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AN EXPLORATORY USE OF THE SEMANTIC
DIFFERENTIAL IN MEASURING THE
EFFECTS OF SPEECHES

by

Merrill F. Garrett

B.S. Montana State College, 1959

Presented in partial fulfillment of the requirements
for the degree of
Master of Arts

MONTANA STATE UNIVERSITY

1960

Approved by:


Chairman, Board of Examiners


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CHAPTER I

STATEMENT OF THE PROBLEM

Considering the fundamental nature of language in human affairs, it is not strange to find that the study of speech is one of the oldest of academic pursuits and one of growing modern significance. Throughout this long and distinguished history of study and inquiry into man's language behavior, there has been the attempt to answer the question of how best to use this peculiarly human function in its many societal roles.

That this is no small consideration is pointed out by Gray and Wise when they observe, "It is through communication that individuals are integrated into societies; it is through communication that the cultures of those societies are established and perpetuated."¹ Speech, when it is viewed as the dominant exercise of the basic medium of human communication, assumes a most significant aspect. The efforts of writers and investigators past and present to contribute to our knowledge of speech processes assume a more general significance in this context of "communicative behavior".

Though there are other considerations, certainly the outstandingly important criterion by which we assess the effectiveness of speech is the extent to which we are successful by our use of language in influencing

¹G. W. Gray and C. M. Wise, The Bases of Speech, (3rd ed., New York: Harper and Brothers, 1959), p. 1.

the behavior of others. As Berlo expresses it:

Our basic purpose in communication is to become an affecting agent, to affect others, our physical environment, and ourselves, to become a determining agent, to have a vote in how things are. In short, we communicate to influence--to affect with intent.²

Underlying this view of communicative purpose is the obvious assumption of direct relationship between the language behavior of men and their other behavior. An example given by Skinner may be useful in making this distinction in "types of behavior" clear in the sense that it will be used here.

Much of the time, however, a man acts only indirectly upon the environment from which the ultimate consequence of his behavior emerge. His first effect is upon other men. Instead of going to a drinking fountain, a thirsty man may simply "ask for a glass of water"--that is, may engage in behavior which produces a certain pattern of sounds which in turn induces someone to bring him a glass of water. The sounds themselves are easy to describe in physical terms; but the glass of water reaches the speaker only as the result of a complex series of events including the behavior of a listener. The ultimate consequence, the receipt of water, bears no useful geometrical or mechanical relation to the form of behavior of "asking for water". Indeed, it is characteristic of such behavior that it is impotent against the physical world.³

Such behavior Skinner terms "verbal behavior", reserving the term only to the behavior described.

We are profoundly interested in the determination of how to expand and insure control over our verbal behavior. There are various ways by which we attempt to establish the link between particular forms of verbal behavior and subsequent effect or lack of effect on the behavior of those we wish to influence. The remainder of this chapter will be devoted to

²David K. Berlo, The Process of Communication, (New York: Holt, Rinehart and Winston, 1960), pp. 11-12.

³B. F. Skinner, Verbal Behavior, (New York: Appleton-Century-Crofts, 1957), pp. 1-2.

an exploration of the problem of establishing this link.

Persuasion Theory

In the field of speech, much of past effort at explanation of the process of influencing behavior through verbal behavior has centered about a distinction between man's "emotion" and his "reason". Referring to this, Berlo states:

By late in the 18th century the concepts of faculty psychology had invaded rhetoric. The mind-soul dualism was interpreted as a basis for two independent purposes in communication. One purpose was intellectual . . . ; the other was emotional.⁴

Even before the time referred to by Berlo much of the substance of this distinction existed. There has long been an assumed close relationship between man's emotional states and his tendency to act. From the time of Aristotle there has been present the tendency to speak of man in terms of his "reason" and his "emotions", to explain his behavior in terms of these concepts. Aristotle identified the emotions as ". . . those states which are attended by pain and pleasure, and which, as they change, make a difference in our judgments (of the same thing)."⁵ George Campbell's 18th century rhetoric pursues the same distinction in explaining the action of men in response to oral appeals.⁶ James Winans observed in the early part of this century: "The relation of the word motive to both motion and emotion is apparent enough. An emotion which

⁴Berlo, p. 8.

⁵Lane Cooper, Trans., The Rhetoric of Aristotle, (New York: Appleton-Century-Crofts, 1932), p. 92.

⁶George Campbell, The Philosophy of Rhetoric, (London: W. Strahan, T. Cadell, W. Creech, 1776), pp. 199-200.

moves to action is a motive, The usage probably arises from the fact that motives, or emotions, stand as major premises in persuasive arguments.⁷ These are not isolated examples, for the assumed close relationship of motive strength to emotional arousal prompts these and other writers to explore the means of evoking emotional response and tailoring it to the purpose of the speaker.

The views of some modern persuasion theorists reflect this same traditional distinction between "reason" and "emotion". Oliver, for instance, defines persuasion as ". . .the art of motivation by non-logical means."⁸ He further says of emotion in persuasion: "For the persuasive speaker it is axiomatic that if people are motivated to a large degree by emotions, persuasive speech must, to have a motivating effect, be emotional."⁹

Minnick, however, is inclined to take a much more inclusive view of the persuasion process, defining persuasion as, ". . .discourse, written or oral, that is designed to win belief or stimulate action by employing all the factors that determine human behavior."¹⁰ Minnick comments on the view of persuasion as exclusively confined to irrational appeal: "Although the preeminence of needs and motives as the driving forces of behavior may be conceded, reason appears to function as the primary means

⁷James A. Winans, Public Speaking, (New York: The Century Company, 1917), p. 196.

⁸Robert Oliver, The Psychology of Persuasive Speech, (New York: Longmans Green and Co., 1942), p. 10.

⁹Ibid, p. 250.

¹⁰Wayne C. Minnick, The Art of Persuasion, (Boston: Houghton Mifflin, 1947), p. 33.

to their attainment."¹¹ The same point of view is most succinctly put by Braden and Brandenburg: "Persons can be moved by short-circuiting their critical processes, but the advocate is on much sounder ground, ethically and psychologically, when he uses argument and facts to stir the springs of action."¹²

The contrast in the above remarks indicates the currency of the reason-emotion dichotomy in the present literature of speech. Statements such as those of Oliver, Minnick, Braden and Brandenburg, et al., represent an attempt by persuasion theorists to provide principles of effective speaking on the basis of some assumptions about human behavior. While this is a necessary step, it should be recognized that the formulation of precepts of verbal behavior as the logical derivatives of a behavioral theory is only a step, part of a process that should include confirmation of such theories and precepts by reference to empirical evidence. Certainly the variation in opinion illustrated by the views of Minnick and Oliver, for instance, should demonstrate the inevitable difficulty in stopping the process short of such experimental determination of theory or principle. The experimental attempts to resolve the various claims for one or the other of the two "types of speaking", "emotional" and "logical", are therefore presented.

¹¹Ibid, p. 23.

¹²Waldo W. Braden and Ernest Brandenburg, Oral Decision Making, (New York: Harper and Brothers, 1955), p. 504.

Review of the Experimental Literature

A number of such studies have been concerned with the relative effects of "emotional" appeals versus "logical" or "non-emotional" appeals. In general, these represent an effort to evaluate "logical" and "emotional" appeals in terms of effectiveness in producing a change of attitude in a test audience. Four investigations that seem particularly pertinent are cited to show the varying results of experimental inquiry into this question.

One such study was conducted by Hartmann in 1936. In this study the appeals were in the form of pamphlets attempting to influence political opinion. Hartmann separated voting precincts in a small eastern city into three approximately equal groups. The voters in one of these groups received a pamphlet employing what was judged to be a predominantly "logical" appeal; similarly, the voters in a second group were given a pamphlet employing what was judged to be a predominantly "emotional" appeal. The third group was used as a control. The results of the appeals were determined by analysis of votes cast in a subsequent municipal election. The difficulty of adequate control in an experiment of this nature should be noted in evaluation of the results of the investigation. In the opinion of Hartmann the results showed the "emotional" appeal to have produced a greater effect on voting behavior than did the appeal described as "logical."¹³

In an experiment conducted by Mennefee and Granneberg in 1939,

¹³G. W. Hartmann, "A Field Experiment on the Comparative Effectiveness of Emotional and Rational Political Leaflets in Determination of Election Results," Journal of Abnormal and Social Psychology, XXXI (1936-37), pp. 99-114.

groups of college students were subjected to oral appeals determined as either "emotional" or "logical" by reference to the judgment of an expert audience. The attempt was to determine the relative effectiveness of the various appeals in shifting political opinion. In this investigation it was found that the appeal described as "emotional" was more successful in producing changes in attitude test scores than was the appeal described as "logical". The differences were significant at the .01 level.¹⁴

The most extensive of the investigations of this general type was conducted by Knower. In this case specific attention was directed at a determination of the effect of oral argument on changes of attitude; the two types of appeal were designed as predominantly "logical" or "emotional". Although Knower does provide a general discussion of the principles used in selecting the appeals, the final determinant was the judgment of an expert audience. The general conclusion by Knower was that there was no significant difference in the effect of the two appeals in producing a change of attitude.¹⁵

A fourth investigation of interest here does not deal directly with speeches described as either "emotional" or "logical", but rather with a related variable. The investigation was conducted by Lomas and was intended to determine the effect of what he termed "provocative" language in changing political opinion. "Provocative" language was defined as;

¹⁴S. C. Menefee and A. G. Granneberg, "Propaganda and Opinions on Foreign Policy," Journal of Social Psychology, XI (1940), pp. 393-404.

¹⁵Franklyn H. Knower, "Experimental Studies on Changes in Attitude: I, A Study of the Effect of Oral Argument on Changes of Attitude," Journal of Social Psychology, VI (1935), pp. 315-345.

"That type of language which introduces usually by insinuation, in-direction, and innuendo, something irrelevant to the evidence presented, by stirring up emotional prejudices, preconceived notions, or other irrelevant concepts which tend to distort the evidence in the direction favored by the speaker."¹⁶ In his investigation Lomas used the paragraph as the basic unit of "provocative" language. The results of Lomas' investigation showed that the speech using "provocative" language delivered in a "provocative manner" was more effective in producing an attitude change than was a speech using "non-provocative" language delivered in a "non-provocative manner".¹⁷

Attitude Measurement and Non-Verbal Behavior

Evaluation of the effects of appeals in the case of Hartmann was by analysis of votes cast in a municipal election. In other words, Hartmann directly observed the action called for in response to his appeals. Mennefee and Granneberg, Lomas, and Knower relied on forms of attitude tests.

