associates from the triplets would serve as learning material, we decided to use a recall rather than a recognition technique as Edwards had done. The next step was taken to make sure that the learning measured took place during the experiment itself.

By free associations, the free responses elicited by any specified set of stimulus words can be measured; therefore, the 41 stimulus words of WA-4 were presented to a class of 165 students and free associations were elicited. This step has been explained already in Chapter II. It made possible the selection of paired associates whose response words were not the subjects' "natural responses".

The difficulties of the experiments cited above having been obviated--in theory at least--preparations were made for the preliminary and final learning experiments.

Digest: Experimental Procedure. At this point a preview of the remainder of this chapter is provided. The experimental prediction to be tested is that subjects can learn words in harmony with existing attitudes faster than words which are neutral or opposed to existing attitudes. The word association triplets (WA-4) described in the last chapter are divided into two sets. One set of triplets (WA-5 for the preliminary learning experiment, and WA-6 for



the final learning experiment) is used to designate criterion attitude groups. The other set (PA-5 in the preliminary learning experiment, and PA-6 in the final learning experiment) is used as the paired associates to be learned by criterion groups. The learning of paired associates in harmony with and opposed or neutral to the attitudes of criterion groups is then measured.

The account which follows is divided into four phases:

- (1) Description of the preliminary learning experiment.
- (2) Changes in technique and administration prior to the final learning experiment in the light of results from the preliminary learning experiment.
- (3) Administration of the final learning experiment.
- (4) Evaluation of results.

#### PRELIMINARY LEARNING EXPERIMENT

Objectives. Before administration of the final learning experiment, several circumstances pointed to the advisability of a preliminary tryout. Prior experiments, such as those cited in the introduction, had indicated that differences between attitude groups in ability to learn verbal material in keeping with or opposed to existing attitudes might not be large. It was felt, therefore, that a very sensitive technique might be needed. It was also felt that at least one preliminary tryout would be needed to develop effective techniques of administration and effective criteria of learning.

It was explained in Chapter II and in the introduction

to this chapter that triplets were selected as the source of material for the learning experiments on the basis of:

(1) Their ability to discriminate between R and PE attitude groups.

(2) The fact that the triplet stimulus words did not elicit the same free associations as the response words used in the triplets.

The learning material having been selected, three inter-related questions arose:

(1) How many paired associates should be used?

(2) How many trials should be used?

(3) What criterion or criteria of learning should be employed?

As a criterion of learning, it was decided to use the number of paired associates learned per trial from a list of paired associates. It was decided to use three trials and to select that number of paired associates which would yield maximum sensitivity. Thus, under optimal conditions, subjects would learn less than half of the paired associates the first trial; approximately half during the median trial; and more than half of the paired associates during the last trial. The positive deviations from the mean on the last trial or trials should be roughly equal to the negative deviations from the mean on the first, the total score of the "average" subject being about 50% of the total possible score. Theoretically, this method of scoring would maximize the probability that a true difference could be demonstrated if one existed.

For the sake of brevity of administration, it was tentatively decided to use three trials. The problem then became one of determining how many paired associates to use. As a first step, 14 paired associates were administered to 5 volunteers from an elementary psychology class by a procedure similar to that to be described in more detail later. Upon scoring responses, it was found that all 5 subjects had learned 12 or more of the response words by the third trial. It was therefore decided to use 16 paired associates in the preliminary learning experiment.

In addition to these more technical considerations, further purposes were:

- (1) To check the experimental prediction.
- (2) To ascertain whether the R and PE paired associates were equally difficult to learn.
- (3) To discover possible difficulties of administration and to eliminate them.

Selection and Arrangement of Paired Associates for the Learning Experiment. The 16 triplets (PA-5), which had been selected from WA-4 as described previously, were divided into 2 sets of paired associates, the stimulus words being paired once with the R response words and once with the PE response words. Thus two lists, one list of 16 R paired associates and a second list of 16 PE paired associates were formed. Eight paired associates were selected from each of these lists and combined. The eight paired associates remaining in each list were combined. In this manner two new lists

were formed, each of which now contained 8 religious paired associates and 8 political-economic paired associates.

The paired associates were systematically arranged in an order that would minimize the effect of position in the list upon learning. The decision to use three learning trials necessitated four presentations of the list to each subject. In the first presentation, the response words were given immediately following the stimulus word to give subjects an opportunity to learn them. The paired associates were arranged so that in each of the 4 presentations, each of the paired associates occurred once among the first 4 paired associates, once among the second 4, once among the third 4, and once among the last 4.

Administration of Paired Associates. The preliminary learning experiment was conducted in two classes, one set of 16 paired associates to each class. WA-5 was administered first, then the learning test was given. Each subject was given a 5x8 card, instructions, and an answer sheet. Instructions were read to the subjects as follows:

This is an experiment in learning. The objective is to learn a given response word to each of 16 stimulus words.

I will read 16 pairs of words. The first word of each pair is the stimulus word. The second word is the response word. You are to learn to associate each response word with its stimulus word.

First, I will read each stimulus word and the response word immediately after it. The first reading is for learning purposes only.

After the first reading, I will read the stimulus words. After each stimulus word is read,

you will be given 5 seconds to recall the correct response word and write it down in the proper space on the form provided. After 5 seconds, I will say, "STOP". After you hear the word "STOP", I will give you the correct response word. Remember it for the next reading.

The task will be repeated four times.

You have been given a 5x8 card. Hold this card in your free hand as you write. Slide it down the page to cover the response words after you have written them. After I say "STOP", cover the response word if you have written one.

TABLE 6. PAIRED ASSOCIATES USED IN PRELIMINARY LEARNING EXPERIMENT.

Class I		Class II	
1. avoid	solitude	1. avoid	hoarding
2. be	aggressive	2. be	righteous
3. benefactor	clergyman	3. benefactor	inventor
4. deceive	sinful	4. deceive	clever
5. high	ideals	5. high	earnings
6. insult	forgive	6. insult	avenge
7. lie	immoral	7. lie	expedient
8. loathsome	poverty	8. loathsome	devil
9. maker of	millions	9. maker of	universe
10. miracles of	loaves	10. miracles of	finance
11. prepare for	prosperity	11. prepare for	judgment
12. protect	savings	12. protect	worship
13. respect	efficiency	13. respect	humility
14. seek	salvation	14. seek	preeminence
15. standards	gold	15. standards	conduct
16. unity	trinity	16. unity	monopoly

The first list in Table 6 was read to Class I, the second list to Class II. The word order was changed in each reading as explained previously.

The elementary psychology classes to whom the preliminary learning experiment was administered consisted of 27 and 37 students respectively. From the total of 64 test papers, 8 were discarded. Five of 8 subjects did not take or complete

WA Form 5; 3 subjects learned so few words that it appeared that they had not made an honest effort.

Designation of Criterion Groups by WA-5. WA Form 5, which consisted of 29 R-PE triplets and 12 N<sup>1</sup> triplets, was scored as usual in terms of the number of religious responses. On the basis of these scores, subjects were divided as follows:

- (1) Those who marked 19 or more R associations were designated as the R Group (N \* 8).
- (2) Those who marked 19 or more PE associations were designated PE Group-1 (N \* 12).
- (3) Those who marked 20 or more PE associations were designated PE Group-2 (N \* 8).

Scoring of Responses. Responses were scored in two ways:

Method (A) Correct responses were scored<sup>2</sup>.

Method (B) A response was scored if it could be classified as either R or PE, regardless of whether it was correct or not.

The scores of each subject for the three trials were summated. The total R and PE responses of each of the three groups (R, PE-1, PE-2) were then computed by scoring methods (A) and (B). These totals are presented in Table 7 on the next page.

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<sup>1</sup>The letter N will be substituted for the adjective neutral in the remainder of this study.

<sup>2</sup>The assigned response word will be called the correct response. The experimenter realizes that any response the subject makes is correct for him.

TABLE 7. FREQUENCIES OF RELIGIOUS AND POLITICAL-ECONOMIC  
RESPONSES BY RELIGIOUS AND POLITICAL-ECONOMIC CRITERION  
GROUPS: PRELIMINARY LEARNING EXPERIMENT.

Summary of Frequencies

Group	Scoring Method (A)		Scoring Method (B)	
	Religious Responses	Polit-Econ Responses	Religious Responses	Polit-Econ Responses
R (N = 8)	116	75	139	86
PE-1 (N = 12)	148	112	174	144
PE-2 (N = 8)	93	75	110	101

The significance of differences shown above is evaluated below by use of the statistic  $\chi^2$ .

Computation of Chi Squares

Group	Scoring Method (A)		Scoring Method (B)	
	Religious Responses	Polit-Econ Responses	Religious Responses	Polit-Econ Responses
R (N = 8)	116	75	139	86
PE-1 (N = 12)	148	112	174	144

$$\chi^2 = .654$$

$$p = \langle .50 \rangle .30$$

$$\chi^2 = 2.69$$

$$p = [.10]$$

Computation of Chi Squares

Group	Scoring Method (A)		Scoring Method (B)	
	Religious Responses	Polit-Econ Responses	Religious Responses	Polit-Econ Responses
R (N = 8)	116	75	139	86
PE-2 (N = 8)	93	75	110	101

$$\chi^2 = 1.07$$

$$p = [.30]$$

$$\chi^2 = 4.13$$

$$p = \langle .05$$

Evaluation of Preliminary Learning Experiment in the Light of Experimental Objectives. Results of the preliminary learning experiment were evaluated in light of the previously stated objectives. The following conclusions were reached.

Combination of Number of Paired Associates and Trials. Sixteen paired associates and three trials appeared to yield satisfactory results. However, this judgment was considered very tentative, as 10 to 15% of the subjects appeared to have been motivated very moderately if at all.

Criterion of Learning. The number of words correct per trial appeared to be satisfactory.

Test of Experimental Hypothesis. One objective of the preliminary learning experiment was to test and evaluate the experimental prediction in the light of experimental evidence.

(1) By scoring method (A) (See Table 7, page 75) no differences approach statistical significance although they are in the direction predicted. The difference between the R group and PE-2 group yields a P value of approximately 30%.

(2) By scoring method (B), the difference between the R group and PE group 1 is in the predicted direction and reaches the 10% fiducial limits. The difference between the R group and PE-2 group is barely under the 5% level of significance. Scoring method (B) is not a conventional method of scoring learning. However, the results of scoring responses by this method have certain theoretical implications which will be discussed at the end of this chapter and in Chapter V.



In summary, the results of the preliminary learning experiment were far from definitive. Differences between R and PE groups were in the predicted direction; however, the 16 triplets which had consistently discriminated clearly between R and PE groups in previous item analyses, had generated small, and, with one exception, insignificant differences when used as paired associates in the learning experiment. One factor was particularly disturbing: two individuals from the PE attitude group had learned many more R responses than PE responses.<sup>1</sup> This circumstance occurred again in the final learning experiment. It will be discussed in Chapter V.

Improvement of Techniques of Administration and of Selection of Subjects for the Final Learning Experiment. Consideration was given to methods and techniques by which the significance of the small differences found between criterion groups in the preliminary learning experiment could be tested critically in the final learning experiment.

Several steps were taken:

(1) Because of the small sample ( $N = 64$ ) used in the preliminary learning experiment, the separation between criterion groups was not as great as was desirable; therefore,

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<sup>1</sup> The contention might be made that the selection of a second PE group, PE group 2 (on the basis of an attitude difference of one unit) was not justified. The writer would not seriously argue with this point of view. However, for our purposes, raising the cutting score from 19 to 20 allowed us to eliminate one of the PE subjects whose learning and attitude scores showed marked reversals.

it was decided to use a larger sample for the final learning experiment to effect an increased separation.

(2) The Allport-Vernon Study of Values was used in conjunction with the word association test to select criterion groups.

(3) The paired associates of WA-5 were item analysed using R and PE learners as criterion groups. The WA-5 forms of the 12 subjects who learned the greatest ratio of R/PE words, and the WA-5 papers of the 12 subjects who learned the greatest ratio of PE/R words were item analysed. Five triplets that correlated either negatively or not at all with ability to learn R and PE words were discarded. Seven triplets that were apparently similar in context to those triplets in WA-5 and which discriminated between R and PE learners were added.