The difference in Knower's results and those of the other three investigations might be explained in several ways. Differences in the design characteristics of the investigations may be one reason. There is also the possibility that variation in the appeals is responsible. Even though all the appeals might be described, in some sense of the words,

¹⁶C. W. Lomas, "An Experimental Study of the Effect of Provocative Language on Audience Reaction to Political Speeches," (Unpublished Ph.D. Dissertation), Northwestern University, 1940, p. 3.

¹⁷Ibid.

as "logical" or as "emotional", the terms are so broad as to permit considerable variation. For instance, the appeals of Knower and Lomas are in all probability quite different. Yet both might be legitimately described as "emotional" appeals.

Most important, however, for the present discussion is the possible variation introduced by differences in the means of deciding the relative effects of the appeals used. To recall the point made at the beginning of this chapter, the basic criterion for determining the effectiveness of verbal behavior is its influence on non-verbal behavior. In only one of the experimental studies reviewed was this criterion of effectiveness directly satisfied. In all but one of the four investigations described attitude measurement was employed as the criterion of effectiveness. Indeed, as Matthews indicated ". . . change of attitude has been the chief criterion of speech effectiveness in most speech work of an experimental nature."¹⁸ In view of this an examination of the relationship of attitude measurement to prediction of behavior seems indicated.

As has been emphasized, we are here interested in discovering the effect of a specific type of verbal behavior on the actions of listeners. The direct course would be to observe the actions of the listeners subsequent to their exposure to the questioned type of verbal behavior in order to determine whether they were influenced and to what degree. Many times,

¹⁸Jack Matthews, "A Proposed Technique for Measuring the Type and Amount of Loaded Language Used in a Speech and the Application of this Technique to the Study of the Effect of Loaded Language on the Amount of Information Audiences Remember from Two Recorded Speeches Dealing with Capital-Labor Disputes," (Unpublished Ph. D. dissertation, Ohio State University, 1946), p. 15.

however, such a course is impossible or impractical. The speech whose effectiveness is in question may not call for overt action or for immediate action on the part of the hearers. In this case there must be some resort to less definite methods of assessing the effectiveness of the speech. Such a problem is often approached, as mentioned, through the use of some form of an attitude test. Essentially, in most such forms the effect of a verbal appeal is determined by a response in kind on the part of the hearers; that is, the effects of a form of verbal behavior are determined in terms of a verbal response rather than a non-verbal response. Presumably, when we determine what is described as an attitude we are seeking some quantitative expression of a predisposition ". . . to action with reference to specific attitude objects."¹⁹ Here, however, enters the question of the relationship of the hearer's verbal responses to the test and their future action. As Remmers puts it, this is a problem of validity: "Do the answers of subjects give a true picture of their behavior? A little thought leads to the conclusion that the basic criterion for validating opinion must be corresponding behavior. When one measures validity on a verbal level, the connection with actions must be established."²⁰ In this same vein Brown remarks: "We believe it is possible to make extensive inferences about unrealized behavior from the single answer to the attitude questionnaire. In fact, of course, we have never made a systematic check on this belief. . . . We recognize the

¹⁹H. H. Remmers, Introduction to Opinion and Attitude Measurement, (New York: Harper and Brothers, 1954), p. 3.

²⁰Ibid, p. 41.

verbal expression may not predict a general disposition. . ."²¹

Two conclusions seem warranted by the statements of Brown and Remmers and by the results of the experimental investigations cited. First, that a determination of the effects of similar types of appeals by verbal means and by non-verbal means respectively does not invariably result in the same conclusion. The results of Knower's investigation (determination by verbal means) and those of Hartman's (determination by non-verbal means) may be compared as an example. Second, that such differential results may derive from an uncertain relationship between attitude test scores (verbal behavior) and non-verbal behavior of test subjects toward the attitude objects. Remmers points out that the validity of attitude measurement rests in non-verbal behavior; Brown indicates that such validation is incomplete.

If it is presumed from this that attitudes are not unvaryingly accurate indices to non-verbal behavior, a possible explanation of the disparity may be considered. Brown discusses attitudes as behavioral dispositions related to linguistic meanings. In this connection he states: "For a dispositional theory of linguistic meaning, attitudes are themselves fractional meanings--dispositions within larger dispositions. . . . attitudinal, pro-and-con behaviors are only a fraction of linguistic meanings."²² The contention by Brown that attitudes may be characterized as dispositions within a larger framework of linguistic meanings suggests the presence of other, unnamed "dispositions" comprising the remainder of such a

²¹Roger Brown, Words and Things, (Glencoe, Illinois: The Free Press, 1958), p. 104.

²²Ibid, p. 41

"framework". If so, then it seems that attitude measurement taps only a portion of the effects of a speech, of some sample of verbal behavior, leaving these other hypothesized elements undisclosed and unmeasured.

To refer this to the differences in the experimental investigations cited, the disparity in the results of the Hartmann study and the Knower study might be considered. Hartmann, using non-verbal behavior as the criterion of effectiveness, found what he described as an "emotional" appeal to have superior effectiveness; Knower, using attitude measurement, found no difference in the effects of the appeals he labeled "emotional" and "logical". However, there may have been differences in the responses of Knower's test groups not revealed by the attitude tests used. Such additional differences may, nevertheless, have influenced the subsequent behavior of the test subjects.

Brown's view of attitude as part of the "meaning" of linguistic forms serves to introduce the idea of linguistic meanings as one of the ways the functions of the human judgmental process can be explored and revealed. The use of "meaning" as a predictor of behavior is introduced as a possible approach.

The Semantic Differential

Recent work with a measurement technique known as the "semantic differential" offers evidence of the existence and the nature of some of the additional dimensions of meaning hypothesized above. Osgood, Suci and Tannenbaum, in their book The Measurement of Meaning, offer a theory of meaning in connection with their investigations with the semantic differential. Within the structure of this theory and its relation to general concepts of attitude measurement is found some encouragement for the view

that there are other important aspects of the human judgmental process which influence our behavior, in addition to those shown by attitude measurement tests.

The theory which is described here was offered by Osgood, Suci and Tannenbaum as a beginning effort to relate their rather well-developed technique for measurement (the semantic differential) to the "theoretical conception of meaning as a representational mediation process."²³

Before describing the theoretical rationale offered by Osgood, et al., a short outline of the semantic differential technique will simplify its explanation. In brief, this technique involves pairing of the concept whose "meaning" is being measured with a number of pairs of bipolar adjectives, such as "good-bad", "strong-weak", etc. One of the members of each pair of adjectives is placed at either end of a seven step scale, as:

good____:____:____:____:____:____:____bad

The subject is requested to check the position on the continuum that best matches his feeling for the meaning of the concept being measured. The positioning of a concept on such a scale results in the basic score for the semantic differential.

With the basic form of the semantic differential in view, the theory offered by these investigators can be discussed. They first postulate a "semantic space, a region of some unknown dimensionality and Euclidean in character."²⁴ Any concept may be represented as a point within this semantic space. The scales defined by the bipolar pairs of adjectives are

²³Charles E. Osgood, George J. Suci, and Percy H. Tannenbaum, The Measurement of Meaning, (Urbana: University of Illinois Press, 1957), p. 29

²⁴Ibid, p. 25.

presumed to represent straight line functions passing through the origin of the semantic space; the mid-points of the scales are coincidental with the origin. A number of such scales defined by various pairs of adjectives, would represent a multidimensional space. The larger and more representative the sample of such scales the more completely defined would be the semantic space as a whole. When an individual assigns to a concept a position on one of these scales he is assigning it a position on one of the dimensions of the semantic space.²⁵

Osgood, Suci and Tannenbaum's data (and that of other investigators) indicate that many of these bipolar pairs of adjectives establish "dimensions" in the semantic space that are virtually the same (the similarity in the nature of the scales defined by the pairs "large-small" and "big-little" is readily apparent), and their duplication does not add significantly to the definition of the semantic space. As Osgood, et al., express it: "To define the semantic space with maximum efficiency, we would need to determine that minimum number of orthogonal dimensions or axes which exhausts the dimensionality of the space--in practice we shall be satisfied with as many such independent dimensions as we can identify and measure reliably."²⁶

A number of experiments were conducted by Osgood, et al., to determine these dimensions of the semantic space. All of these revealed substantially the same major results. The investigations indicated the presence of three dominant factors that account for about two-thirds to

²⁵Ibid, p. 25.

²⁶Ibid, p. 25.

three-fourths of the variance of scale scores, plus the presence of numerous other factors accounting individually for a relatively small amount of the common variance and being much less general in their nature. The three dominant factors are referred to as the evaluative (characterized by such scales as good-bad, fair-unfair, kind-cruel, etc.), potency (characterized by such scales as hard-soft, large-small, masculine-feminine, etc.), and activity factors (characterized by such scales as fast-slow, active-passive, excitable-calm, etc.). These three factors regularly appear in the same relative proportions; the evaluative factor accounts for by far the largest share of the common variance, usually at least twice that of any of the succeeding factors; the potency factor is usually next largest, accounting for about half the amount of variance of the evaluative factor; the activity factor is usually about equal to or slightly smaller than the potency factor; the remaining factors (when they are identifiable) regularly account for no more than half as much of the common variance as the potency or activity factors.²⁷

Now, consider this "factor" structure in terms of its similarity to attitude measurement. As was pointed out, the general view of attitudes is that they reflect "predispositions" to response, and further, that they are forms of readiness which are closely associated with "approaching and withdrawing behavior", with "liking and disliking for objects;"²⁸ in short, that they are, as Osgood, et al., point out, highly evaluative in nature. These investigators note a further similarity in the theory underlying the semantic differential technique and attitudes. They state that

²⁷Osgood, Suci and Tannenbaum, pp. 64-75.

²⁸Remmers, p. 3.

attitudes are often characterized as being "ascribed to some basic bipolar continuum with a neutral or zero-reference point, implying that they have both direction and intensity."²⁹ "It seems reasonable," say the investigators, "to identify attitude, as it is ordinarily conceived in both lay and scientific language, with the evaluative dimension of the total semantic space, as this is isolated in the factorization of meaningful judgments."³⁰

With this in mind, consider again the original question of the possible influence of factors other than those measured by attitude tests. If, for the moment, the characterization of attitude as only a part (albeit the greatest part) of the judgmental process is accepted, what of the effect of the remaining factors of potency and activity?