(4) The discrimination power and the relative difficulty of each of the 32 paired associates used in the preliminary learning experiment was studied by the following procedure: The 8 subjects who learned the greatest ratio of R/PE responses, and the 8 subjects who learned the greatest ratio of PE/R responses were selected from Class I. Criterion groups of learners were selected in the same manner from Class II, thus all of the 32 paired associates were represented.

A record was made of the number of times each response word was correctly made on each trial by members of the criterion learning groups. The results of this analysis are summarized in Table 8.

**TABLE 8. FREQUENCIES OF CORRECT RESPONSES OF CRITERION  
LEARNING GROUP (8 R AND 8 PE) FROM TWO ELEMENTARY  
PSYCHOLOGY CLASSES.**

**NOTE:** Numbers listed in columns R and PE represent total times that the word opposite that number appeared as a response in the preliminary learning experiment.

Item No.	Stimulus Word	Response Words	Frequencies of correct responses by criterion groups	
			R	PE
1	MAKER OF	universe	16	10
		millions	6	13
2	RESPECT	humility	6	5
		efficiency	1	3
3	BENEFACTOR	clergyman	8	9
		inventor	8	12
4	PREPARE FOR	prosperity	4	10
		judgment	14	14
5	LIE	expedient	0	6
		immoral	5	8
6	HIGH	earnings	1	8
		ideals	8	8
7	LOATHSOME	poverty	4	9
		devil	21	17
8	INSULT	avenge	10	14
		forgive	7	9
9	PROTECT	worship	9	7
		savings	3	7
10	DECEIVE	clever	10	9
		sinful	9	5
11	BE	righteous	17	14
		aggressive	8	14
12	AVOID	hoarding	7	8
		solitude	5	0
13	SEEK	preeminence	8	9
		salvation	4	3
14	UNITY	trinity	10	10
		monopoly	8	14
15	MIRACLES OF	finance	13	14
		loaves	10	14
16	STANDARDS	gold	2	12
		conduct	17	5



An attempt was made to make the association less easy by using the word "satan" instead.

(5) The preliminary learning experiment had revealed certain weaknesses of group administration. It appeared fairly obvious that at least 10 to 15% of the subjects had not tried very hard to learn the paired associates, their learning curves showing a decline. A few of these subjects made no responses on the last trial. A further objection, subjects could write the correct response word after it was given if they were so inclined. A few responses were illegible since subjects were under pressure to write fast. Worst of all, no effective method for timing responses could be used in group administration of the learning experiment. It was therefore decided that individual administration rather than group administration would be used in the final learning experiment.

#### FINAL LEARNING EXPERIMENT

Experimental Prediction. The experimental prediction that subjects can learn paired associates in harmony with existing attitudes faster than paired associates which are neutral or opposed to existing attitudes was made as in the preliminary learning experiment. A further purpose of the final learning experiment was to allow a more accurate measure of the phenomenon that mediated differences between criterion attitude groups which had been found by scoring method (B). It will be recalled that subjects tended to

respond more often with incorrect response words in keeping with their own attitudes than with incorrect responses (which formed paired associates) opposed to their attitudes. Therefore in this experiment all responses were recorded.

It was felt also that in this experiment the latency of responses might be a more sensitive indicator of learning than the number of words correct, an assumption supported by the findings of Postman, Egan, and Davis (38). Therefore response times were recorded.

Selection of Subjects. Results of the preliminary learning experiment indicated that differences in the learning of paired associates in harmony with, and opposed or neutral to existing attitudes was not large. Therefore it appeared probable that extreme R and PE deviates would have to be selected for the final learning experiment if significant differences between groups were to be demonstrated. In consideration of these facts, the R and PE attitudes of a large group of subjects were measured so that R and PE subjects could be selected from extreme ends of the continuum.

WA Form 6 and the Allport-Vernon Study of Values were administered to 319 students in four elementary psychology classes. Both measures were administered in the first week of the new term. The experimental subjects had seen none of the previous WA forms. WA-6 was scored as described previously; R scores were arbitrarily designated as high. The Allport-Vernon Study of Values was scored as described in Chapter II. By reference to scores on both these measures, R and PE

criterion groups were selected.

The subjects designated as religious satisfied both of the following criteria: (1) a score of 21 or more on WA-6 and (2) a score of 25 or more on the Allport-Vernon Study of Values. A score of 21 or more on the WA-6 indicated that the subject had paired the stimulus word with the R response word more than twice as often as with the PE response word. There were 22 subjects in the R criterion group. The PE criterion group consisted of 21 subjects having scores of 10 or less on WA-6 and who in addition had scores of 10 or less on the Allport-Vernon Study of Values. A score of 10 or less on WA-6 indicated that the subject had associated the stimulus word with the PE response word more than twice as often as with the R response word. Eight subjects were chosen at random from each of these criterion groups for the final learning experiment. The elementary psychology classes from which subjects had been selected consisted roughly of 75% males and 25% females. Therefore 6 of the subjects selected from each criterion group were males and 2 females.

Apparatus. The apparatus consisted of a 36x12-inch board painted dull black and fixed to a base of the same size. Approximately in the center of the board was a 4x7-inch aperture through which the paired associates could be seen. A plywood panel was attached to the back of the apparatus 1/4 of an inch behind the aperture. A 5x8 card was then glued to the backing plywood panel so that a white background could be seen through the aperture at all times.

Between the backing panel and the 36x12-inch board was a 1/4-inch slot into which cards could be inserted by the experimenter.

Cards for Presentation of Paired Associates. The paired associates were presented on 5x8-inch white unlined cards. The words were typed in capital letters equidistant from the top and bottom of the card. The stimulus word was typed  $1\frac{1}{4}$  inches from the left margin of the card, and a space of  $2\frac{1}{4}$  inches was left between the stimulus and response word. Each card was identified by appropriate markings on the back to enable the experimenter to score responses without reference to the front of the card. An arrow was marked on the back of each card on the bottom edge. When this arrow was lined up with a second arrow on the apparatus ( $\downarrow$ ),  $\uparrow$  the subject could see the stimulus word in the middle of the aperture, but he could not see the response word.

Eight decks of 16 cards were used. On four of the decks, the stimulus word was paired with the appropriate religious response word from the triplets; on the other four decks, the stimulus word was paired with the PE response word from the triplets.

Method of Presentation of Paired Associates. In the preliminary learning experiment each subject had been given a series of three trials in which to learn 16 paired associates, 8 represented religious values, 8 political-economic values. This procedure was modified in the final learning experiment as follows: each subject was given two series of 3 trials;



on each trial 16 paired associates were presented. In one series of trials the stimulus words were paired with the religious response words; in the second series of trials with the political-economic response words. Within both series of trials the stimulus words were presented to subjects four times.

In the first of the four trials the subjects were shown both words of the paired associates with instructions to learn them for the next time. This trial was followed by three learning trials. (The procedure used in the learning trials is explained in detail under the heading Experimental Procedure.)

An order for presenting paired associates was devised so that no systematic order effect could operate to make any one of the paired associates easier to learn than the others. Two problems of order had to be reckoned with. (1) The order of presentation of paired associates for each trial had to be randomized. (2) An arrangement of trials had to be devised so that the sequence of trials would be systematically varied in a similar manner for both groups.

Within-List Order. The 16 stimulus words of the 32 paired associates were arranged in eight orders by the following procedure: each stimulus word was numbered. The numbers were then arranged in an 8 by 16 table in an order such that each number appeared once in either the first or second row of numbers, once in either the third or fourth row, once in either the fifth or sixth row, and so on through the list.

Furthermore no two stimulus words followed each other in the same order upon any two successive trials. This method utilizes the Latin square principle of randomization.

**Order Between Trials.** The eight orders of paired associates were numbered a through h. The sixteen subjects selected for the learning experiment were then divided into four blocks, four subjects to each block. The blocks were designated A, B, C, and D. Each contained two R subjects and two PE subjects. The between-trial order was arranged as follows:

(1) Block A (first group of four subjects). All subjects in this block were presented the R paired associates in trial order a, b, c, d. The same subjects were presented the PE paired associates in trial order e, f, g, h.

(2) Block B (second group of four subjects). All subjects in this block were presented the R paired associates in trial order d, c, b, a. Subjects were presented PE paired associates in trial order h, g, f, e.

(3) Block C (third group of four subjects). All subjects in this block were presented the R paired associates in trial order e, f, g, h. Subjects were presented PE paired associates in trial order a, b, c, d.

(4) Block D (fourth group of four subjects). All subjects in this block were presented the R paired associates in trial order h, g, f, e. Subjects were presented PE paired associates in trial order d, c, b, a.

The within trial and between trial orders described above assured randomization of the paired associates and at the same time prevented any systematic order effect from favoring either R or PE subjects.

Practice Effect. To assure that no constant practice effect favored either R or PE subjects in the learning of R and PE contexts, one of the R subjects and one of the PE subjects in each block was presented the R paired associates first and the PE paired associates second. The other two subjects in each block were presented the PE paired associates first and the R paired associates second.

Experimental Procedure. The eight decks of cards on which the paired associates were presented were checked to make sure that they were in the prearranged order before each subject was tested. The subject sat at a table in a small booth facing the learning apparatus. Before instructions were given, a metronome was started. The metronome was set at 69 beats a minute throughout the experiment. The subject was then instructed as follows:

This is a test of your ability to learn paired associates. You will be given two similar learning tasks. I will describe the first task and tell you what you are to do. First, you will be shown 16 paired associates, like this: (At this point the subject was shown a demonstration card similar to those used in the experiment. The paired associate, HORSE-SADDLE, was printed on this card). The word "horse" is the stimulus word, the word "saddle" is the response word. Notice that when I place the card in this position (Experimenter inserts card half-way into slot with arrows aligned) you can see only the stimulus word. With the card in this position (Experimenter inserts card all the way into slot) you can see both the stimulus and the response words.

Your job will be to learn to pair the stimulus and response words shown on each card. The first time I will show you the stimulus and response words like this: (Here the experimenter inserts the demonstration card into the slot, allowing the subject to see the stimulus word for two beats, then both stimulus and response words for four beats). I will first show you the 16 cards in this way so that you can learn the correct response word. This trial is for learning purposes only. After this trial, three more trials will follow in which the stimulus word alone will be presented. In each trial you are to give the response word which has been shown you as soon as possible after you have seen the stimulus word. For instance if you see the word HORSE, you say SADDLE as quickly as you can.

What happens next depends upon whether or not you can give the correct response word. One, if you give the correct response word within the six seconds that will be allowed you, I will say "Correct" and we will go on to the next card. Two, if you cannot give the correct response word, I will show you the response word again so you can remember it for the next trial. Three, if you give a wrong response word, I will show the correct response word to you.

#### Questions?

I will show you the sixteen stimulus words three times. Each time they will be shown in a different order. Try hard but don't be discouraged if you can't remember all the response words; there are more than you could be expected to learn in one trial.

When the second set of paired associates were shown (the paired associates in which stimulus words were paired with response words from the second context) subjects were instructed as follows:

This task is similar to the first one except that this time the stimulus words are paired with a different set of response words. As before, there will be one trial in which you will be shown both stimulus and response words to give you a chance to learn them. Then there will be three trials in which the stimulus words alone will be

presented. As before, when you see the stimulus word, give the response word of THIS series if you can.

Presentation of Cards. The cards were presented to subjects as explained in the instructions. The purpose of the presentation of the first deck of cards of each context was to allow the subject to learn the appropriate response word. In trial 1, the stimulus word was shown for two beats of the metronome, then both stimulus and response words for four beats. The card was then withdrawn and after four more beats the stimulus word of the next card was shown to the subject and so on through the deck.

Upon presentation of the second deck of R and PE cards and throughout the presentation of the third and fourth decks, the responses were recorded on scoring sheets which had been prepared prior to the experiment. The appropriate response words for the sixteen stimulus words of the last three trials of both the R and the PE contexts were arranged on the score sheets in the same order as they were arranged in the decks of cards.

The experimenter presented each card to the subject so that the stimulus word would be visible just as the metronome clicked. The experimenter then counted the metronome beats subvocally while waiting for the subject to respond. It has been noted in the instructions that the subject could respond in any one of three ways:

- (1) With the appropriate response
- (2) With an incorrect response
- (3) Failure to respond.