Osgood, Suci and Tannenbaum report an investigation that sheds some light on the question. In 1952 a study of the meanings of certain political concepts as determined by the semantic differential was conducted. In this study one of the attempts made was to predict voting behavior in the 1952 presidential election from analysis of semantic differential scores. In the predictions made, those employing only data on the evaluative (attitudinal) dimension predicted successfully at the five per cent level of significance. The use of potency scores raised the prediction to the one per cent level of significance. Addition of the activity scales did not contribute to the success of the prediction.³¹

²⁹ Osgood, Suci and Tannenbaum, p. 190.

³⁰ Ibid, p. 190.

³¹ Ibid, pp. 142-143.

To maintain that prediction of non-verbal behavior may be enhanced by use of the semantic differential rather than an attitude test alone, on the basis of this one investigation, might seem overly optimistic. However, if the basic assumption of the close similarity of what is measured by attitude tests and by the evaluative dimension of the semantic differential is accepted, then there is the obvious point that by use of the factors of potency and activity more information is included as the basis for prediction. It would seem reasonable to expect improved prediction from this.

To give an example of how this additional information might function to improve prediction, consider the case of two subjects whose attitude test scores for a particular attitude object are identical. On the basis of this, the prediction of the non-verbal behavior of such subjects in situations involving the attitude object would be the same. In one of the investigations with the semantic differential conducted by Tannenbaum, one of the subjects rated the concept THE NEGRO as unfavorable, strong and active; still another subject rated the concept THE NEGRO as equally unfavorable, but for the potency and activity factors rated it weak and passive. As Osgood, et al., state: "It seems likely that the former subject would behave differently (e.g., with fear and avoidance) than the latter. While it is true that different attitudes imply different behaviors toward objects signified, at least in some contexts, it is not true that the same attitude automatically implies the same behavior."²³

The intent here is not to imply that attitude measurement is not a valuable indicator of behavior, or to suggest that the semantic

³²Osgood, Suci and Tannenbaum, p. 199.

differential has some direct link or tie that makes it an infallible predictor of behavior. It does seem, however, that the generally conceded point that attitudes are only a part of the total complex of elements that mediate behavior makes exceptionally pertinent data such as that of Osgood, Suci and Tannenbaum, indicating the nature and presence of some additional factors.

If one considers the basic criterion of speaking effectiveness to be influence on non-verbal behavior, it would appear that whatever instrument offers an indication of more accurate prediction of behavior deserves careful consideration. The semantic differential seems to offer such an indication through the use of the additional factors of potency and activity, as well as any others which may be reliably identified in later investigations of the factor structure of the semantic differential.

The Purpose of the Investigation

In brief outline, the intent of this investigation is to carry out an exploratory use of the semantic differential as a means of assessing speech effectiveness. In doing this some of the aspects of the problem with which investigators of the logic-emotion dichotomy were concerned will be used. By selecting variables related to those involved in the investigations cited earlier (pp. 7-9) the results obtained by Hartmann, Knower, Lomas, and Menefee and Granneberg can be used in determining the research hypothesis.

Some of the several variables involved in what is generally considered to be "emotional" speaking will be employed in the construction of the test appeals. The effects of these on audience judgments will be determined by use of the factors of evaluation, potency and activity in

the semantic differential.

Of the several elements mentioned in discussions of "emotional" speech, two were selected. These were the use of "figures of speech" and "vividness" in word choice. These are prominently mentioned by Oliver³³, Brigance³⁴, Monroe³⁵, and others. In general these characteristics are seen to be common to a number of discussions of "emotional" speech. There is no intention of presenting these two variables as being definitive of "emotional" speech.

The relationship of these factors to "emotional" speech should be considered in formulation of a research hypothesis. The investigations of Hartmann, of Lomas and of Memefee and Granneberg all showed the "emotional" appeal (in one form or another) to produce superior results. Hartmann used non-verbal behavior as criterion of effectiveness; the other two investigations (as did Knower's also) relied on attitude measurement. Presuming the selected variables of "figures of speech" and "vividness" in word choice to share a measure of the same nature of the appeals of those three investigations would dictate a choice in favor of the test speech containing relatively greater use of the variables. Knower's study, having resulted in a conclusion of no difference in the effects of his test appeals, would not indicate a choice in either direction. In addition, the two variables selected are generally viewed favorably by the authorities

³³ Oliver, p. 155-162.

³⁴ W. Norwood Brigance, Speech Composition, (New York: McGraw Hill Book Company, 1936), p. 158.

³⁵ Alan H. Monroe, Principles and Types of Speech, (Chicago: Scott Foresman, 1939), p. 108.

cited (Oliver, Monroe, Brigance, et al.). The presumption seems to be that these variables are related positively to effective speaking, both with respect to the experimental evidence and opinions of authorities in the field.

Accordingly, it is the purpose of this investigation to explore the use of the semantic differential as a measure of speaking effectiveness. In so doing, two of the variables in what is generally considered to be "emotional" speaking will be used in the construction of test speeches. The result of the test appeals will be determined by use of the semantic differential for the three major factors isolated in previous studies; evaluation, potency and activity.

The hypothesis governing this experimental inquiry is that a speech incorporating the elements of "figures of speech" and "vividness" in word choice will produce greater changes in the factor scores (evaluation, potency, and activity) of the semantic differential than will a speech in which these elements are relatively lacking.

CHAPTER II

PROCEDURE

The following general procedure was followed in applying the semantic differential as a measure of the effects of two test speeches. The test speeches were constructed relative to the two test variables ("figures of speech" and "vividness" in word choice) selected. These speeches were recorded for later presentation. Each of the two speeches was presented to a different audience by means of a tape recorder. The audiences were tested before and after presentation of the two speeches with the semantic differential (evaluative, potency and activity factors), using selected concepts common to both speeches. The data thus obtained was compared with that of a control group.

The Test Speeches

The two variables to be used in construction of the test speeches have already been designated as "figures of speech" and "vividness" in word choice.

Two speeches advocating greater concern with conservation problems were constructed. The topic selected was intended to be one not likely to arouse resistance, but at the same time, to be one the audience might be relatively apathetic toward. The speech which will hereafter be referred to as speech A was constructed with a straightforward presentation of the information selected, and lacking, relatively, "figures of speech". The speech which will hereafter be referred to as speech B was constructed

embodying the devices of "figures of speech" and "vividness" in word choice wherever possible. In short, where the introduction of a contention in speech A consists of a relatively unembellished presentation of information, that same contention is presented in a more colorful manner ("figures of speech" and "vividness" in word choice) in speech B.

The two speeches were maintained parallel in all possible respects other than the above. Topic, key contentions, organization and information; these were identical in outline and were so treated as to produce the same point of view in both speeches. Total tokens, total delivery time and time devoted to each contention; these differences were minimized to as great an extent as possible. Copies of the test speeches as they were recorded appear in appendices A and B.

In order to demonstrate the difference in the two speeches with respect to "figures of speech", the following steps were taken. All the sentences of speech A were listed in random order, and similarly for speech B. Both these random lists were given to a member of the speech faculty. This person was asked to go through the lists and identify all the "figures of speech" he discovered. No other instructions were given. The investigator also made independently a similar tabulation. The numbers and types of "figures of speech" found in each of the speeches are given in Table 1. The random lists of sentences with the "figures of speech" as identified by the investigator and the faculty judge are found in appendices C and D.

To determine the variation in word choice from speech A to speech B, the following procedure was devised. All the different words in each of the speeches were listed. From these lists were deleted all of the

TABLE 1

Types and Numbers of Figures of Speech in
Test Speeches A and B as Identified
by Two Judges

Figure of Speech	Judge I*		Judge II**	
	Sp. A	Sp. B	Sp. A	Sp. B
Allusion	0	1	0	4
Analogy	0	1	0	0
Antithesis	2	4	1	7
Climax	0	1	0	0
Epigram	0	0	0	1
Exclamation	0	2	0	1
Hyperbole	0	17	0	16
Interrogation	0	11	0	15
Irony	0	0	0	4
Metaphor	0	2	0	7
Metonymy	0	0	0	2
Personfication	9	31	2	22
Simile	0	1	1	1
Synecdoche	0	3	0	1
TOTAL	11	74	4	81

*Speech Faculty Judge

**Investigator

words classified by Sledd as the "minor syntactic classes". As Sledd lists these they are the (1) determiners, (2) preposition, (3) conjunctions, (4) relatives, (5) interrogatives, (6) intensive-reflexives, (7) auxiliaries, and (8) adverbials of degree.¹ These words might roughly be referred to as "structure", in that they are used either as general substitutive words or are necessary for the formation of sentences in English. Sledd remarks concerning these classes: "Most of the smaller sets," (the eight classes listed), it should be noted, are closed classes, that is, their membership is fixed and slow to change."² Because of this quality of words of these classes, i.e., they are generally structural and constant rather than varying and descriptive, it was felt that their exclusion would not distort the comparison of the two speeches, while it would greatly reduce the number of words it would be necessary to classify. Moreover, almost every one of the words so excluded would have also been excluded on the basis of the following step.

Of the words remaining from each speech all the words common to both speeches were deleted from the lists. Since it was the intent to show differences in the selection of words in the two speeches, this step was taken to reduce the word lists to those words which would reflect the difference in word choice in the two speeches.

From the list of words remaining (431 from speech B and 285 from speech A) from each speech, two hundred and fifty words were randomly selected, The five hundred words so selected were randomly assorted and

¹James Sledd, A Short Introduction to English Grammar, (Chicago: Scott Foresman, 1959), pp. 235-236.

²Ibid, p. 97.

listed. Such a list was given to each of four upperclass and graduate students. They were instructed to sort the words into four categories, neutral words, attitude words, image words and those that were both attitude words and image words. These classifications were selected for simplicity and inclusiveness. The use of these particular descriptive terms and the instructions given with them comes from discussions by Walpole³, Fearnside and Holther⁴, and Ogden and Richards. A statement from Ogden and Richards' book The Meaning of Meaning indicates the general tone of these remarks: "The symbolic use of words is statement; the recording, the support, the organization and communication of references. The emotive use of words is a more simple matter, it is the use of words to express or excite feelings and attitudes."⁵

The instructions that were given the people who performed this word sorting operation included these definitions: attitude words are words which reveal the feeling of the user of the word toward the object or action which the word refers to; image words are words which arouse some degree of the feeling of an action or situation, or give rise to a "mental picture" of the object named; neutral words are words that essentially convey only basic information, neither arousing "images" nor expressing attitudes. Examples for each of these definitions were included. The instructions and word lists used appear in appendix E.

³Hugh R. Walpole, Semantics, (New York: W. W. Norton and Company, 1941), pp. 38-54.

⁴W. Ward Fearnside and William B. Holther, Fallacy, (Englewood Cliffs, N. J.: Prentice Hall, 1959), pp. 76-82.