Method of Scoring Responses. (1) If the appropriate response was given, the experimenter said "correct" and recorded the number of clicks between the presentation of the stimulus word and the emission of the first syllable of the response word. The experimenter made each stimulus word visible to the subject on the beat of the metronome. If the response word occurred before the next beat of the metronome, the response time was scored as zero. If the response word occurred between the first and second beats of the metronome (after the beat on which the stimulus word was presented) the response time was scored as one. All responses were timed to the prior beat of the metronome. Four beats after the correct response was given, the next stimulus word was presented.

(2) If an incorrect response was given, the experimenter waited two beats then showed the subject both the stimulus and response words. The incorrect response was recorded and timed. If during the two beat interval, a second (correct) response occurred, it was recorded and timed. If the second response was incorrect, the experimenter showed the subject both stimulus and response words for four seconds and recorded the second response also. The card was then withdrawn and four seconds later the next stimulus word was presented.

(3) If the subject failed to respond in six seconds, the experimenter showed the subject both the stimulus and the response word for four seconds and marked an X beside

the same response word on the scoring sheet. A scoring sheet which contains the responses of subject R-4, learning R paired associates, is presented in Table 10, page 92.

### EVALUATION OF RESULTS

Review of Experimental Predictions. It has been predicted that subjects will learn paired associates in harmony with existing attitudes faster than paired associates conflicting with existing attitudes. No specific prediction was made in regard to the concept VERBAL RESERVE, which had not been fully developed at this time. However, all responses were recorded and timed in the expectation that (1) the tendency to substitute incorrect<sup>1</sup> responses from the opposite attitudinal context would occur and that (2) subjects would respond faster when learning words symbolic of their own attitudes.

Compilation of Results. Each subject's responses are summated for each trial in terms of (1) words correct, (2) time of response (whether the appropriate response was given or not), and (3) the number of responses. These data are presented in Table 11, pages 93-96. (By cross reference to Table 10, page 92, in which the responses of subject on the R paired associates are presented, the reader will note that the summations of its columns are presented in Table 11.)

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<sup>1</sup>The word incorrect is used here to denote any response other than the response assigned in the particular series the subject is learning. An "incorrect response" in this case might have been (1) an assigned response from the previous context, or (2) any other response.

TABLE 10. SCORE SHEET FOR LEARNING TEST.

Subject No. R-4

Block-B

(R) PE Series of Paired Associates Presented (1st, 2nd

## TRIALS - R Paired Associates

Wd. No.	1	2	3
1	Charity X	Judgment /	Clergyman /
2	Commandments /	Conduct X	Satan 0
3	Righteous 3	Salvation 0	Conduct X
4	Immoral 1	Loaves 1	Universe 1
5	Conduct X <sup>2 righteous</sup>	Ideals /	Loaves /
6	Universe 0	Trinity /	Worship X <sup>4 truth</sup>
7	Loaves /	Universe /	Righteous 3
8	Satan /	Sinful X	Judgment 2
9	Ideals X <sup>2 standards</sup>	Immoral 4	Salvation /
10	Sinful X	Commandments 0	Charity <sup>2 gift</sup> 4 ✓
11	Humility X	Charity X	Sinful <sup>2 deceive</sup> 4 ✓
12	Clergyman 2	Satan 2	Ideals 1
13	Salvation 1	Worship 2	Humility 3
14	Trinity 1	Clergyman 1	Commandments 1
15	Judgment 2	Humility X	Trinity 1
16	Worship X <sup>3 morals</sup>	Righteous X <sup>1 humble</sup>	Immoral X
Words Correct	10	11	13
Total Responses	13	12	16
Total Time	38	39	35

NOTE: Words in columns are correct responses. Numbers in columns specify response times in 60/69 sec.; X in columns denotes failure to respond; responses written in column are incorrect responses. Note in column 3, rows 10 and 11, subject responded twice, the second response being correct in both instances. Both responses are recorded and scored.



TABLE 11. SCORES OF CRITERION GROUPS ON FINAL LEARNING  
EXPERIMENT.

NOTE: Subjects are divided into Blocks A, B, C, and D, each block containing two R and two PE subjects. Each block is presented as a separate section of the table and identified by letter in Column I. Subjects are numbered R-1 through R-8, and PE-1 through PE-8. An asterisk placed before the subject's number in Column I (e.g., \*R-1) indicates that the context of the first set of paired associates presented was in harmony with the subject's attitude. T1, T2, etc., indicates the trial number.

Block A	Scoring Method	Paired Associates							
		Religious				Political Economic			
		T1	T2	T3	Tot	T1	T2	T3	Tot
R-1	Words Correct	9	10	12	31	4	6	10	20
	Time	42	36	31	109	61	63	44	168
	Total Words	13	15	15	43	10	10	13	33
PE-1	Words Correct	7	10	13	30	8	11	11	30
	Time	60	56	38	154	49	39	34	122
	Total Words	10	11	15	36	11	13	15	39
*R-2	Words Correct	7	8	13	28	5	11	15	31
	Time	66	60	34	160	81	51	33	165
	Total Words	11	10	15	36	5	12	15	32
*PE-2	Words Correct	8	8	9	25	9	10	11	30
	Time	63	52	53	168	50	49	42	141
	Total Words	9	11	11	31	13	12	14	39

TABLE 11. SCORES OF CRITERION GROUPS ON FINAL LEARNING  
EXPERIMENT (continued).

Block B	Scoring Method	Paired Associates							
		Religious				Political Economic			
		T1	T2	T3	Tot	T1	T2	T3	Tot
R-3	Words Correct	8	11	12	31	8	9	10	27
	Time	52	39	33	124	62	47	37	146
	Total Words	11	13	14	38	11	13	13	37
PE-3	Words Correct	6	5	9	20	8	8	14	30
	Time	63	67	58	188	66	59	37	162
	Total Words	8	8	10	26	12	12	16	40
*R-4	Words Correct	10	11	13	34	7	10	10	27
	Time	38	39	35	112	56	48	45	149
	Total Words	13	12	16	41	11	13	12	36
*PE-4	Words Correct	10	11	13	34	6	4	10	20
	Time	52	51	47	150	73	74	54	201
	Total Words	11	12	13	36	7	5	10	22

TABLE 11. SCORES OF CRITERION GROUPS ON FINAL LEARNING  
EXPERIMENT (continued).

Block C	Scoring Method	Paired Associates							
		Religious				Political Economic			
		T1	T2	T3	Tot	T1	T2	T3	Tot
*R-5	Words Correct	9	12	12	33	11	13	15	39
	Time	64	43	30	137	53	43	45	141
	Total Words	10	13	15	38	13	13	15	41
*PE-5	Words Correct	9	12	12	33	7	11	10	28
	Time	52	49	36	137	48	45	43	136
	Total Words	12	15	15	42	11	14	14	39
R-6	Words Correct	13	14	16	43	11	15	15	41
	Time	31	22	19	72	37	25	21	83
	Total Words	14	17	16	47	13	15	16	44
PE-6	Words Correct	9	9	12	30	14	14	13	41
	Time	49	48	36	133	38	35	35	108
	Total Words	14	12	17	43	14	15	15	44

TABLE 11. SCORES OF CRITERION GROUPS ON FINAL LEARNING  
EXPERIMENT (continued).

Block D	Scoring Method	Paired Associates							
		Religious				Political Economic			
		T1	T2	T3	Tot	T1	T2	T3	Tot
*R-7	Words Correct	6	10	14	30	8	11	10	29
	Time	55	40	30	125	66	48	50	164
	Total Words	11	14	15	40	10	12	11	33
*PE-7	Words Correct	6	7	12	25	6	9	11	26
	Time	69	67	45	181	67	57	53	177
	Total Words	8	7	12	27	8	12	11	31
R-8	Words Correct	5	6	10	21	2	5	7	14
	Time	64	65	44	173	85	72	64	221
	Total Words	9	10	12	31	3	7	7	17
PE-8	Words Correct	7	7	11	25	12	12	12	36
	Time	59	44	36	139	41	37	36	114
	Total Words	9	13	13	35	13	13	13	39

TABLE 12. COMBINED SCORES OF CRITERION GROUPS (8 R - 8 PE SUBJECTS) ON FINAL LEARNING EXPERIMENT.

Group	Paired Associates	Scoring Method	Trials			
			1	2	3	Total
R	Religious	Words Correct	67	82	102	251
		Time	412	344	256	1012
		Total Words	92	104	118	314
R	Political-Economic	Words Correct	56	80	92	228
		Time	501	397	339	1237
		Total Words	76	95	102	273
PE	Religious	Words Correct	62	69	91	222
		Time	467	434	349	1250
		Total Words	87	89	106	282
PE	Political-Economic	Words Correct	70	79	92	241
		Time	432	395	334	1161
		Total Words	89	96	98	283
SUMMARY						
Group-Context		Scoring Method	1	2	3	Total
Favorable Context (R Grp - R Wds + PE Grp - PE Wds)		Words Correct	137	161	194	492
		Time	844	739	590	2173
		Total Words	181	200	216	597
Unfavorable Context (R Grp - PE Wds + PE Grp - R Wds)		Words Correct	118	149	183	450
		Time	968	831	688	2487
		Total Words	163	184	208	555

Comparison of Scores of R and PE Groups. The results of scoring methods (1) words correct, (2) time of response, and (3) number of responses were totalled for:

- (1) R subjects learning R paired associates.
- (2) PE subjects learning PE paired associates.
- (3) R subjects learning PE paired associates.
- (4) PE subjects learning R paired associates.

The first and second items above were then summed and compared with the summation of the third and fourth items. Note that the first and second items are the scores of criterion groups learning favorable paired associates, (paired associates in keeping with existing attitudes). The summation of the third and fourth items represents the scores of criterion groups learning unfavorable paired associates. The results of the summed scores are presented in Table 12, page 97. From this table the reader will observe that the differences between criterion groups are consistently in the direction predicted.

Significance of Differences. The experiment was designed with the intent of using the method of Analysis of Variance to evaluate results. Preliminary analyses by this method indicated that differences in performance between individuals was so large that, with one exception, the critical GroupXContext F-ratio was not significant. Therefore results have been analysed in terms of  $X^2$  and t.

Computation of  $X^2$ . It has been explained that each subject was scored on each trial by each of three methods

of scoring: words correct, time, and number of responses. Experimental predictions would have been fulfilled perfectly if for corresponding trials<sup>1</sup> on the two contexts, each subject (1) had learned more paired associates in keeping with his own attitudes, (2) had responded faster, and (3) had given more responses, both correct and incorrect.

Therefore, scores on corresponding trials (see Table 11) were matched. For each pair of trials a frequency was recorded in the row designated "Favorable" if the difference between the subject's scores on corresponding trials was in the direction predicted. A frequency was recorded in the row designated "Unfavorable" if the difference between the subject's scores on corresponding trials was opposite to the direction predicted. A frequency was recorded in the row designated "Tie" if the subject had identical scores on corresponding trials. Thus nine frequencies were recorded for each subject, three for each of the methods of scoring. With 16 criterion subjects there were 48 frequencies for each of the three methods of scoring.

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<sup>1</sup> By corresponding trials we mean that Trial I on the R context corresponds with Trial I on the PE context, Trial 2R with Trial 2PE, and Trial 3R with Trial 3PE.

TABLE 13. COMPARISON OF PERFORMANCES AGAINST EXPERIMENTAL  
PREDICTION: CHI-SQUARE.

NOTE: R and PE groups are combined to compare corresponding trial scores in relation to the experimental prediction that (1) more paired associates in keeping with existing attitudes would be learned, (2) response times for these associations would be shorter, and (3) that more responses, both correct and incorrect, would be made. Chi squares are computed between frequencies in the total column.