⁵C. K. Ogden and I. A. Richards, The Meaning of Meaning, (New York: Harcourt Brace, 1923), p. 149.

Since the degree of measurement attained in this sorting process was "nominal", the Chi square test was used to determine if the numbers of words classified as attitude, image, and attitude-image were significantly greater for speech B than for speech A.

A high significance level was felt necessary, since it was expected that a distinct difference should be evident and, more importantly, that the risk of type one error should be especially guarded against. The investigation was intended to explore the use of the semantic differential as a measuring instrument. Therefore, to reject the null hypothesis with regard to the variable of "vividness" in word choice would, if type one error were committed, reduce the opportunity for the usefulness of the semantic differential to be revealed. The significance level was set at .01 for a one-tailed test. The results of this sorting exercise and the Chi-square values are given in table 2. All the Chi-square values are significant at the required level.

In order to summarize the similarities in speech A and speech B, table 3 is included, showing total tokens, total delivery time, and approximate time devoted to each major topic. The type-token ratio is also shown as an additional point of similarity in the two speeches. This latter similarity was an unlooked for one. It is possible that it was produced by the effort to insert the same basic information in both speeches, and to devote the same approximate time to discussion of each of the major topics or contentions. It should be noted in this connection that in carrying out the operations described in the procedure for demonstrating the difference in the speeches with respect to "vividness" in word choice, a difference was found in the total number of words that remained after the

TABLE 2

Words Classified as Attitude, Image,
Attitude-Image and Neutral in Test
Speeches A and B by Four
Student Judges

Classification	I		II		III		IV	
	Sp. A	Sp. B	Sp. A	Sp. B	Sp. A	Sp. B	Sp. A	Sp. B
Attitude Words	16	27	35	23	46	59	27	39
Image Words	26	61	71	136	8	77	8	100
Attitude-Image Words	3	10	13	24	0	0	3	17
TOTAL	45	98	119	183	54	136	38	156
Neutral Words	205	152	131	67	196	114	212	94
Chi-square (df=1)	26.23*		33.20*		55.61*		98.65*	

*The value of Chi-square required for significance at the .01 level for a one-tailed test is 5.41.

TABLE 3

Similarities in Test Speeches
A and B for Delivery Time
and Word Counts

	Speech A	Speech B
Total Delivery Time	16.5 min.	16.0 min.
Delivery Time for Major Topics*		
Introduction	4.5	4.5
Minerals	1.5	1.5
Timber	1.5	2.0
Wildlife	3.5	2.5
Soil and Water	4.5	4.0
Conclusion	1.0	1.5
Total Tokens	2153	2159
Type-token ratio	.407	.410

*approximate

minor syntactic classes and the words common to both speeches were deleted. The number of words remaining from speech A was two hundred eighty-five; those from speech B, four hundred thirty-one. This possibly is the reflection of the greater "vividness" in word choice in speech B that might have been expected to appear in the type-token ratio.

Speech A and speech B were tape recorded at a speed of seven and one-half inches per second. Both speeches were delivered by the same person and recording of speech A was followed immediately by recording of speech B. The speaker was selected for his experience and skill in oral interpretation. He was given equal opportunity for study of each speech prior to recording and was instructed to deliver each speech to the best of his ability in the manner most appropriate to the content. No other instruction was given. The procedure here followed was an attempt to hold delivery variables constant.

The Criterion Test of Effectiveness

As indicated, the effects of the speeches were measured with the semantic differential for the factors of evaluation, potency, and activity. The source of information used in constructing the semantic differential forms was the previously cited work of Osgood, Suci and Tannebaum, The Measurement of Meaning. Osgood, et al., present considerable evidence attesting to the reliability of the semantic differential technique.⁶ It was felt, however, that some indication of the reliability of the adjective scales used in this investigation to represent the three factors of evaluation, potency, and activity should be obtained.

⁶Osgood, Suci and Tannenbaum, pp. 126-140.

Accordingly, a pilot study was designed. Five key concepts were selected common to both speeches; these were "Natural Resources", "The Principle of Conservation", "Soil Erosion Today", "Wildlife Preserves", and "Conservation Practices Today". Using these and the following scales to represent the three factors, the forms were constructed. The scales were: "good-bad", "valuable-worthless", "wise-foolish" (evaluation); "strong-weak", "large-small", "hard-soft" (potency); "active-passive", "fast-slow", "static-dynamic" (activity). The scales used were selected from those found by Osgood, et al., to have high loadings on their respective factors. The scales were also selected for their relevance to the projected test concepts.

Two sets of semantic differential forms were prepared; each form contained all the listed concepts as well as the same scales. Two different forms were considered desirable in order to minimize as much as feasible the likelihood of recall from one performance with the semantic differential forms to the next. The forms used differ only in the additional concepts used to "pad" the forms and in the order of the appearance of the actual test concepts taken from the test speeches. The additional concepts (which are unrelated to the subject of the test speeches) not only permit something of the appearance of two different forms, thus tending to increase the probability of independent judgments for the successive administrations of the forms, but also allow spacing of the test concepts to decrease the possibility of any "halo" effect from similar concepts. As Osgood, Suci and Tannenbaum point out, the evidence indicates that different contexts for the test concepts (e.g., different "padding") does not significantly affect the responses of

subjects to specific test concepts.⁷ Hence, this technique seems advisable for the reasons given, while apparently not injecting any additional variables.

The two forms are designated form 1 and form 2; form 1 was used in pretesting and form 2 was administered after a fifteen minute interval (the approximate length of the test speeches). The instructions, test concepts, "padding" concepts and one of the sheets containing the adjective scales used with each concept are given in appendix F.

The subjects for this reliability investigation were a class of twenty-five beginning speech students (predominantly freshmen and sophomores). The forms were administered during regularly scheduled class time.

The forms were scored by assigning a value of 3 to the extreme "positive" ends of the adjective scales, i.e., the ends of the scales which indicate the presence of the factor (evaluation, potency and activity), in question. For instance, on the "good-bad" scale, the extreme position on the "good" side received a score of 3. The opposite extreme end of the seven step scale was given a value of -3; corresponding values were given to the intermediate positions on the scales. To obtain a "factor score", the scores for the three scales representing a factor were summed algebraically. Factor scores were computed for each of the five test concepts on each of the three factors.

The reliability of each of the three factors was checked by computing a Pearson product-moment correlation coefficient for each factor across

⁷Osgood, Suci and Tannenbaum, pp. 192-195.

all five concepts (i.e.,) the scores for all of the five test concepts on each factor were combined in computation of the correlation for that factor. In order to discover whether there had been any significant change in the central tendency of scores from form 1 to form 2, the difference in the means of the factor scores was checked using the "t" test.

The correlation coefficients and "t" scores are given in table 4. As shown, only the evaluation factor reaches a correlation coefficient beyond .70; the potency factor, moreover, shows a "t" significant beyond the .10 level of significance. Since Osgood, et. al., obtained an "r" of .85 for correlation across the three major factors, these results were considered unsatisfactory.

It was hypothesized that the cooperation of the test subjects might not have been as complete as desirable and may have been the cause of the unsatisfactory results. Although an effort was made to impress upon the subjects participating the importance of care and attention in their work, the responses of some participants supported this hypothesis. Questions asked by subjects during the investigation also suggested that the concepts being used needed a more specific statement.

With these considerations in mind, a second reliability check was undertaken. The scales used to represent the three factors were the same as for the first investigation. The wording of some of the test concepts was changed to a more specific form to avoid difficulty due to ambiguity. The concepts used in the second study were "Natural Resources", "The Principle of Conservation", "The Results of Soil Erosion", "Wildlife Preserves", and "Present Conservation Measures".

The Subjects for this second study were obtained by calling for volunteers to take part in the investigation. There were sixteen people

TABLE 4

Pearson Product-moment Correlation Coefficients
and t scores of Mean Differences for Factor
Scores of Forms 1 and 2 of the
Semantic Differential

Factor	Pearson r	t (df=112)
Evaluation	.755	.098
Potency	.417	1.820*
Activity	.516	.512

*For significance at the .10 level, $t = 1.671$.

in this group, most of whom were upperclassmen taken from speech classes. None of the subjects in this group took part in the first investigation.

Factor scores were computed for each of the test concepts on each of the three factors; scoring was in the same manner as the first investigation described. Pearson product-moment correlation coefficients were again determined as in the first case; the "t" test was again used to determine shifts in the central tendency of the scores. The correlation coefficients and "t" scores are given in table 5. As shown, all of the correlation coefficients are considerably higher and none of the three factors shows a significant shift with the "t" test. Although the correlations were not as high as those obtained by Osgood, et al., they were deemed high enough to permit construction of the forms to be used with the experimental groups.

In devising the semantic differential forms to be used in measuring the effects of the tests speeches, two changes were made from the forms used in the just described reliability studies. In addition to the three scales used for each factor, three new scales were included, one additional for each factor. These scales were "positive-negative" (evaluation), "heavy-light" (potency), and "sharp-dull" (activity). These scales were added to further insure reliability by reducing variations due to random errors. All of the test concepts were again slightly re-worded to make them, in the opinion of the investigator, somewhat less ambiguous. The test concepts as changed were "Our Natural Resources", "An Ideal Conservation Program", "The Function of Wildlife Preserves", "The Effects of Soil Erosion", and "Conservation as it is Practiced Today". The instructions were the same as in the reliability studies. Test concepts, "padding"

TABLE 5

Pearson Product-moment Correlation Coefficients
for Factor Scores of Forms 1 and 2 of the
Semantic Differential; "t" Scores of
Mean Differences in Factor Scores

Factor	Pearson r	t (df=79)
Evaluation	.884	.089
Potency	.703	.110
Activity	.642	1.220

concepts and one of the sheets containing the adjective scales used with each of the concepts are included in appendix G.

At the time of this investigation there was being conducted on the Montana State University campus a high school speech camp. The speech camp was attended by high school students who were all between their junior and senior years in high school. These students all had superior academic records. Volunteers were sought from this group. All of the sixty-two students participating in the camp volunteered to be subjects.

This group of sixty-two was randomly assorted into two experimental groups of twenty each (Groups I and II) and a control group of twenty-two (Group III). All three groups were assembled in one room and administered form 1 of the semantic differential. Group I then went to a separate room where they were given the following instructions:

You are about to hear a tape recorded speech. Please listen carefully.

The group then heard speech A. Immediately following the speech the group was read the following:

You will now return to the room in which you were tested. Please do not discuss the speech you just heard or the test you took.