Scoring Method	Relationship to Prediction	Corresponding Trials				Chi-Square
		1	2	3	Tot	
Words Correct	Favorable	10	11	9	30	$\chi^2 = 4.27$ ; 1DF
	Unfavorable	4	5	7	16	$P < .05$
	Tie	2	0	0	2	
Time	Favorable	13	13	11	37	$\chi^2 = 17.04$
	Unfavorable	3	2	4	9	$P < .01$
	Tie	0	1	1	2	
Total Words	Favorable	10	9	7	26	$\chi^2 = 6.08$
	Unfavorable	3	4	4	11	$P < .02 > .01$
	Tie	3	3	5	11	

Computation of t-scores. Each subject was given an opportunity to learn 16 paired associates in keeping with his existing attitudes and 16 paired associates which were neutral or opposed. To compute the t-scores, the trial score of each subject on paired associates representative of his unfavorable attitudinal context was subtracted from his corresponding trial scores on paired associates representative of his favorable attitudinal context. Thus, pairs of scores were



compared, trial by trial, for each of the three methods of scoring responses. The differences were evaluated by the t-test for the comparison of differences of related measures. The nine t-scores are presented in Table 14 on this page.

TABLE 14. COMPARISON OF PERFORMANCES AGAINST EXPERIMENTAL

PREDICTION: t.

NOTE: N and PE groups are combined to compare corresponding trial scores in relation to the experimental prediction that (1) more paired associates in keeping with existing attitudes would be learned, (2) response times for these associations would be shorter, and (3) that more responses, both correct and incorrect, would be made. t comparisons are made between corresponding trials.

Scoring Method	Corresponding Trials (DF=15)					
	1		2		3	
	t	P	t	P	t	P
Words Correct	1.60	< .20	.682	> .20	1.05	> .20
Time	-2.23	< .05	-1.63	< .10	-2.06	< .10
Total Words	1.85	< .10	1.28	> .20	1.55	< .20

From this table it can be seen that the t-scores are all in the direction predicted. The differences are smaller but roughly comparable to those found by the Chi-Square method, since in computing t-scores, trials cannot be combined.

From this experiment we can conclude that the experimental predictions have been tentatively confirmed in respect to the conventional method of measuring learning in terms of words correct. Even stronger evidence has been shown for the occurrence of more and faster responses when paired associates

in harmony with existing attitudes are being learned as compared to paired associates which are neutral or opposed to existing attitudes. To confine ourselves strictly to the evidence at hand, the differences found here are applicable to extreme deviates of elementary psychology classes at the University of Maryland and similar groups when learning paired associates which represent religious and a combination of political and economic values or attitudes in so far as we have been able to measure such values or attitudes by word associations and by the Allport-Vernon Study of Values.

Contrary Evidence. Two PE subjects in the preliminary learning experiment and subjects PE-4 and 5 in the final learning experiment, learned considerably more R than PE paired associates. A discernible emotional reaction was noted in these two subjects during the learning of R paired associates. Subject PE-4 who appeared quite placid during the learning of the PE paired associates, squirmed in his chair and by facial expression indicated his distaste for the R paired associates. After these initial reactions his performance on the R paired associates markedly exceeded that on the PE paired associates in respect to all three methods of scoring. Subject PE-5, on missing the R paired associate SEEK-salvation, said, "Huh, I don't believe in that", and made a number of other similar remarks while learning the R list. After the experiment this subject said, "I might have felt different about religion if my parents hadn't tried to cram it down my throat".

### SUMMARY

At the beginning of the chapter we stated the hypothesis that attitudes influence immediate learning. We have explained how we attempted to create conditions favorable to a critical experimental test of this hypothesis. The word association triplets described in Chapter II were divided into two sets: one was used to select criterion subjects; the second was divided into paired associates to provide learning material.

Results of the preliminary learning experiment were in the direction predicted; however, with the exception of a tendency (significant at the 5% level) for subjects to make incorrect responses consistent with their pre-experimental attitudes, differences between criterion groups were not significant.

As a result of findings from the group-administered preliminary learning experiment, the experimental design was modified to increase its precision. The Allport-Vernon Study of Values and the WA triplets were used in the final learning experiment to select 8 subjects from each end of the R-PE continuum. Responses obtained in this individually administered learning experiment were scored in terms of (1) correct responses, (2) response time, and (3) the number of responses--whether correct or not. Differences between criterion groups were evaluated by  $X^2$  and  $t$ , and in all instances were found to be in the direction predicted. Scoring of responses in terms of words correct and total responses

yielded chi-square values significant at the 5% level of confidence; differences in response time were significant at the 1% level. Of nine t's computed in terms of trial by trial comparisons, 1 exceeds the 5% fiducial limits and 3 are between the 5 and 10% fiducial limits.

A positive practice effect favoring the learning of the second series of paired associates was noted. In the two learning experiments, three PE subjects were found who were markedly superior in the learning of R paired associates.

The experimental results are interpreted as tentative evidence in support of the experimental hypothesis. Shorter response times and the tendency to respond more frequently to paired associates in keeping with existing attitudes (in the final learning experiment) and the tendency by subjects (in the preliminary experiment) to give incorrect responses in keeping with existing attitudes helped give rise to and support the construct, verbal reserve.

## CHAPTER IV

### PERCEPTION AND INCIDENTAL LEARNING

#### INTRODUCTION

Theoretical Basis. The experimental evidence as to the projective nature of perception has been cited in some detail in pages 25-27 of Chapter I and summarized on page 28. It will not be reviewed again here. The experiments reviewed in Chapter I and many others are indicative of the growing recognition of the crucial role which such factors as attitudes and psychological needs play in the perceptual process. Bruner and Goodman (6) have used the phrase "behavioral determinants" to distinguish these personality correlates of perception from the psychophysical, sensory, and essentially formalistic principles of perception.

From the experimental evidence cited in Chapter I, we draw the following conclusions which are taken as a point of departure for the experiments to be described in this chapter: (1) The perceptive process is selective. What stimuli individuals perceive from their environments are in part a function of their personalities. (2) It is very probable that the initial stages of the perceptive process have no conscious counterpart. Many investigators have used an attitude measure, the Allport-Vernon Study of Values, as the independent variable to study intra-individual differences in perception.

Our reasoning is as follows. Since perception is selective in nature, it should follow that subjects having strong attitudes of a specifiable sort will perceive objects or words in harmony with such attitudes more readily than objects or words neutral or contrary to such attitudes. The concept verbal reserve may be used to make this prediction with equal facility. If this concept has validity, it must be assumed that individuals holding strong attitudes of a specifiable sort have a more ready reserve of verbal responses for objects or words in keeping with that attitude. The strong verbal reserve mediates greater neural activity, lowering the perceptual threshold for objects or words which are in harmony with the more ready reserve of verbal responses.

A further phenomenon, incidental learning, which may be related to the above assumptions is investigated as a second part of this experiment. Everyday experience leads one to believe that different people learn different things about their environments; they select different items from their environments to be learned. This can be observed at the drug-store book counter where the sports enthusiast will choose a book by Paul Gallico; the confirmed reader of detective stories will select a book by Earl Stanley Gardner or Agatha Christie. The reader will recall that we said in Chapter III, page 64, that the statement, "learning and attitudes are related," can mean that: (1) attitudes affect immediate learning, or (2) an individual's attitudes influence what he chooses to learn. The purpose of the learning experiments to

be described here is to test the second possibility. It would seem probable that the person with a strong attitude of a specifiable sort would learn words in keeping with such attitudes faster than words from a neutral or opposed context without experimental instructions.

Outline of Experimental Work. Specifically, as a first approximation, the experiments will be carried out as follows:

(1) The WA Form 7 will be used to select as criterion groups subjects who presumably hold strong religious and political-economic attitudes.

(2) A mixed verbal context containing religious, political-economic, neutral words, and some nonsense syllables will be presented to all subjects with instructions to underline all words. It is predicted that the members of the criterion group will underline more words in harmony with their own attitudes than words representative of the contrary attitude.

(3) After having completed this task subjects will be instructed to recall all words they can remember having seen in the mixed context. It is predicted that the members of the criterion groups will learn more words in harmony with their own attitude than words representative of the contrary attitude.

In retrospect, and to help clarify this description of the experiments for the reader, it is noted here that a number of technical and other difficulties were encountered during the course of the work to be described. Several

changes and successive approximations were made to make the experiments test the experimental predictions. The report of the experimental work may be divided into four sections:

(1) An account of successive approximations needed to design a mixed context that would permit enough incidental learning to occur and thus to allow realistic scoring. (The original plan was to carry out the perception and incidental learning experiments as separate experiments.)

(2) An account of the development of a technique of administration for the perception experiment. (After a few preliminary trials it became apparent that the amount of time subjects would be allowed to see the mixed context would have to be controlled.)

(3) An account of the first perception experiment and of measurement of incidental learning by recall.

(4) An account of the second perception experiment, incidental learning being measured by the recognition method.

#### EXPERIMENTAL PROCEDURES

Word Selection. The words used for the perceptual and incidental learning experiment were selected by the following method. Eighty words of religious connotation and 78 words of political-economic connotation were selected by the experimenter and screened by group discussions with undergraduate students. Two lists, an R list consisting of 52 words and a PE list consisting of 55 words, were prepared.

The R list was presented to the 15 students of an elementary psychology class having the highest scores on the



R continuum on both the Allport-Vernon Study of Values and the Word Association Form 3, which had been administered on a prior occasion as part of this total study. The PE list was presented at the same time to 19 students of the same class who had scored highest on the PE continuum of the Allport-Vernon Study of Values and the WA Form 3. Each group was asked to rate the words in its list for vividness by (1) drawing a line through those words which seemed to be out of context; (2) leaving unmarked those words which seemed to be in context, but not particularly striking; and (3) checking those words which they considered most vivid.

Before subjects were allowed to begin, the experimenter presented briefly the definitions of the religious, political, and economic man according to Spranger. Subjects were asked when rating each word to consider these definitions as well as their own conceptions of the words.

The rated lists were then scored in the following manner: Rating (1), 0 points; rating (2), 1 point; and rating (3), 2 points. On the basis of these ratings, the 40 words judged most vivid were chosen from each list. Forty neutral<sup>1</sup> words of roughly the same frequency of occurrence were selected from the Thorndike Word List (49).

The selection of words in all classes was a compromise between vividness and the mechanical consideration of having an equal, or nearly equal, number of vowels in each class.

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<sup>1</sup>The letter N will be substituted for neutral hereafter.

Cancellation Form 1. The first figure for the experiment was constructed and named Cancellation Form 1. In its construction, the selected R, PE, and N words were scattered through a figure consisting of 30 closely spaced lines of equal length. Each line contained 50 letters. The spaces between words were filled in with consonants and nonsense syllables. To minimize the effect of primacy the first line contained no words. (For copy of Cancellation Form 1, see Table 30, page 152,)

This form was pretested on 11 subjects who were not members of the group to be used in the final experiment. Subjects were instructed to encircle all vowels A, E, and O. The task was described to them as one of accuracy and not one of speed. Subjects were allowed to set their own working rate. They were instructed to turn their papers over when each had completed the task. The whole group was then instructed to write any words they could recall having seen during the circling procedure. The task was reported by the subjects to be long and fatiguing; furthermore, only one subject recalled more than one word.

Cancellation Form 2. To obviate the difficulties in Cancellation Form 1, Cancellation Form 2 was devised. To shorten the task, the number of lines of letters was reduced from 30 to 20, and only 30 words from each of the R, PE, and N classes were used. These words were selected from the list used for Cancellation Form 1 in the same manner as the original 40 had been selected. The figure was double spaced

to make it more "readable". (For copy of Cancellation Form 2, see Table 31, page 153.)

Cancellation Form 2 was administered to 23 students of the experimenter's class in elementary psychology at Ft. Meade, Md. Instructions on the form were read. Subjects were instructed to underline the vowels A, E, and I, as well as the letter on either side of each, every time these vowels were seen. They were told to complete the underlining, turn their papers over, and record their individual time on the back. A running record of the time in 5 second intervals was kept on the blackboard.

When all had completed the task, they were then instructed to write down any words that they could recall having seen during the underlining procedure. The purpose of this trial was to determine how many of the PE, R, and N words had been learned incidental to the underlining procedure. Eleven of the class were unable to recall any of the words, and of the remainder who recalled one or more words, none recalled more than five words. The incidental learning which occurred during this method of presentation was too meager to allow realistic analysis; therefore it was decided that the method of administration and/or instructions would have to be changed to permit more incidental learning to occur.

Recognition Form 1. A third figure, referred to hereafter as Recognition Form<sup>1</sup> 1 (for copy, see Table 15, page 112),

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<sup>1</sup>The letters RF will be substituted for Recognition Form hereafter.

TABLE 15. RECOGNITION FORM 1

## Instructions:

This is a recognition task. Note the lines of letters below. When directed, you are to underline all the words you can find in each line. You will be allowed 15 seconds to do this. At the end of each fifteen second interval, I will tell you to move on to the next line. Do so immediately, whether you have completed the line you are working on or not. Do not start the next line until you are directed to.

1. OLRUXTGCREPPHARNESDRUSDCMIXTUREJSTVUWOXHTUFODYFVQL
2. AGLBQALTARFOHRMJLOANKDJNCRUCIFIXDSFQLOBEKYPORIVALHM
3. BGHORIZONYGLOQUDEVLXHLAEDERJRYNOSTRILFDJULRABBIFX
4. BGXLQWRPENTECOSTQHULGPLASTERCHUPKYTHGRANITEJPOWERTM
5. HINGEKTGENGHISKHANBUPDEA CONCRONCOMMERCEFUJYDIHADESL
6. GFLIBELQUCVGARMENHLHMOSESRWYTJEHOVAHHUFDLATITUDEPM
7. FLKPDYBTRENGTHCHROUNDALVQLGYSABBATHRSALADDMORGANUX
8. STUTORKYCATHEDRALPJTBOHCSSLPPGTFORCEJPHNKNUNNERYFFD
9. BGMELODYYLQUCVOHPOLITICIANEMFROWNZJWSRQNDXPSALMTWNK
10. PTVESPERSEMARKETQCHEMICALVCPIOUSXYCAPITALJRADIA TORB
11. WYDJHNAPOLEONTGDSAINTNXFSKMONKRTFUNDSYBCINGREDIENTK
12. YNDRETYDEITYVGNEUTRALLVYPROMOTERWRCEILINGYCHNOAHNXT
13. FTPTKFPROPHEITLMACHINEFQCHOFFICEYMEDILENQABSORBJNQW
14. STXMEADOWPRORETGCREDITWDISCIPLENPSACREDKGDACCOUNTSHN
15. YDGOVERNTHPRIESTFUVKTPBSERMONFLSTUDIOLNVENVELOPEJRL
16. PNDISCOUNTBURANDOMKPTBIBLECHMRBLOSSOMDJNSYPROFITNTZ
17. YPTIANGELFXSRPRESTIGEHNRPVAVILIONWFHYMNRMHCCASHHTAH
18. LWNRESPONSEOGGJXGOSPELHDGLRUPNYKFW EALTHNWBAPTISEMLS
19. PNUDTEMPLEMMCOMPETE OJELIMINATEPLRKDOJBYDOMINATEHDL
20. VQLFYXOFUTHXOWBUJTSKOQULLVEAFEGMRISPCGTXUFL OVFLYDRN

Name \_\_\_\_\_

was constructed. The R, PE, and N words used in Cancellation Form 2 were used again in a 20-line, double-spaced figure. Subjects were instructed to underline words rather than to encircle or underline vowels, the method heretofore tried. Two neutral words were moved from the lower part of the figure to the first line so that each line would now contain two or more words. The only other change made was to remove a few unintentional monosyllabic words which had been overlooked in preparing previous forms.

WA Form 7 and RF-1 were administered in that order to an elementary psychology class of 66 students. WA Form 7 was administered in the usual manner. RF-1 was handed out face down. Subjects were instructed as follows:

This is a recognition task. Note the lines of letters below. When directed, you are to underline all the words you can find in each line. You will be allowed 15 seconds to do this. At the end of each fifteen second interval, I will tell you to move on to the next line. Do so immediately, whether you have completed the line you are working on or not. Do not start the next line until you are directed to.

When the form was administered in this manner, all subjects presumably saw each line the same length of time and all finished the task together. Immediately after completing the task, subjects were instructed to turn the paper over and write on the back all of the words they could recall having seen during the underlining procedure.

WA-7 Forms of all subjects were scored. The 12 subjects with the highest R and PE scores on WA-7 were designated as the R and PE criterion groups respectively. The range of

scores for the R criterion group ran from 24 to 32 R associations out of a possible 40. The members of the PE criterion group made from 27 to 37 PE associations out of a possible 40.

Experimental Results: RF-1 and Incidental Learning.

RF-1 of each of these subjects was then scored as follows:

- (1) The number of times each R and PE word was underlined by each criterion group.
- (2) The number of words recalled by each criterion group.
- (3) In the scoring of the papers, it was noted that R subjects tended to underline parts of certain PE words so that the word which resulted lacked either R or PE connotation, e.i., "discount" underlined as dis-COUNT. A similar trend occurred in the reverse direction in the PE group, the PE subjects tending to partially underline more R words. The number of R and PE words treated in this manner by each group was counted to check the possible significance of this trend.

The results of scoring method (1) were as follows:

- (1) Each group tended to underline a greater proportion of words in its own attitudinal context than words in the opposite context, but the difference was not statistically significant.

TABLE 16. WORDS UNDERLINED IN RECOGNITION FORM 1 BY RELIGIOUS AND POLITICAL-ECONOMIC GROUPS

	R Words	PE Words
R Group	180	191
PE Group	203	248

$$\chi^2 = .96; 1 \text{ DF}$$

p=approximately .32

(2) The PE group, as a group, underlined more words in each category than the R group.

TABLE 17. WORDS RECALLED BY SUBJECTS OF THE R AND PE GROUPS, RECOGNITION FORM 1.

	R Words	PE Words
R Group	42	28
PE Group	41	24

The results of scoring method (2) (recall) were not significant; in fact, they were slightly in the direction opposite to that predicted.

The results of scoring method (3) showed that each group tended to cut up more words from the opposite context. This tendency was significant at the 5% level.

TABLE 18. NUMBER OF WORDS PRODUCED BY R AND PE GROUPS BY CUTTING UP WORDS OF OWN AND OPPOSED CONTEXTS.

	R Words	PE Words
R Group	28 (23)	18 (23)
PE Group	24 (29)	34 (29)

$$\chi^2 = 4.17$$

$$p < .05$$

#### Construction of Recognition Form 2 and Incidental Learning.

A fourth form, RF-2 (see Table 19, page 116), was devised to exploit the trends which had operated in Recognition Form 1.

TABLE 19. RECOGNITION FORM 2

## Instructions:

This is a recognition task. Note the lines of letters below. When directed, you are to underline all the words you can find in each line. You will be allowed 15 seconds to do this. At the end of each 15 second interval, I will tell you to move on to the next line. Do so immediately, whether you have completed the line you are working on or not. Do not start the next line until you are directed to do so.

1. OLRUXTCGRERPHARNESSDRUSDCMIXTUREJSTVUWOXYTUFODYFVL
2. LGNAPOLEONBQJINFERNOROKDISCOUNTKDJNDSFHADESKYPOLHM
3. BGLHINGEKJMIDASGRLATITUDEGLOQCATHEDRALFTJULUPXQWRD
4. FLHORIZONPDYSMARKETRULGCHMELODYUJPARSONKYTHRTMTGBU
5. NCROFALTARLGFGGRAFTQUCVGPENTECOSTKGRAMMARHLGRANITE
6. BLHTEMPLEPDYSKPCBLOSSOMLVPRICEPRVICEROYHUXSEKPJTSA
7. FDEGNOSTRILKSAINTQUCVOHRESPONSEEMFRSMEADOWMTWNEJLO
8. APVENERATEKBRILLIANCEXPSOVERLORDKRTDEVOTEDSYBCITKN
9. YNPDRETBUSINESSNTGSA REVERENTXSFKNARRATIVEPENDULUMN
10. FEABSORBPKCEREMONEYTLGCONVENTIONFQCHLRCOMMUDIETAL
11. DGEPTMARTYRUVKBSHALLOWEDNVRADIATORKIBENAFACTERYDRN
12. DETROUSERSBUINVESTMENTSKPTADMINISTERWHINGREDIENTEP
13. LIWNSTSA CREDITFODMERCHAN TPHDPOWURSHIPYPTICEILINGKE
14. BLENVELOPEYPTSERMONE TARYSRPHVRAL TARIFFNWFGARMEN TOB
15. SCOMMERCEYLWNYISHCHEMICALUNELIMINATEJQUARRELIGIONK
16. VQLFYABSENCEFUTSACRILEGALBUJPRACTIGALVARYQULLVEAFN

Name \_\_\_\_\_

Class \_\_\_\_\_

Date \_\_\_\_\_



(1) Those R and PE words which had discriminated most effectively on the basis of an item analysis of Recognition Form 1 were retained.

(2) In order to give the cutting up tendency a chance to operate (this tendency was significant in Recognition Form 1 at the 5% level) PE and R words which would lend themselves to this tendency were included, plus overlapping R and PE words.

A sixteen-line double-spaced figure was used, each line containing fifty letters. Twenty-five N words were distributed at random throughout the figure. The R and PE words which had discriminated most effectively in Recognition Form 1 were distributed in the upper section of the figure. Six R words containing PE words within their structure, e.g., "pentecost", and 6 PE words similarly containing R words, e.g., "business", were placed in the center section. Twelve "overlaps", e.g., "saoredit" and "sermonetary", were placed in the lower third. A sharp demarcation was not made between each section, the sections being interlocked, so to speak, from bottom to top. As in previous figures, the spaces between words were filled in with consonants and nonsense syllables.

The test of incidental learning was given as follows:

A list of 64 words was prepared for administration to subjects after RF-2 had been administered. This list contained 16 R words, 16 PE words and 14 N words which appeared in the figure, and 6 R, 6 PE and 6 N words that had not appeared in the figure. The latter words were included for

the purpose of evaluating false recognition. (For a copy of RF-2 and instructions, see Table 19, page 116. For a copy of the recognition word list used in conjunction with RF-2, see Table 20, page 119.)

Administration. WA-7 and RF-2 were administered in that order to an intermediate psychology class of 93 students. WA-7 was administered in the usual manner. RF-2 was handed out face down, and the subjects were instructed as indicated in Table 19. In addition to the typed instructions, subjects were instructed verbally to underline the largest word in cases in which shorter words were contained in longer words.

Learning--Recognition. After the task had been completed, subjects were instructed to turn to the recognition list, which they had not seen previously, and to encircle all words which they recognized as having been in the figure.

The WA-7 forms of all subjects were scored. The 14 subjects having the highest R scores were designated as the R criterion group. The range of scores for this group extended from 24 to 34 R associations out of a possible 40. The 14 subjects having the highest PE scores were designated as the PE criterion group. The range of scores for this group extended from 29 to 40 PE associations out of a possible 40.

Scoring. RF-2 was scored as follows:

(1) The total number of R and PE words underlined by each criterion group.

(2) The number of times the members of each criterion group underlined parts of R or PE words to make (a) neutral or

TABLE 20. RECOGNITION WORD LIST USED IN CONJUNCTION WITH  
RECOGNITION FORM 2.

1. ALTAR	22. CONVENTION	43. MIDAS
2. MERCHANT	23. PARSON	44. CAPITAL
3. SABBATH	24. CALVARY	45. DISCOUNT
4. ABSORB	25. DIETTY	46. VICEROY
5. GOSPEL	26. STUDIO	47. PRICE
6. RENT	27. SACRED	48. ADMINISTER
7. STRENGTH	28. MEADOW	49. PRACTICAL
8. CEREMONY	29. QUARREL	50. VESPER
9. PROFIT	30. DEVOTED	51. SALAD
10. HADES	31. BLOSSOM	52. SIN
11. WEALTH	32. VENERATE	53. CREDIT
12. POWER	33. NEUTRAL	54. MERCY
13. CHEMICAL	34. OVERLORD	55. INGREDIENT
14. SERMON	35. PRESTIGE	56. CHANT
15. CATHEDRAL	36. PENTECOST	57. BONDS
16. PLASTER	37. HARNESS	58. BAPTISE
17. GRANITE	38. COMMODITY	59. ENVELOPE
18. LATITUDE	39. INVESTMENTS	60. PROPHET
19. RESPONSE	40. RELIGION	61. GLOBE
20. BRILLIANCE	41. ROUND	62. ABSENCE
21. ANGEL	42. WORSHIP	63. NAPOLEON
		64. OWED

C

R	P	N
T		

W

R	P	N
T		

nonsense words, (b) words of the opposite attitudinal context.