At the same time that Group I heard speech A, Group II in a separate room heard speech B. They were given the same instructions as Group I. While Groups I and II were listening to the test speeches, Group III, the control, was requested not to discuss the test they had taken. In order to insure no communication among the members of the control group, they were read some short entertaining essays for diversion. When Groups I and II had heard the test speeches they were brought back to the same room

in which form 1 of the semantic differential was administered. All three groups were then administered form 2 of the semantic differential.

An Operational Statement of the Research Hypothesis

The research hypothesis restated in terms of the test speeches is that speech B will produce a greater shift in the factor scores of the semantic differential than will speech A. To relate this to the factor structure of the semantic differential the following predictions concerning the test concepts were made. For the evaluative factor the prediction was that the three concepts "Our Natural Resources", "An Ideal Conservation Program", and "The Function of Wildlife Preserves", would all move "up" the scales in the positive direction, since the test speeches were intended to produce a more favorable attitude toward these concepts. The prediction for the two concepts "The Effect of Soil Erosion" and "Conservation as it is Practiced Today" was that the scale scores would move "down" in the negative direction, since the two speeches were intended to produce a more unfavorable attitude toward these concepts.

For the potency factor it was predicted that the two concepts "An Ideal Conservation Program" and "The Effect of Soil Erosion" would shift scores in the positive direction, being perceived as more potent, since the test speeches were meant to increase the listeners' awareness of the far-reaching effects of soil erosion and to emphasize the importance of a strong conservation program. The three remaining concepts were predicted to show shifts in factor scores in the negative direction since the speeches were intended to demonstrate the inadequacy of these three under present conditions.

For the activity factor it was predicted that the two concepts "An Ideal Conservation Program" and "The Effects of Soil Erosion" would shift scores in the positive direction, since the speeches were intended to show the extreme and continuous progress of erosion forces and to indicate a need for greater efforts in conservation. The prediction for the three remaining concepts was that they would show a shift in the negative direction, since the failure of these three to meet the problems outlined in the test speeches was emphasized. The predictions for shifts on all three factors are summarized for each concept in table 6.

While these predictions were made for the effects of both test speeches, the hypothesis was that in each case the movement in factor scores would be greater for the group that listened to speech B.

A Final Check on Reliability

Because of the changes described earlier that were made in the forms used in the experimental situation, a final check on the reliability of the semantic differential forms was made using the data from the control group. The same procedure as that described in the pilot studies of reliability was used. The results of this analysis are given in table 7. None of the values of t are significant, but of the correlation coefficients, only evaluation and potency reach levels which compare favorably with those obtained in the second reliability investigation. The activity factor, however, is even less satisfactory than in the second reliability investigation (where it had the lowest of the three correlation coefficients). It was felt that the rewording of the test concepts and the addition of one more scale on which to base factor scores would raise the correlation to a level comparable to the other two factors.

TABLE 6

Predicted Directions of Shift in the
Factor Scores of Five Selected
Concepts of Speeches A and B

Concepts	Evaluative Factor	Potency Factor	Activity Factor
Our Natural Resources	positive	negative	negative
An Ideal Conservation Program	positive	positive	positive
The Function of Wildlife Preserves	positive	negative	negative
The Effects of Soil Erosion	negative	positive	positive
Conservation as it is Practiced Today	negative	negative	negative

TABLE 7

Pearson Product-moment Correlation Coefficients
and t Scores of Mean Differences for Factor
Scores of Forms 1 and 2 of the
Semantic Differential

Factor	Pearson r	t (df=106)
Evaluation	.893	.198
Potency	.736	.190
Activity (4 scales)	.576	.255
Activity (3 scales)	.789	.313

Such did not prove to be the case.

Questions asked by some of the subjects during the administration of the semantic differential forms suggested that the "static-dynamic" scale might be the source of the difficulty. Several of the subjects indicated that they did not understand the terms. Correlation coefficients for each of the scales used in the activity factor were computed and the "static-dynamic" scale proved to have the lowest correlation coefficient. An examination of the scores also seemed to indicate that the "static-dynamic" scores did not covary consistently with the other three scales representing the activity factor. Accordingly, factor scores for the activity factor were computed omitting the "static-dynamic" scale scores. The correlation coefficient for this set of factor scores also appears in table 7.

As can be seen, the correlation coefficient for these scores is markedly improved, being brought to a comparable level with potency and evaluation. The same operations were performed on the scale scores for both potency and evaluation but there was no pronounced difference in the correlation coefficients of the scales used in these factors. Elimination of the scale with the lowest correlation coefficient in the computation of factor scores failed to bring about any large change in the correlation coefficients for these factors (elimination of "positive-negative" from the evaluation factor scores raised the correlation from .893 to .901; elimination of "hard-soft" from the potency factor scores lowered the correlation from .736 to .721). The correlation coefficients shown in table 8 (excepting the activity factor scores computed from four scales) are comparable to those obtained by Osgood, et al.

Treatment of Data

The factor scores for each of the concepts for the evaluation and potency factors was computed in the same manner as that described for the reliability tests; this was done for the data from each of the three groups of subjects. The factor scores for the activity factor were also computed in the same way, with the exception that these factor scores were determined from the scores of the three scales remaining after the scores for the "static-dynamic" scale were omitted. Factor scores appear in appendices H, I, and J.

In selecting a significance level to be used, it was considered that the risk of type 2 error was a more serious consideration than is normally the case. Since this is an exploratory investigation, the penalty for accepting the null hypothesis when there does in fact exist a difference measurable by the semantic differential, would seem to be a possible discouragement of further investigation in speech with a promising technique of measurement. The results of type 1 error, rejecting the null hypothesis when it is true, seem not to be more serious than the additional investigations required to show this. For this reason α was set at the .05 level rather than the .02 or .01 levels of significance.

The shifts of the factor scores for the individual concepts in the predicted directions were tested for significance using the Wilcoxon's matched-pairs signed-ranks test; each group serves as its own control for this test.

The use of the Wilcoxon test was prompted by the desire to check the significance of each of the produced shifts in factor score for all

test concepts while making none of the assumptions discussed below in connection with the parametric statistical tests used. Additionally, for the non-parametric Wilcoxon test as it is used here, no direct statistical comparison of the shifts in the scores of the three groups is involved. The Wilcoxon test will, in other words, determine (for each of groups I, II, and III) the significance of the predicted shifts in factor scores (see table 7), a total of fifteen for each group.

The data of groups I, II, and III was compared in the following manner. Using as basic scores the differences (form 2 score minus form 1 score) in factor scores for each of the five concepts, analysis of variance was used to determine if there were significant differences in the shifts shown by the three groups of subjects. The analysis was performed comparing the scores for groups I, II, and III on each concept for each factor; this is a total of fifteen analyses, three for each of the five concepts. Where a significant F ratio was obtained, the "t" test was used to determine significant differences between the various groups.

The use of analysis of variance and the "t" test involved a number of assumptions, chief among them the assumptions that (1) the variable is normally distributed in the sample populations, (2) there is equal variance in the sample populations, (3) the variable has been measured in an interval scale.⁸ Of the first of these, Snedecor states: "Rather wide departures from normality are tolerated in practice. . . . Unless some rather startling lack of normality is known or suspected,

⁸Sidney Siegel, Non-Parametric Statistics for the Behavioral Sciences, (New York: McGraw-Hill, 1956), p. 19.

analysis of variance may be used with confidence."⁹ Of the second assumption, Blommers and Linquist say: "It is . . . known that inequality of population variances does not seriously affect the validity of the t test, so long as the inequality is not extreme."¹⁰ There is no present indication of the failure of these two assumptions; neither is there indication of their correctness.

The third assumption, that the variables have been measured in an interval scale, is discussed by Osgood, et al. They offer some evidence that the form of the semantic differential used here closely approximates an interval scale. The investigation by Messick cited by Osgood, et al., indicates some departure from the ideal of an equal interval scale, but of a degree considered not prohibitive by Osgood, et al. They state (referring to Messick's investigation of the scaling properties of the semantic differential): "Considering the . . . indications of the present study, i.e., an approximate equality of intervals between scales and a similar placement of origins across scales, it seems reasonable to conclude that the scaling properties assumed with the semantic differential have some basis other than mere assumption."¹¹ These investigators also note a study by Cliff showing that ". . . the adverbial quantifiers slightly, quite, and extremely (which define the three degrees of intensity in using the semantic differential) proved to yield almost

⁹George W. Snedecor, Calculation and Interpretation of Analysis of Variance and Covariance, (Ames, Iowa: Collegiate Press, 1934), p. 10.

¹⁰Paul Blommers and E. F. Lindquist, Elementary Statistical Methods, (Boston: Houghton Mifflin Co., 1960), p. 356.

¹¹Osgood, Suci and Tannenbaum, p. 152.

perfectly equal increasing degrees of intensity, .50, 1.00, and 1.50 respectively."¹² These results also seem to encourage the assumption of interval measurement.

Not only does the evidence given above tend to support the assumption of interval measurement, but in addition the assumption is necessary on another basis. The computation of the basic scores used in this investigation, the factor score, and also the scores determined from factor differences (used in the analysis of variance) require addition and subtraction operations. Since these operations involve the assumption of interval measurement in themselves, the use of the F test and the "t" test does not actually require a new assumption.

Considering evidence by Osgood, et al., concerning the scaling assumptions and the lack of present evidence that the assumptions of normality and equal variance are in error, the use of the parametric F and "t" tests seems warranted. In addition, the use of the Wilcoxon test, which does not require these assumptions, serves as a measure of insurance against some unexpected departure from the parametric assumptions.

¹²Ibid, p. 153.

CHAPTER III

RESULTS

The operational statement of the hypothesis contained fifteen predictions of the shift of scale scores for the five test concepts. The mean of the differences of the factor scores from test 1 to test 2 is an indication of the direction and magnitude of these shifts. In table 8 the means of the sums of these differences are recorded for each of the concepts on each of the factors. The expectation was that in each case the greatest movement would be produced by speech B. As the table shows, the shifts for Group I (which heard speech A) were in the predicted directions for ten of the fifteen concepts. The shifts for Group II (which heard speech B) were in the predicted directions for twelve of the thirteen concepts that showed a shift; two of the concepts showed no change. For the control group, Group III, the shifts were seven in the predicted direction, one concept showing no change, and seven shifts not in the predicted direction.

In comparing the magnitudes of the shifts in factor scores, table 8 shows that in every instance for the potency and activity factors Group II scores changed more than did the control group scores; in four of five concepts on each of these factors Group II shifts were also greater than Group I shifts, the exceptions being the same concept in both factors. This concept was "Conservation as it is Practiced Today". For the activity factor the magnitude of the shifts were the same; for the potency factor the Group I shift exceeded that of Group II (1.45

TABLE 8

Summary of Mean Shifts in Factor Scores for
Five Test Concepts in Three Groups

Test Concept	Evaluation			Potency			Activity		
	I (Sp.A)	II (Sp.B)	III (Control)	I (Sp.A)	II (Sp.B)	III (Control)	I (Sp.A)	II (Sp.B)	III (Control)
Our Natural Resources	-.36	-.90	-.05	-1.15	-3.20	.14	-.70	-1.15	.00
An Ideal Conservation Program	.95	1.45	.86	.70	1.55	.36	.70	2.15	.05
The Function of Wildlife Preserves	.36	.00	.27	.05	-1.10	.05	-.15	-.90	-.09
The Effects of Soil Erosion	-.70	.00	-.45	.55	1.30	-.41	-.05	.25	-.23
Conservation as it is Practiced Today	.75	-3.50	.25	-1.45	-1.00	-.50	.80	-.80	.09

versus 1.00).

In the evaluative factor Group II scores showed no shift for two of the concepts, so that in these cases both the control group scores and Group I scores showed greater changes. For the remaining three concepts in this factor in which Group II scores did display a shift, the shifts were of greater magnitude than either those of Group I or Group III.

The shifts of the Group I scores with respect to the shifts of Group III, the control, were greater in every concept for the evaluative factor and in four of five concepts on both the potency and activity factors. The exception in the potency factor was the concept "The Function of Wildlife Preserves"; for this concept the magnitude of shift was the same for both Group I and Group III. The concept "The Effects of Soil Erosion" had a greater shift for the control group scores than for those of Group I in the activity factor.

Overall, the expected rank ordering of the shifts for the concepts occurred in ten of the possible fifteen cases. The exceptions were in all cases displacements of only one of the three groups from the expected position. With respect to the predicted directions of shift, the control group showed chance distribution of shifts (seven in the predicted direction, seven in the direction not predicted, and one not changing). The shifts for Group I were ten in the predicted direction; this is a pattern that would occur by chance approximately fifteen percent of the time.¹ The shifts for Group II were twelve in the predicted direction; this correspondence would occur by chance less

¹Siegel, p. 250.

than two per cent of the time.² In ten of the cases in which Group II showed a shift, Group I also showed a shift in the same direction. Since Group II showed a shift in only thirteen of the fifteen possible instances, the chance occurrence of this correspondence in the directions of the shifts for Groups I and II would be less than five per cent of the time.³

The Non-Parametric Tests

The shifts in test scores from form 1 of the semantic differential to form 2 were tested for statistical significance using the non-parametric Wilcoxon' matched-pairs signed-ranks test. The test was used for the shifts shown in each of the three groups of subjects.

The evaluative factor showed no significant shifts to have taken place in the control group's scores. The group that heard speech A (Group I) showed no shifts significant at the required level. The group that heard speech B (Group II) showed two shifts at the required significance level. These concepts were "An Ideal Conservation Program" and "Conservation as it is Practiced Today". The results for the evaluative factor are summarized in tabel 9.

The potency factor showed no significant shifts in the control group scores (Group III). Group I scores showed one significant shift at the .05 level; the concept is "Conservation as it is Practiced Today". The scores of Group II showed significant shifts for three of the five tests concepts; these concepts were "Our Natural Resources", "An Ideal Conservation Program", and "The Function of Wildlife Preserves". The results

²Ibid, p. 250.

³Ibid, p. 250

TABLE 9

Summary of the Wilcoxon's Matched-Pairs Signed Ranks
 Analysis of Shifts in Evaluative Factor Scores on
 Five Concepts for Three Groups of Subjects

Concept	Group I		Group II		Group III	
	N	T	N	T	N	T
Our Natural Resources	16	53.0	18	53.0	18	85.0
An Ideal Conservation Program	16	40.5	14	10.0*	15	38.0
The Function of Wildlife Preserves	15	36.0	17	51.0	15	44.5
The Effects of Soil Erosion	16	51.5	18	82.5	18	84.5
Conservation as it is Practiced Today	14	28.5	16	22.5**	13	37.5

*T must not exceed 25 for significance at the .05 level for a one-tailed test.

**T must not exceed 35 for significance at the .05 level for a one-tailed test.

of the Wilcoxon test for the potency factor are summarized in table 10.

In the activity factor, Group III scores again showed no significant shifts. Group I scores also showed no shifts at the required significance level. The scores for Group II showed two shifts significant at the .05 level of significance; these concepts are "Our Natural Resources" and "An Ideal Conservation Program". The results for the activity factor are summarized in table 11.

Several concepts in the three factors, for Group I and Group II scores, approached the required significance level. For Group I, two concepts in the evaluative factor, one in the potency, and two in the activity were significant at the .10 level. For Group II, there were two additional concepts at this level, one in the potency and one in the activity factors.

The Parametric Tests

The shifts in factor scores for each of the three groups of subjects were compared on all of the five test concepts using analysis of variance and the "t" test.

The evaluative factor produced one significant F ratio in the five analyses of variance (one for each of the five concepts). The F ratio for the test concept "Conservation as it is Practiced Today" is significant at the required level. The results of the analysis of variance for each of the five test concepts are summarized in tables 12, 13, 14, 15, and 16.

For the concept which showed a significant F ratio, the "t" test was used to determine the statistical significance of the differences between the various groups. Table 17, which gives the results of the "t"

TABLE 10

Summary of the Wilcoxon's Matched-Pairs Signed-Ranks
Analysis of Shifts in Potency Factor Scores on
Five Concepts for Three Groups of Subjects

Concept	Group I		Group II		Group III	
	N	T	N	T	N	T
Our Natural Resources	16	37.0	18	8.5*	17	65.5
An Ideal Conservation Program	14	37.0	13	7.5**	17	64.5
The Function of Wildlife Preserves	15	60.0	18	38.0*	18	85.5
The Effects of Soil Erosion	17	58.5	17	46.0	16	46.5
Conservation as it is Practiced Today	15	20.5***	16	38.5	13	31.5

*T must not exceed 46.0 for significance at the .05 level for a one-tailed test.

**T must not exceed 21.0 for significance at the .05 level for a one-tailed test.

***T must not exceed 30.0 for significance at the .05 level for a one-tailed test.

TABLE 11

Summary of the Wilcoxon's Matched-Pairs Signed-Ranks
Analysis of Shifts in Activity Factor Scores on
Five Concepts for Three Groups of Subjects

Concept	Group I		Group II		Group III	
	N	T	N	T	N	T
Our Natural Resources	16	38.5	17	39.0*	20	102.0
An Ideal Conservation Program	15	46.0	16	11.0**	13	42.5
The Function of Wildlife Preserves	15	54.0	18	55.5	19	97.5
The Effects of Soil Erosion	15	49.5	17	74.0	18	71.0
Conservation as it is Practiced Today	16	41.5	15	36.0	14	48.0

*T must not exceed 40.0 for significance at the .05 level for a one-tailed test.

**T must not exceed 35.0 for significance at the .05 level for a one-tailed test.

TABLE 12

Summary of Analysis of Variance for Testing Differences
 Among Means of Shifts in Evaluative Factor Scores
 on the Concept "Our Natural Resources" for
 Three Groups of Subjects

Sources of variation	Degrees of freedom	Sum of squares	Mean square	F ratio
Treatments (a)	2	7.69	3.85	$F = MS_a / MS_w$
Within Groups (w)	59	357.55	6.06	$F = .635$
Total	61	365.24		

TABLE 13

Summary of Analysis of Variance for Testing Differences
Among Means of Shifts in Evaluative Factor Scores
on the Concept "An Ideal Conservation Program"
for Three Groups of Subjects

Sources of variation	Degrees of freedom	Sum of squares	Mean square	F ratio
Treatments (a)	2	5.01	2.51	$F = MS_a / MS_w$
Within groups (w)	59	347.59	5.89	$F = .426$
Total	61	352.60		

TABLE 14

Summary of Analysis of Variance for Testing Differences
 Among Means of Shifts in Evaluative Factor Scores on
 the Concept "The Function of Wildlife Preserves"
 for Three Groups of Subjects

Sources of variation	Degrees of freedom	Sum of squares	Mean square	F ratio
Treatments (a)	2	1.68	.84	$F = MS_a / MS_w$
Within groups (w)	59	781.16	13.24	$F = .063$
Total	61	782.84		

TABLE 15

Summary of Analysis of Variance for Testing Differences
 Among Means of Shifts in Evaluative Factor Scores
 on the Concept "The Effects of Soil Erosion"
 for Three Groups of Subjects

Sources of variation	Degrees of freedom	Sum of squares	Mean square	F ratio
Treatments (a)	2	5.06	2.53	$F = MS_a / MS_w$
Within groups (w)	59	997.65	16.91	$F = .150$
Total	61	1002.71		

TABLE 16

Summary of Analysis of Variance for Testing Differences
Among Means of Shifts in Evaluative Factor Scores on
the Concept "Conservation as it is Practiced Today"
for Three Groups of Subjects

Sources of variation	Degrees of freedom	Sum of squares	Mean square	F ratio
Treatments (a)	2	215.83	107.92	$F=MS_a/MS_w$
Within groups (w)	57	824.50	14.46	$F= 7.46*$
Totals	59	1040.33		

*The F ratio required for significance at the .05 level is 3.18.

TABLE 17

Summary of Analysis of Differences Among Means of
Shifts in "Evaluative Factor Scores on the
Concept "Conservation as it is Practiced
Today" for Three Groups of Subjects

Mean Difference			
Group	I	II	III
I		3.00*	.833
II			2.670*
III			

*The "t" required for significance at the .05 level for a one-tailed test is 1.697.

test, shows that Group II scores are significantly different from both those of Group III, the control, and those of Group I. The scores of Group I are not significantly different from those of the control group, Group III. The results of this test support the hypothesis that speech B would produce a greater shift in factor scores than would speech A.

The potency factor included one significant F ratio. The concept "Our Natural Resources" produced an F ratio significant at the required .05 level of significance. The results of the analysis of variance for each of the five test concepts are given in tables 18, 19, 20, 21, and 22.

The "t" test for the concept which showed a significant F ratio yielded significant differences between the shifts in factor scores for Group II and the shifts in factor scores for both Group I and Group III. Groups I and III did not show a difference significant at the required level, although the change for Group I scores was in the predicted direction, as was the change for Group II. These results support the hypothesis that speech B would produce a greater change in factor scores of the semantic differential than would speech A. The results of the "t" test are summarized in table 23.