The Recognition Word List (incidental learning) was scored as follows:

(1) The total number of R, PE, and N words correctly recognized by each criterion group.

(2) The total number of R, PE, and N words falsely recognized, i.e., words encircled in the R, PE, and N list which had not appeared in Recognition Form 2.

Results. The results of scoring methods 1 and 2 for RF-2 are presented in Table 21. Conclusions are as follows:

(1) The total number of R and PE responses is brought forward from Table 21.

	Religious Responses	Political-Economic Responses
R Group	84 + 11* = 95	109 + 17* = 126
PE Group	124 + 8* = 132	153 + 16* = 169
	$\chi^2 = .035$	$p = < .90 > .80$

\*Responses representative of this context produced by underlining parts of words from opposite context.

From the data above, it can be seen that the difference between groups is not significant. The prediction that subjects will underline more words in harmony with existing attitudes is not borne out in this experiment with elementary psychology students.

(2) The number of times the members of each criterion group underlined parts of R and PE words to make (a) neutral or nonsense words, (b) words of the opposite attitudinal context.

TABLE 21. TABULATION OF RELIGIOUS, AND POLITICAL AND ECONOMIC WORDS (A) UNDERLINED, (B) CUT TO NEUTRAL WORDS, AND (C) CUT TO WORDS OF THE OPPOSITE CONTEXT BY THE RELIGIOUS AND POLITICAL-ECONOMIC CRITERION GROUPS.

Criterion Group	Religious Words			Political-Economic Words		
	Underlined	Cut to N Con-text <sup>1</sup>	Cut to PE Con-text	Underlined	Cut to N Con-text <sup>1</sup>	Cut to R Con-text
Religious	84	40	17 <sup>3</sup>	109	24	11 <sup>2</sup>
Political-Economic	124	16	16 <sup>2</sup>	153	32	8 <sup>3</sup>

<sup>1</sup>The figures in this column specify the frequency with which subjects of the criterion groups cut words representative of their own attitudinal context into neutral words. For example, HALLOWED cut to HALL, INFERNO to FERN.

<sup>2</sup>The figures in these blocks specify the frequency with which subjects of the criterion groups cut words representative of the opposite attitudinal context into (smaller) words in harmony with their own attitudinal context. For example, OVERLORD cut to LORD, INVESTMENTS to VESTMENTS.

<sup>3</sup>The figures in these blocks specify the frequency with which subjects of the criterion groups cut up words in harmony with their own attitudinal context into (smaller) words representative of the opposite context. For example, HALLOWED to OWE, DEVOTED to VOTED.

These totals can be extracted from Table 21. From this table, it can be observed that the difference in favor of cutting a larger word from the opposite context into a shorter neutral word or a shorter word in harmony with existing attitudes (which was significant at the 5% level in the elementary psychology class) is not significant with this group. One further trend should be noted however:

The PE group cut up 32 R words, 16 to make N words and 16 to make PE words. Thus of the R words they cut up they extracted PE words from 50% of them. The PE group cut up 40 PE words, 32 to make N words and only 8 to make R words. Thus they extracted R words from 20% of the PE words.

The same trend does not hold for the R criterion group. The members of this group cut R and PE words into approximately an equal percentage of N words and words of the contrary attitudinal context. Thus, while a trend in accord with a prediction which might have been corollary to the actual prediction is noted, the prediction itself, i.e., the predicted tendency to cut up words from the opposed attitudinal context into words in harmony with existing attitudes does not hold in this experiment.

We must conclude from the results cited above that experimental predictions are not borne out in this case. A search for factors which might have led to negative results leads to certain interesting conclusions:

(1) In this experiment subjects were instructed that when a short word was contained in a longer word, the longer

word should be underlined. If the data are considered in this light, all the words cut either to neutral or opposite contexts represent errors. Thus, by summing only the number of entire words underlined by each criterion group, we find that the R group underlined 84 plus 109 or 193 words correctly, and that the PE group underlined 124 plus 153 or 277 words correctly. The difference between frequencies of 193 and 277 yields a  $X^2$  of 15.01.

We conclude that whatever selective factor operated to assign subjects to R and PE groups also led to marked differences in the performance of these groups on the assigned task. The probability of such a difference occurring by chance alone is much less than one time in 100. Therefore a real difference between groups in performance of the assigned task may be assumed. It is probable that this large difference interfered with the validity of the experiment.

Learning. The results of the recognition experiment given in conjunction with the perception experiment are tabled below.

TABLE 22. RELIGIOUS, POLITICAL-ECONOMIC, AND NEUTRAL WORDS CORRECTLY AND FALSELY RECOGNIZED IN THE RECOGNITION LIST AS HAVING APPEARED IN RF-2.

Criterion Group	Words Correctly Recognized			Words Falsely Recognized		
	R	PE	N	R	PE	N
Religious	68	98	104	6	9	1
Political-Economic	87	103	93	13	10	2

The results of this experiment fail to show differential learning between groups for words in harmony with existing attitudes.

#### SUMMARY

The results of the learning experiment, both recall and recognition, are negative. In the elementary psychology class, a tendency to cut up words from the opposite attitudinal context into words in harmony with existing attitudes was operative at the 5% level of significance. A tendency to underline completely more words in harmony with existing attitudes was noted but was not significant. These results did not hold for the intermediate psychology class. In both classes, the performance of the PE criterion group in the underlining task was superior to that of the R criterion group. The PE criterion group, especially in the intermediate psychology class, attained a much higher level of performance than did the R criterion group. It is probable that in both classes this difference interfered with experimental predictions.



## CHAPTER V

### CONCLUSION

Statement of Problem. In the first chapter we pointed to the need for a better understanding of the relationship between an individual and his verbal behavior. It was suggested that our moderate progress toward this objective may be due to the fact that investigators have frequently failed to make specific assumptions in this respect and test them. The assumption was made here that verbal behavior has some substance and permanence in itself, and that, consequently, hypotheses in regard to verbal habits will be necessary to the proper understanding of related behavioral phenomena. This is our basic hypothesis. Taking that as a point of departure, we have delineated certain of its seemingly necessary implications in the area of attitudes, learning, and perception.

The Response Potential. The construct, implicit response or reaction potential, has been used to implement the theoretical analysis. Evidence in favor of individual differences in verbal behavior has been cited--perhaps a documentation of the obvious. We have assumed that individual differences in overt verbal behavior are coordinate with differences in the number and strength of implicit response potentials. Word association triplets were designed to show the usefulness of the construct, response potential, by making use of a stimulus word which could be associated with either of two

response words to elicit discriminial dispersions among samples of college students.

Response Potentials and Attitudes. The need to define attitudes more precisely was cited. Our position may be stated simply: students seldom speak of lower animals possessing attitudes and with good reason; attitudes are commonly expressed verbally. In the preponderant majority of cases attitudes are measured by verbal techniques. Let us assume then that attitudes are manifestations of verbal habits. For our habit unit we have selected the implicit (verbal) response potential. It was assumed that the response potential construct could implement our understanding of attitudes by providing a means for their measurement. A list of word association triplets was designed to represent religious (R) and a combination of political and economic (PE) attitudes. An example is the following:

STANDARDS	moral
	gold

The respondent was instructed to "associate the stimulus word with the response word that goes with it best." The triplet list was developed and refined by successive internal validation of seven successive forms and by comparison with similar scales of the Allport-Vernon Study of Values.

Experimental Results. Correlations between successive triplet lists and the religious and the political and economic scales of the Allport-Vernon Study of Values were .68 and .69. (The probability that  $r = 0$  was  $< .001$ ,  $< .001$ ) The writer strongly believes that a higher correlation could

have been obtained had word association forms been item analysed against the R and PE scales of the Allport-Vernon Study of Values. Strictly speaking, from the results reported here, we can only make predictions concerning elementary psychology students at the University of Maryland and similar groups. But the order of correlations indicates a strong probability that word association tests can be designed to correlate highly with most reliable (verbal) attitude measures. ✓ High correlations with a questionnaire type attitude measure provide inferential support of the usefulness of the construct, response potential, for attitude measurement.

Permanence of Response Potentials. We have used the expression, verbal habits. One necessary characteristic of a habit is its relative permanence. We can add further support to our theoretical position if we can show that verbal habits and their coordinate implicit response potentials are relatively permanent. Confirmatory evidence was sought in three ways.

(1) Reliability. The test-retest reliability of the final word association form, WA-7, was computed twice and found to be .81 and .87.

(2) Completion Time. It was assumed that if two conflicting response potentials are approximately equal in strength, each will tend to inhibit the elicitation of the other. It follows that respondents who hold either of two attitudes (R and PE in this case) much stronger than the other will be subject to fewer conflicting response potentials than

subjects who hold two attitudes in relatively equal strength. It would follow that respondents of the latter sort would require more time to associate the response words in a triplet list with the stimulus words, and so would take more time to complete the task. This assumption was twice tested. Comparison of times required by strong attitude and middle attitude groups yields p-values of 4% and 2% favoring shorter completion time for the former groups.

(3) Learning. It was assumed that verbal habits are functionally related to implicit verbal associations which facilitate the learning of similar associations and inhibit the learning of associations of a contrary sort. We have here a twofold test: (1) we are measuring the influence of attitudes upon learning which we can do without making the further assumption that (2) verbal habits are relatively permanent. Two tests of these hypotheses are summarized below.

Learning. The triplet lists were divided into two sets. One set was used to select criterion learning subjects, the other was divided into paired associates to provide learning material. On the basis of theoretical considerations, it was predicted that criterion subjects could learn paired associates in keeping with existing attitudes more efficiently than paired associates representative of neutral or contrary attitudes. This experimental prediction was tested as described below.

(1) Preliminary Learning Experiment. In a group-administered preliminary learning experiment, techniques were devised to provide a more critical test of this hypothesis in the final learning experiment which followed. The triplets used for attitude measurement were divided into two sets. In the preliminary learning experiment criterion subjects were selected by one set of triplets and tested in the learning of material consisting of paired associates formed from the second set of triplets. Responses were scored in terms of frequencies with which criterion subjects gave (a) correct response words, and (b) response words in keeping with either the religious or political-economic attitude whether the correct response was given or not.

(2) Final Learning Experiment. The religious and the political and economic scales of the Allport-Vernon Study of Values were used in conjunction with the triplets to select 8 R and 8 PE subjects for the individually administered final learning experiment. Responses were scored in terms of (a) correct responses, (b) response time and (c) the total number of responses whether correct or not. Scores were statistically evaluated by chi-square and t.

Experimental Results. Results of the preliminary learning experiment scored in terms of correct responses were in the direction predicted, but they were not large enough to be significant by scoring method (a). Differences were significant at the 5% level by scoring method (b). Results of the final learning experiment when evaluated by chi-square

were significant at the 5%, 1% and 2% levels when responses were scored in terms of correct responses, time and total responses.  $t$  yields differences in the predicted direction but not as large as those computed with chi-square.

These results are interpreted as providing strong support for the assumption that implicit verbal response potentials are relatively permanent. From the final learning experiment we can conclude tentatively that attitudes influence the learning rate. ✓

Verbal Reserve: Perception. An attempt was made to extend the theory of verbal behavior to perceptual phenomena. The experimental investigations of Postman, Bruner, McGinnies, Goodman, McLeary, Lazarus and others<sup>1</sup> concerning the projective nature of perception were reviewed. When experimental findings were summarized, it was apparent that the response potential construct was not sufficiently broad in scope to account for the experimental evidence of attitude and personality influences on perception and related processes.

The theory of verbal behavior was extended accordingly. The construct Verbal Reserve was formulated to denote an organization or systematic relationship among response potentials. The elaboration of the construct verbal reserve in an attempt to explain certain projective aspects of perception, led the theory to become so extensive that only a few of its implications could be tested experimentally.<sup>2</sup>

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<sup>1</sup>Discussion of these experiments, and a summary and references to experimental findings are cited in Chapter I.