In the activity factor the scores used were determined from three representative scales rather than four as was the case in the potency and evaluative factors. The analysis of variance with these "three-scale" factor scores yielded one significant F ratio. The F ratio for the concept "An Ideal Conservation Program" was significant at the required .05 level. The results of the analysis of variance for all five test concepts

TABLE 18

Summary of Analysis of Variance for Testing Differences
Among Means of Shifts in Potency Factor Scores on
the Concept "Our Natural Resources"
for Three Groups of Subjects

Sources of variation	Degrees of freedom	Sum of squares	Mean square	F ratio
Treatments (a)	2	117.85	58.93	$F = MS_a / MS_w$
Within groups (w)	59	442.34	7.48	$F = 7.87*$
Totals	61	560.19		

*The F ratio required for significance at the .05 level is 3.15.

TABLE 19

Summary of Analysis of Variance for Testing Differences
Among Means of Shifts in Potency Factor Scores on
the Concept "An Ideal Conservation Program"
for Three Groups of Subjects

Sources of variation	Degrees of freedom	Sum of squares	Mean square	F ratio
Treatments (a)	2	15.25	7.63	$F = MS_a / MS_w$
Within Groups (w)	59	286.44	4.86	$F = 1.57$
Total	61	301.69		

TABLE 20

Summary of Analysis of Variance for Testing Differences
Among Means of Shifts in Potency Factor Scores on
the Concept "The Function of Wildlife Preserves"
for Three Groups of Subjects

Sources of variation	Degrees of freedom	Sum of squares	Mean square	F ratio
Treatments (a)	2	17.65	8.83	$F=MS_a/MS_w$
Within groups (w)	59	397.90	6.75	$F= 1.31$
Total	61	415.55		

TABLE 21

Summary of Analysis of Variance for Testing Differences
Among Means of Shifts in Potency Factor Scores on
the Concept "The Effects of Soil Erosion"
for Three Groups of Subjects

Sources of variation	Degrees of freedom	Sum of squares	Mean square	F ratio
Treatments (a)	2	30.87	15.44	$F = MS_a / MS_w$
Within groups (w)	58	374.28	6.46	$F = 2.49$
Total	60	406.15		

TABLE 22

Summary of Analysis of Variance for Testing Differences
Among Means of Shifts in Potency Factor Scores on the
Concept "Conservation as it is Practiced Today"
for Three Groups of Subjects

Sources of variation	Degrees of freedom	Sum of squares	Mean square	F ratio
Treatments (a)	2	8.13	4.07	$F = MS_a / MS_w$
Within groups	57	474.85	8.31	$F = .490$
Total	59	482.98		

TABLE 23

Summary of Analysis of Differences Among Means of
Shifts in Potency Factor Scores on the
Concept "Our Natural Resources"
for three Groups of Subjects

Mean Difference			
Group	I	II	III
I		2.14*	1.27
II			3.65*
III			

*The "t" required for significance at the .05 level for a one-tailed test is 1.697.

are summarized in tables 24, 25, 26, 27, and 28.

The "t" test for the concept "An Ideal Conservation Program" showed a significant difference between the shifts in factor scores for Group II and those of Group III, the control group. The differences between shifts in Group I factor scores and both those of Group II and Group III is not significant at the required level. The difference between Group I shifts in factor scores and those of Group II does approach closely the required significance level, however. The "t" score of 1.49 is significant at approximately the .07 level. Table 29 summarizes these results.

The results of the analysis of the data for the three factors of evaluation, potency, and activity with the parametric tests tend to support the hypothesis that speech B produced a greater shift in factor scores than did speech A.

TABLE 24

Summary of Analysis of Variance for Testing Differences
 Among Means of Shifts in Activity Factor Scores on
 the Concept "Our Natural Resources"
 for Three Groups of Subjects

Sources of variation	Degrees of freedom	Sum of squares	Mean square	F ratio
Treatments (a)	2	14.17	7.09	$F = MS_a / MS_w$
Within groups	59	364.75	6.18	$F = 1.147$
Totals	61	378.92		

TABLE 25

Summary of Analysis of Variance for Testing Differences
Among Means of Shifts in Activity Factor Scores on
the Concept "An Ideal Conservation Program"
for Three Groups of Subjects

Sources of variation	Degrees of freedom	Sum of squares	Mean square	F ratio
Treatments (a)	2	47.15	23.58	$F = MS_a / MS_w$
Within groups (w)	58	379.70	6.55	$F = 3.60*$
Total	60	426.85		

*The F ratio required for significance at the .05 level is 3.15.

TABLE 26

Summary of Analysis of Variance for Testing Differences
Among Means of Shifts in Activity Factor Scores on
the Concept "The Function of Wildlife Preserves"
for Three Groups of Subjects

Sources of variation	Degrees of freedom	Sum of squares	Mean square	F ratio
Treatments (a)	2	8.30	4.15	$F = MS_a / MS_w$
Within groups (w)	59	348.17	5.90	$F = .703$
Total	61	356.47		

TABLE 27

Summary of Analysis of Variance for Testing Differences
 Among Means of Shifts in Activity Factor Scores on
 the Concept "The Effects of Soil Erosion"
 for Three Groups of Subjects

Sources of variation	Degrees of freedom	Sum of squares	Mean square	F ratio
Treatments (a)	2	2.42	1.21	$F = MS_a / MS_w$
Within groups (w)	59	302.56	5.13	$F = .236$
Total	61	304.98		

TABLE 28

Summary of Analysis of Variance for Testing Differences
Among Means of Shifts in Activity Factor Scores on the
Concept "Conservation as it is Practiced Today" for
Three Groups of Subjects

Sources of variation	Degrees of freedom	Sum of squares	Mean square	F ratio
Treatments (a)	2	25.73	12.87	$F=MS_a/MS_w$
Within groups (w)	57	376.20	6.60	F= 1.95
Total	59	401.93		

TABLE 29

Summary of Analysis of Differences Among Means of Shifts
in Activity Factor Scores on the Concept "An
Ideal Conservation Program" for
Three Groups of Subjects

Group	Mean Difference		
	I	II	III
I		1.49	.823
II			3.440*
III			

*The "t" required for significance at the .05 level for a one-tailed test is 1.697

CHAPTER IV

DISCUSSION

The purpose of this investigation was the exploratory use of the semantic differential as a means of measuring the effects of speeches. In carrying out this purpose an aspect of the problem dealt with in investigations of the logic-emotion dichotomy was used.

Two persuasive appeals were constructed as test speeches, one incorporating the devices of "figures" of speech" and "vividness" in word choice to a greater extent than the other. The research hypothesis was that the speech employing relatively greater use of the selected variables would produce greater shifts in factor scores of the semantic differential.

The results of the Wilcoxon tests seem to support the research hypothesis. For Group II (which heard speech B), two of the concepts in the evaluative factor, three in the potency factor and two in the activity factor showed significant shifts ($\alpha = .05$). Group I (which heard speech A), none of the concepts showed a significant shift in the evaluative or activity factor, while one concept had a significant shift in the potency factor. For Group III (the control group), none of the concepts showed a significant shift in any of the three factors.

The second statistical treatment was with the ~~parametric~~ analysis of variance and "t" tests. In this case, the factor score shifts of groups I, II and III were compared. Where the F ratio was significant, the "t" test was used to determine the significance of the differences

between the groups. The results of this analysis also support the research hypothesis, although not to the extent of the Wilcoxon tests. (Some possible reasons for the differences in the results of the parametric and non-parametric tests are later discussed.) Three of the five test concepts intended to show the effects of the two test speeches did have significant F ratios; two of the test concepts showed no significant F ratio on any of the three factors of the semantic differential. For those concepts which showed a significant F ratio, the subsequent "t" tests also showed in each case that speech B had produced a significant shift in factor scores in the predicted direction; in two factors (evaluation and potency) the scores for Group II (speech B) were significantly different from those of Group I (speech A). In none of the three instances of a significant F ratio did the "t" test show the difference between the shifts for Group I and Group III to be significant at the required level.

The Test Concepts

In the evaluative factor the concepts "An Ideal Conservation Program" and "Conservation as it is Practiced Today" showed significant shifts in Group II scores with the Wilcoxon test. The latter concept also showed a significant F ratio, the "t" test showing Group II shifts to differ significantly from both those of Group I and Group III. No significant difference was shown between shifts for Group I and Group III.

Of the remaining three concepts, perhaps the apparent lack of effect can be partially explained by noting that the scores of the test

groups before exposure to the test speeches (and also the factor scores of the groups that took part in pilot studies) were well into the extreme ends of the scales. There appears to be a relationship between this tendency of the subjects to score these concepts toward the ends of the scales and the predicted direction of shift for these concepts. In each of the three concepts which showed no significant change the predicted shift in factor scores was toward the extreme. For example, the concept "Our Natural Resources" was scored very frequently in the 2 and 3 positions of the scales; the generally high initial scores on this concept left very little margin for the effects of the test speeches to be reflected. The only concept of the five, however, that showed a significant shift (Group II scores) on both the Wilcoxon test and the analysis of variance was also the only one of the five, for the evaluative factor, in which the predicted movement was "down" the scale from the initial score position; i.e., the concept "Conservation as it is Practiced Today" received initial scores in the positive side of the scales, but the predicted movement was in the negative direction. The concept "An Ideal Conservation Program" does not fit this apparent pattern. The scores for it were initially high positive scores; the predicted shift was also positive. Yet this concept showed a significant shift with the Wilcoxon test.

In the potency factor the Wilcoxon test showed the shifts in the concepts "Our Natural Resources", "An Ideal Conservation Program", and "The Function of Wildlife Preserves" for Group II to be significant at the .05 level. Additionally, the concept "Conservation as it is Practiced Today" showed a significant shift for Group I scores. The concept

"Our Natural Resources" also produced a significant F ratio. The "t" test for this concept showed Group II shifts in factor scores to differ significantly from both those of Group I and Group III. No significant difference is shown between the shifts for Group I and Group III.

The reason for the failure of the concept "The Effect of Soil Erosion" to show a significant shift is difficult to assess. Perhaps in some measure, the same pattern as that observed in the evaluative factor is operative in the potency factor. The scores for the three concepts "Our Natural Resources", "The Function of Wildlife Preserves", and "Conservation as it is Practiced Today" all initially tended to be positive; the predictions of shifts in factor scores were for a negative shift in the case of all three of these concepts. The concept "The Effects of Soil Erosion", however, though it had scores initially in the positive sides of the scales, was predicted to show movement in the positive direction. This seems consistent with the pattern of the evaluative factor results. Once again, the concept "An Ideal Conservation Program" is an exception to this pattern. Both initial scores and predicted movement were positive for this concept, yet it showed a significant shift with the Wilcoxon test.