<sup>2</sup>For delineation of this theory, see Chapter I.

Perception. For the most part, the investigators cited above have selected attitudes as an independent variable and have correlated with it differences in recognition and reaction times to verbal material. In like manner we selected criterion attitude groups with the final word association form, WA-7. We then attempted to demonstrate selective perception of verbal material.

Criterion groups were shown a jumbled verbal context consisting of R and PE words, some of which contained R or PE words or "neutral" words within them. For example:

JXKESPNHADESBMBZSACREDITCFODJDISCOUNTQUNH

Subjects worked under a time limit with instructions to underline all words they could find. Responses were scored in terms of the number of words from each attitudinal context underlined. Experimental prediction: members of each attitude group will underline more words in keeping with their own attitudes. This prediction was tested twice, once with elementary and once with advanced psychology students.

Experimental Results. The first experiment yielded results in the direction predicted which were not large enough to be significant ( $p = 30\%$ ). Criterion groups showed a tendency to underline parts of words which represented attitudes contrary or opposed to their own to form (a) neutral words, and/or (b) words in keeping with their own attitudes. This trend was significant at the 5% level.

The results of the second perceptual experiment did not confirm experimental predictions. There was a trend in the

predicted direction for the PE subjects to underline parts of words from the opposed attitudinal context to form neutral words.

We believe that one reason for these essentially negative results was the fact that the political-economic criterion subjects in this intermediate psychology class far exceeded the religious group ( $p < .01$ ) in performance of the assigned underlining task.

Incidental Learning. An incidental learning experiment was administered in conjunction with the perception experiment. We pointed out that the often made statement, "attitudes influence learning," could mean (a) attitudes influence the rate of immediate learning (tests of this hypothesis are described above) or (b) an individual's attitudes influence what he selects to learn. The second alternative was tested. Immediately upon completion of the underlining task, subjects were instructed to turn their papers over and reproduce as many words as they could from the jumbled list. This hypothesis was twice tested, once by recall, and once by the recognition method.

Experimental Results. Results were negative in both recall and recognition experiments, differences between criterion groups being practically nil in both cases. It is tentatively proposed that when subjects are busily engaged in the performance of one task, criterion attitude groups will not exhibit large differences in incidental learning except, perhaps as a function of differences in ability.



Differences between the criterion groups in the much more carefully controlled final learning experiment were only significant at the 5% level. Therefore, negative results in respect to incidental learning were not entirely unexpected.

Summary. In the beginning we assumed that verbal behavior has substance and permanence in itself and that verbal habits mediate behavior. It follows that hypotheses in regard to verbal habits will be necessary to the better understanding of related behavioral phenomena. Certain consequences of these assumptions have been delineated in the areas of attitudes, learning and perception where they have been tested experimentally. We pointed out first that attitudes are generally expressed and measured by verbal techniques. We suggested that a parsimonious assumption in regard to attitudes is that attitudes are a manifestation of verbal habits. Starting with this assumption, we demonstrated at a very high level of probability that the relative strength of two attitude can be measured by a simple word association technique. We recommend the method for its speed and economy.

The relative permanence of verbal habits has been tested in three ways:

- (1) The reliability of the triplet technique of attitude measurement was twice checked.

- (2) The time required by criterion attitude groups to complete the triplet list was twice measured.

- (3) The influence of attitudes upon learning has been

investigated as a further test of the permanence of verbal habits as well as to provide a measure of the role of attitudes in mediating behavior.

In the first two of the above tests, experimental predictions were confirmed in each instance. In the third--the learning experiments--results were not as definitive. A preliminary experiment yielded results in the direction predicted which were not large enough to be significant. Experimental findings from the final learning experiment were significant at the 5% level.

One reason results in regard to learning were not so clearcut was the fact that two subjects showed marked reversals between their verbal expression of attitudes and learning of material in keeping with and opposed to expressed attitudes. Special attention is called to these reversals since they have been found many times by other investigators (6, 9, 30, 50). We take the position that to apply such terms as "perceptual resonance" to the behavior of subjects who react as predicted and "perceptual vigilance" to the behavior of those who do not is an unscientific stratagem. We maintain that the phenomenon should not be glossed over by mere name calling but should be studied in its own right. It is felt that an adequate theory of verbal behavior may provide added insights into this matter.

In an attempt to extend our theory of verbal behavior to the perceptual area, we developed and elaborated the construct, verbal reserve. We believe it has important

implications to such systematic fields as attitudes, emotion, and thinking. Some of the results of the perceptual experiments tended to bear out predictions but, in general, experimental results were inconclusive.

We believe that we have shown enough positive experimental evidence that the probability of the validity of our initial assumptions must be considered increased; we believe that the approach to many aspects of behavior outlined here has been shown fruitful in that a theory of verbal behavior provides a framework convenient to the explicit formulation of testable hypotheses.

Finally, we repeat the truism, "Man is the only talking animal." In reviewing various theories of hearing, Hilgard<sup>1</sup> has pointed out that the learning process in man (perhaps his cognitive maps as well) may differ fundamentally from the same process in rats. It is indeed a shame that these little animals so docile, so easily available for experimentation, cannot talk to us. If a theory of verbal behavior provides the psychologist a key for the better understanding of man, his findings must necessarily be of interest to scientists of other fields. What the psychologist learns, will prove of value to all scientists who study the attitudes and ethical beliefs which guide man in individual and social action toward the material and other requisites of well being.

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<sup>1</sup>See Hilgard, E. R., Theories of Learning. New York: Appleton-Century-Crofts, Inc., 1948, pp. 328-331.

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## APPENDIX



TABLE 23. WORD ASSOCIATION FORM 1.

1. REDEEM	pay off save	13. FREEDOM OF	religion enterprise
2. GIVE	blessed take	14. ROCKEFELLER	philanthropist industrialist
3. WINE	party communion	15. RESEARCH	objectivity truth
4. DECEIVE	clever sinful	16. REWARD	heaven work
5. SUNDAY	church rest	17. BENEFACTOR	inventor clergyman
6. MONEY	tithe wealth	18. CONGRESSMAN	prestige service
7. INSULT	avenge forgive	19. FAITH IN	religion capitalism
8. CRUSADE	religious conquer	20. FEAR OF	hell depression
9. KING	benevolent powerful	21. DENOMINATION	bill's churches
10. SUN	heat solar system	22. WAGES OF	sin workers
11. PROTECT	free speech investments	23. TEN	dollars commandments
12. CONTRIBUTE TO	retirement charity	24. TRAIN FOR	service selling
		25. SAVE MY	money soul

TABLE 24. WORD ASSOCIATION FORM 2.

1. REDEEM	pay back save	20. CIGARETTE	match smoke
2. GIVE	blessed take	21. AMBASSADOR	prestige service
3. WINE	communion party	22. BELIEVE IN	god self
4. DECEIVE	clever sinful	23. FEAR OF	hell depression
5. FINGER	hand arm	24. DENOMINATION	bills churches
6. SUNDAY	church rest	25. CHAIR	table furniture
7. INSULT	avenge forgive	26. WAGES OF	sin workers
8. LEADER	helpful powerful	27. TEN	dollars commandments
9. SUN	heavens hot	28. TRAIN FOR	service business
10. BALL	bat sport	29. SAVE MY	purse soul
11. PROTECT	worship investment	30. DRIVE	road car
12. CONTRIBUTE TO	retirement charity	31. BENEFactor	clergyman inventor
13. FREEDOM OF	religion enterprise	32. CREATOR OF	heavens radios
14. SEEK	preeminence salvation	33. BE	efficient spiritual
15. PARTY	dance date	34. TWELVE	cabinet members apostles
16. PREPARE FOR	prosperity judgment	35. SCIENCE	practical theoretical
17. RESEARCH	truth objectivity	36. PRAYER	answered futile
18. REWARD	heaven work	37. FUTURE	savings life
19. LIE	wrong tactful		

TABLE 25. WORD ASSOCIATION FORM 3.

1. DECEIVE	sinful clever	13. HIGH	profits ideals
2. GIVE	blessed take	14. BIBLE	practical spiritual
3. WINE	communion party	15. REWARD	heaven work
4. SUNDAY	rest church	16. FREEDOM OF	enterprise religion
5. FINGER	hand arm	17. SEEK	preeminence salvation
6. INSULT	avenge forgive	18. TWELVE	cabinet members apostles
7. SUN	heavens hot	19. RESEARCH	truth practical
8. LIE	expedient wrong	20. CIGARETTE	match smoke
9. PROTECT	savings worship	21. PREPARE FOR	prosperity judgment
10. BALL	field sport	22. PRINCIPLES OF	utility morality
11. RESEARCH	truth useful	23. UNIVERSAL	disarmament business machines
12. CLEANSE	face heart	24. FEAR OF	hell depression

TABLE 25. WORD ASSOCIATION FORM 3 (continued).

- |                  |                         |                  |                         |
|------------------|-------------------------|------------------|-------------------------|
| 25. CHAIR        | table<br>furniture      | 36. MASS         | catholic<br>production  |
| 26. DENOMINATION | bills<br>church         | 37. EVERPRESENT  | taxes<br>God            |
| 27. TEN          | commandments<br>dollars | 38. SAVE MY      | purse<br>soul           |
| 28. BENEFACTOR   | clergyman<br>inventor   | 39. CELESTIAL    | mysteries<br>navigation |
| 29. MAKER OF     | universe<br>millions    | 40. MONEY        | savings<br>charity      |
| 30. UNITY        | trinity<br>monopoly     | 41. SUCCESS THRU | working<br>prayer       |
| 31. BOUNTIES OF  | nature<br>industry      | 42. HONESTY IS   | moral<br>policy         |
| 32. BELIEVE IN   | self<br>God             | 43. VALUES       | spiritual<br>economic   |
| 33. CREATOR OF   | radios<br>heavens       | 44. WAGES OF     | sin<br>workers          |
| 34. PRAYER       | futile<br>helpful       | 45. TRAIN FOR    | service<br>business     |
| 35. DRIVE        | road<br>car             |                  |                         |

Date \_\_\_\_\_

Name \_\_\_\_\_

Score (R) \_\_\_\_\_ (PE) \_\_\_\_\_

TABLE 26. WORD ASSOCIATION FORM 4.

1. CELESTIAL	navigation mysteries	19. UNITY	trinity monopoly
2. HONESTY	moral policy	20. GIVE	lose gain
3. GAME	chess tennis	21. CARDS	bridge solitaire
4. VALUES	spiritual economic	22. DENOMINATION	bills church
5. CREATOR OF	radios heavens	23. NATURE	admire conquer
6. SPOON	silver cup	24. BOOK	text novel
7. PRAYER	futile helpful	25. SAVE MY	purse soul
8. WRITE	letter theme	26. CREDIT TO	workers management
9. WAGES OF	workers sin	27. MAKER	millions universe
10. MONEY	charity interest	28. REWARD	heaven striving
11. GOOD	manners companions	29. SPOUSE	sociable hardworking
12. MASS	catholic production	30. SEEK	salvation preeminence
13. SPECULATE	theorize profiteer	31. UNIVERSAL	business machines disarmament
14. PEAS	carrots vegetables	32. RING	engagement telephone
15. BE	righteous aggressive	33. FEAR OF	depression hell
16. AVOID	hoarding solitude	34. RESPECT	humility efficiency
17. CHAIR	furniture table	35. LAZY	slovenly content
18. SELF	realization preservation	36. BELIEVE IN	self God

TABLE 26. WORD ASSOCIATION FORM 4 (continued).

37.	PRINCIPLES OF	utility morality	54.	LIE	expedient immoral
38.	INSULT	forgive avenge	55.	PROTECT	worship savings
39.	FRIENDS	cultured noisy	56.	HIGH	earnings ideals
40.	ENJOY	reverie competition	57.	ENJOY	parties reading
41.	FREEDOM OF	enterprise religion	58.	WINE	communion party
42.	IMPROVE	efficiency masses	59.	LOATHSOME	poverty devil
43.	EVERPRESENT	taxes God	60.	CAR	cadillac jalopy
44.	FREE	open easy	61.	STANDARDS	gold conduct
45.	BIBLE	practical spiritual	62.	APPLE	fruit orange
46.	DECEIVE	clever sinful	63.	SUNDAY	rest church
47.	FAILURE	admit forget	64.	PREPARE FOR	prosperity judgment
48.	LUXURIES	wasteful desirable	65.	RESPECT	authority humanity
49.	TWELVE	cabinet makers apostles	66.	MIRACLES OF	loaves finance
50.	FORMAL	artificial proper	67.	SHREWD	crooked adroit
51.	BE	forceful ethical	68.	STATELY	majestic stiff
52.	SUCCESS THRU	prayer striving	69.	BENEFactor	clergyman inventor
53.	TROUT	fish fly	70.	TRUTH BY	intuition experience

Date \_\_\_\_\_

Name \_\_\_\_\_

Score (R) \_\_\_\_\_ (PE) \_\_\_\_\_

TABLE 27. WORD ASSOCIATION FORM 5.

1. CELESTIAL	mysteries navigation	12. TEN	dollars commandments
2. SPOON	silver cup	13. BOOK	text novel
3. VALUES	spiritual economic	14. SAVE MY	soul money
4. PRAYER	doubtful helpful	15. CARDS	bridge poker
5. SPOUSE	sociable intelligent	16. SUCCESS THRU	prayer striving
6. TRUST	faith proof	17. SUNDAY	rest church
7. WAGES OF	workers sin	18. NATURE	conquer admire
8. GOOD	manners companions	19. RESPECT	authority humanity
9. SELF	realization preservation	20. FRIENDS	happy cultured
10. MOVIES	musical dramatic	21. ENJOY	reverie competition
11. CREATOR OF	fashions heavens	22. EVERPRESENT	taxes God

TABLE 27. WORD ASSOCIATION FORM 5 (continued).

23.	PRAISE	workers executives	33.	TWELVE	cabinet members apostles
24.	WINE	communion party	34.	LUXURIES	unnecessary desirable
25.	STATELY	majestic pompous	35.	LOOSE	change morals
26.	BELIEVE IN	saviour self	36.	HONESTY	purity policy
27.	PRINCIPLES OF	utility morality	37.	FAILURE	admit forget
28.	FREEDOM OF	religion enterprise	38.	GIVE	blessed take
29.	INTERNATIONAL	business machines disarmament	39.	REWARD	working heaven
30.	DENOMINATION	currency church	40.	BECOME	ethical forceful
31.	FEAR OF	depression hell	41.	ENJOY	work play
32.	CAR	cadillac jalopy			

Date \_\_\_\_\_

Name \_\_\_\_\_

Score (R) \_\_\_\_\_ (PE) \_\_\_\_\_



TABLE 28. WORD ASSOCIATION FORM 6.

1. CELESTIAL	mysteries navigation	12. MASS	production catholic
2. SPOON	silver cup	13. BOOK	text novel
3. VALUES	spiritual economic	14. SAVE MY	soul money
4. PRAYER	doubtful helpful	15. CARDS	bridge poker
5. SPOUSE	sociable intelligent	16. SUCCESS BY	prayer striving
6. TRUST	faith proof	17. SUNDAY	rest church
7. WAGES OF	workers sin	18. NEW	opportunities testament
8. GOOD	manners companions	19. PERSONAL	initiative reverence
9. SELF	realization preservation	20. FRIENDS	happy cultured
10. MOVIES	musical dramatic	21. ENJOY	reverie competition
11. CREATOR OF	fashions heavens	22. EVERPRESENT	taxes God

TABLE 28. WORD ASSOCIATIONS FORM 6 (continued).

23.	PRAISE	workers executives	34.	LUXURIES	unnecessary desirable
24.	INSULT	forgive avenge	35.	LOOSE	change morals
25.	STATELY	majestic pompous	36.	CLERICAL	ministry typist
26.	BELIEVE IN	saviour self	37.	FAILURE	admit forget
27.	PRINCIPLES OF	utility morality	38.	GIVE	blessed take
28.	FREEDOM OF	religion enterprise	39.	REWARD	working heaven
29.	TWELVE	cabinet members apostles	40.	BECOME	ethical forceful
30.	DENOMINATION	currency church	41.	ENJOY	work play
31.	FEAR OF	depression hell	42.	A LIFE OF	integrity luxury
32.	CAR	cadillac jalopy	43.	DESIRE	prestige peace of mind
33.	INTERNATIONAL	business machines disarmament	44.	GOOD	wine books

Date \_\_\_\_\_

Name \_\_\_\_\_

Score (R) \_\_\_\_\_ (PE) \_\_\_\_\_

**TABLE 29. METHOD OF SCORING RELIGIOUS, POLITICAL AND ECONOMIC  
SCALES ON THE ALLPORT-VERNON STUDY OF VALUES.**

**Scoring of Part I**

**Questions 3 and 9.**

Strong preference for Answer a	scored 0.
Slight preference for Answer a	scored 1.
Slight preference for Answer b	scored 2.
Strong preference for Answer b	scored 3.

**Questions 12 and 24.**

Strong preference for Answer a	scored 3.
Slight preference for Answer a	scored 2.
Slight preference for Answer b	scored 1.
Strong preference for Answer b	scored 0.

**Scoring of Part II**

**Questions in which R response is compared with P response or E response (Question Nos. 2, 5, 11, 12, 4, 15).**

If R response is first choice, score 3.  
 If R response is last choice, score 0.  
 If R response is ranked above PE but not first, score 2.  
 If R response is ranked below PE, score 0.  
 If R response is ranked below PE but 2nd, score 1.

**Questions in which R responses are compared with both the P and E responses (Question Nos. 1, 4, 7).**

If R response is first choice, score 3.  
 If R response is last choice, score 0.  
 If R response is ranked above both P and E, score 3.  
 If R response is ranked below both P and E, score 0.  
 If R response is between P and E responses, score 1.

**TABLE 30. CANCELLATION FORM 1**

**Instructions:**

1. This is a cancellation task. Note the lines of letters below. When directed, you are to start at the top line and circle all "A's", "E's", and "O's", like this:  
PAXCEZO
2. This is a test of accuracy, not of speed. Try not to overlook any of these three vowels.
3. When you finish, turn the paper over. Look at the black-board. You will see there a running record of the time. Note the time you finish in the place designated on the back of the paper.

**PAXCEZO**

ALRINTCGREPP IRTOLANIOTRUSICHURKELLPHOXASTIVERPONAL  
RENUNNERYPPUDEL IZENARPOWERNELPFODALWEALTHPRANDOMEX  
J ISEITEMPLEEKERGUDISCIPLERYBROSKLARYBCORMACHINERIC  
A FLORGENOLUDERPARITYMBEMELODYQAEGOSPEL IBELESKORLUC  
NYBRILLIANTUCLEASECHRAL TARULM IXTUREVZRGDRCHAPEL TID  
HINCOMENAPEN DULUM IFTYNNOAHRRONEDEACON IS TUBBORN DLOR  
BORK IW FETUT ORIVAL DEXTHEOLOGYSTEDOMINATEKOBLOSSOMEL  
TNARRATIVECMKIPTETIESALESHOSRHILYKTUNOSPOSPULPITELS  
CYPOPLASTEREFIMONKORGELMOSESTUMIFTICELORGOVERNEALE  
PRANGELEGALYELIMINATEGDMNUONAPOLEONCETYBMESTUDIORT  
VRIBSLRBLORKGCMERCHANTRICOMMERCEIBSTYNEBONDSARRYNE  
ASJPARSONUTARNIDEITYSTERGYMDARPTNOMARSAINTOJLPSTRE  
VULDICROLHL INGRROHALLOWEDDNRPAEVILLIWOGENGHISKHANF  
OLMARTYRPHKNDRUCLEADERTBAPTISELOHARNESSRARGNTYLFE  
STIVOXPDHYMNQZROLTYOJEHOVAHSSCNLOPRICESM IXTUREMTHS  
GRYFFUNDS TULPQUIRABBICHRFORCEWTIGRANITETWBZAHINGENS  
VCREDITHRLTODSTNGCOMPETERGNSALADRYSLSPOLITICIANION  
LMDFNDDISCOUNTAIGARMEN TRUYJILHADESALHTEGRACETRPYLDA  
OLVESTERGEENLYBQSERMONOSTRILJTRKHVMGESLIRSABBATHRPN  
KLYSTRENGTHNNYNEUTRALODYKRENCRUCIFIXIONYFPROMOTERF  
ULLPASSOVERLYBAPRESTIGEJNPESPIOUSLUVARFOLIAGEYZTEM  
YBARGA INOHMEDDLEABSENCERGROMA FRBUFA XIDHMEADOWPNUR  
EZOBSCURENBIBLESPORDXPRESSUREDODEVTRCATHEDRALDHUM  
RUPRINUHORIZONYLTHOUXSERSAFORESTHTYS DUWRINKLEVURNY  
PLOANADCHEMICALYRTPROFITUFODVNZEPURGATORYGHMIFARSH  
EPOGEPROPHETQYNPOFFICEPNPSALMEISHORUPLISKRA DIATORD  
NISPRIESTNYGLOBEJURSHKBSACREDIJYLMNUPKLACCOUNTSHAR  
VUTRUMARKETUSKLUPENTECOSTRULMORGANOPULATITUDEFDUKT  
MINGREDIEN TRUCASHIPQUPAVILIONLYFETHAJENREVERENCESE  
RJBUSINESSIDOBONTESDILPOCAPITALUFHOIVRESPONSENNVIR

TABLE 31. CANCELLATION FORM 2

Instructions:

1. This is a cancellation task. Note the lines of letters below. When directed, you are to start at the top line and underline the vowels A, E, and I as well as the letters on either side of these three vowels, like this:  
                                   QMAJLKXEDHPRSIMTNZAEFQ
2. You are to read the letters from left to right on each line.
3. This is a test of accuracy, not of speed. Try not to overlook any of these three letters.
4. When you finish, turn the paper over. Look at the black-board. You will see there a running record of the time. Note the time you finish on the top of the back of your paper.

OLRUXTGREPPHRDYL INDRUXDCMVLLQUIJSTVUWOXHTUFODYFVQL  
 AGLBQALTARCOHFMJLOANIDJNCRUCIFIXDSFQLOBEKYPORIVALHM  
 BUHORIZONYGLOQUDVCHVILEADEHMRWYNOSTRILDJUERABBIFBX  
 BOYLQWRPENTECOSTONULYPLASTERCHUPKYTHGRANITEDGPOWER  
 FHINGENGHISKANNBULYDEACONCROMCOMMERCEDUJYNCHADESFKM  
 GLMOSESQUCVQARMENTMHLRLIBELRYWTJEHOVAHHUDDLATITUDEP  
 FLKPDYSTRENGTHCHROUNDOLVQLGUSABBA THOSALADNMORQANMUX  
 STUTORKYCA THEDEALPJTBONDSSLPPGTFORGEJ POKNKUNNERYFFD  
 BGMELODYXLQUCVOHPOLITICIANUMFROWNQJWSOQNDXPSALMNWKT  
 PTVESPERBGMARKETQCHEMICALVCPIOUSXYCAPITALRADIA TORST  
 WYDJONSAINTHMNAPOLEONXPSKMONKRTFUNDSSYBCINGREDIENT  
 YNDRETYDIE TYVQNEUTRALLVYPRONOTERWRCEILINGYCHNOAHNXT  
 FFTPCKOPROPHE TLGMACHINEFQCHOFFICEYRMEDDLEABSORBJ ONDW  
 STXMEADOWPRCREDITWDDISCIPLEYNPSACREDKCDACCOUNTSCHON  
 YDGOVERNTHPRIESTFUPKTPBSERMONFLSTUDIOLNVENVELOPEJRL  
 PNDISCOUNTRURANDOMKPTBIBLECHMNWOELOSSOMDJNSYPROFITH  
 YPTOANGELFXSRPRESTIGEHVVRNPAVILLIONDW RHYMNRMHGCCASHTHS  
 LONRESPONSEGGJXGOSPELHDMIXTUREBAPTISEFNWEAL THMRMLS  
 PRUDTEMPLEMMCOMPETEOJELIMINATEPHARNESSEYDOMINATENDRL  
 VQLFYDOFUTHXOWBUJTSJ IQUILLVMA FEGERISPCGTXURLORILYDRN