In the activity factor the Wilcoxon test showed Group II factor scores to have shifted significantly in the concepts "Our Natural Resources" and "An Ideal Conservation Program". The latter concept also produced a significant F ratio. The subsequent "t" test showed that factor score shifts for Group II to differ significantly from those of Group III. No significant differences were observed between the shifts for Group I and Group III; similarly for the differences between Group I

and Group II.

The pattern of significant shifts with relation to initial scores and predicted movements discussed for the previous two factors does not seem to be present here. In attempting to discern some explanation for the lack of a significant shift for the concepts "The Function of Wildlife Preserves", "The Effects of Soil Erosion", and "Conservation as it is Practices Today", the much greater tendency of the subjects to use the midpoints of the scales for the activity factor seems important. This was particularly true of the two concepts "The Function of Wildlife Preserves" and "The Effects of Soil Erosion". For the activity factor these concepts appear in retrospect to have been ill-chosen. The greater use of the midpoint of the scales indicates either no strong feeling on the part of the subjects or inability to see a relevant relationship between the scales used and the test concepts. The latter seems the most likely explanation since a major portion of the speeches was given to discussion of soil erosion and destruction of wildlife. Since there were concepts (receiving less time in the speeches than erosion problems) that did produce a significant shift, it would seem strange to find that a major appeal, such as that for control of erosion, would produce no changes in audience judgments.

This same problem of extensive use of the midpoints of the scales was also present to a lesser degree than in the activity factor in the potency factor.

A summary view of the test concepts shows that the concept, "Our Natural Resources" showed significant shifts for Group II scores on

both the potency and activity factors with the Wilcoxon test; analysis of variance and the "t" test showed Group II scores shifts to differ significantly from those of Group I and Group III for the potency factor. The concept "An Ideal Conservation Program" had significant shifts for Group II scores on all three factors with the Wilcoxon test; analysis of variance and the "t" test showed Group II shifts to differ significantly from those of the control group for the activity factor. The concept "The Function of Wildlife Preserves" had significant shifts for Group II scores on the potency factor with the Wilcoxon test. The concept "The Effect of Soil Erosion" had no significant shifts with either the Wilcoxon or analysis of variance tests. The concept "Conservation as it is Practiced Today" showed significant shifts for Group II scores on the evaluative factor with both the Wilcoxon and the "t" test. This concept also showed a significant shift in the scores for Group I on the potency factor with the Wilcoxon test.

In view of the results discussed above, it would seem that test speeches which advocated positions quite different from those an audience might be expected to take initially would more completely reflect changes brought about by the speeches. The semantic differential, in the form used here, may simply not be sensitive enough to detect changes of the magnitude called for in connection with some of the test concepts used in this investigation. The earlier mentioned tendency of the subjects to score some of the concepts in the extreme ends of the scales may be contributory to this. The scores of the subjects indicated that they were, as a group, more aware of the problems and importance of conservation than had been the assumption.

This circumstance may also explain the failure of speech A to produce more than one significant shift in factor scores. The shifts may well have taken place and yet not be reflected. The fact that the shifts of scores in Group I were in the same direction as those of Group II in ten of the thirteen instances in which Group II scores did shift, tends to support the feeling that speech A did produce some effect. Such a shift would occur less than five per cent of the time by chance.

The selection of a topic and/or the wording of test concepts to compensate for the difficulties discussed here might well increase the number of changes detectable with the semantic differential. Wording of the test concepts so that expected reaction of the subjects is shifting of scores in the direction of the greatest margin for movement seems the most desirable first step in changing the form of the semantic differential from that used here.

Statistical Techniques

The analysis of the data was done using two types of statistical technique, a non-parametric test and two parametric tests. The two types of tests were employed for somewhat different purposes. The non-parametric Wilcoxon's matched-pairs signed-ranks test was used to determine the significance of shifts in factor scores for each group of subjects; the fifteen predicted shifts were tested for each of the three groups (five concepts on three factors). In this case each subject acted as his own control and only the significance of shifts within a group were tested, not the significance of the shifts occurring in one group with respect to another of the three groups. The comparison of the shifts in factor scores in a group with those of the other groups was

done with the parametric analysis of variance. Where a significant F ratio was reached the "t" test was used to evaluate the differences between the groups for significance.

Not only were the non-parametric and parametric tests employed for different functions, but also, the use of both constituted a measure of insurance against the assumptions involved in the use of the parametric tests. To be sure, certain assumptions are also made in the use of the non-parametric Wilcoxon test, but the assumptions are much less extensive than those underlying the parametric tests used. The three major assumptions involved in the use of analysis of variance and the "t" test have already been discussed (chapter two, pp. 51-53). However, the differences in the results of the analysis of variance and the "t" test from the results of the analysis with the Wilcoxon test seem to require some discussion.

The first possible explanation is that this is simply a chance variation. The fact that in the Wilcoxon test each group is its own control and in the analysis of variance the groups are compared with each other suggests a possible source of such chance variation. However, the number of significant shifts for Group II observed was seven, four more than the three shown with analysis of variance and the "t" test. The chance of observing more than twice as many significant differences with the Wilcoxon test as with analysis of variance and the "t" test seems small enough to encourage consideration of alternate explanations.

The scaling assumptions involved in the use of the semantic differential in this investigation were previously considered (chapter two, pp. 52-53). The investigation by Messick, cited in that discussion, showed

that although the assumption of interval measurement is not unqualifiedly met, none of the inequalities observed in the semantic differential scales were pronounced and all were consistent from scale to scale. This would seem to settle the question of interval measurement as being an unlikely source of error. Moreover, the Wilcoxon, because of the use of factor scores, also assumes interval measurement. This assumption does not seem to account for the difference.

The assumption of equal variance in the populations from which the groups were drawn, it was noted, may in the opinion of most statisticians vary considerably from the ideal without serious consequences. The average variance for the scores for Group I was 6.11; for Group II, 18.40; for Group III, 3.91 (where a significant F ratio was obtained).

The assumption that the variable, in this case factor scores, is normally distributed is based primarily on the lack of evidence to the contrary. There were no remarkable departures observed in the data. However, a tendency for several of the sets of scores for the various concepts to be skewed toward the ends of the scales was noted. Whether this is due to the small sample sizes or reflects a genuine characteristic of the factor scores is not known.

None of the three assumptions discussed may be unqualifiedly made, though there are indications for the acceptance of all of them. It should be recognized that what is a significant departure from the parametric assumptions remains largely a matter of opinion. Siegel states: "Although some empirical evidence has been gathered to show that slight deviations in meeting the assumptions underlying the parametric tests may not have radical effects, on the obtained probability figure, there

is as yet no general agreement as to what constitutes a 'slight' deviation."¹

The Semantic Differential as a Criterion Test

The first question in considering the use of the semantic differential as an instrument to measure the effects of speeches might well be its sensitivity. The results of this investigation seem to indicate that the semantic differential will distinguish rather closely similar types of speeches. The two test speeches were constructed with as nearly the same information, organization, point of view, etc. (see table 3, Chapter II), as possible. The differences in the speeches, the use of "figures of speech" and "vividness" in word choice, were not so major as to render the task as "easy" one. The semantic differential detected the difference in the effects of these speeches for four of the five test concepts, on one or more factors; on only one of the five test concepts did the semantic differential fail to show a shift significant at the required level. All but one of these significant shifts were for the factor scores of Group II.

It was hypothesized from past experimental investigation and from statements in the literature of speech that speech B, which was heard by Group II, would secure the greatest effect and this was demonstrated both by the greater number of significant shifts shown for Group II with the Wilcoxon test (seven as opposed to one for Group I) and by the "t" tests used to determine significant differences between Group I and Group II. However, the lack of more than the one significant shift for

¹Siegel, p. 20.

the Group I scores with the Wilcoxon test is a point that seems to call for consideration in discussing the semantic differential as a means of measuring the effects of speeches. Although the research hypothesis was that speech B would produce the greater effect on factor scores, it would seem reasonable to expect that speech A would produce some change in factor scores for the test concepts.

The lack of significant shifts as shown by the Wilcoxon test could indicate two general conclusions. One is that speech A really was not successful in producing any changes in the subjects judgments of the test concepts. This seems unlikely for two reasons. First there is the already mentioned point of the similarity in the direction of shifts produced by speech A and speech B. This similarity would occur less than five per cent of the time by chance. The second reason is that while only one of the fifteen shifts predicted was significant at the required level, five others approached this level, being significant at between the .10 and .05 levels. Four of these five were also on the same factors and concepts that Group II scores showed shifts at the required significance levels.

Another possible conclusion is that speech A (as the above indicates) did produce shifts in the subjects' judgments of the test concepts but the semantic differential was not sensitive enough to measure these shifts. This, for the form of the semantic differential used in this investigation, seems the most likely explanation. If so, it need not disallow the use of the semantic differential for such purposes as, for instance, the determination of whether a speech such as speech A produces any change in audience judgments. As was previously pointed out, the

particular group of subjects used in this investigation proved more than usually aware of the problems of conservation. The assumption in the selection of the topic and selection and formulation of the test concepts was that the audience would display only average knowledge of the subject of the speeches. The use of an audience meeting this assumption, the selection of a different topic meeting the assumption, the rewording of the test concepts; all of these might effect the necessary changes to allow the semantic differential to, while making no finer distinctions, still perform the desired function.

A second important consideration in evaluating the semantic differential as a measuring instrument is its reliability. Three reliability tests were conducted, two prior to the actual experimental situation and one using the data from the control group in the investigation. The first of the two preliminary reliability checks yielded unsatisfactory pearson product-moment correlations. The failure to get satisfactory reliability results in this first instance may have been due to several factors. As was mentioned in Chapter II, the ambiguity of test concepts seems to have some influence. That is, the subjects interpret an ambiguous concept differently at each of the two administrations of the semantic differential forms. In addition, the interaction of the scales with the concepts makes it difficult to determine whether it is vagueness in the wording of a concept or inappropriateness of scales or both operating. The effect of a scale being used in apparently differing senses by subjects from one testing to another was illustrated by the "static-dynamic" scale in the activity factor's reliability as computed from data from the control group. The correlation coefficient computed using all four of the scales

representing the activity factor was below satisfactory levels (.576). When the correlation was computed leaving out this scale ("static-dynamic") the correlation rose to a satisfactory level. (.789).

The effect of such an increase in reliability on the results of the statistical analysis of the data is shown by the fact that when an analysis of variance was performed using the factor scores determined from four activity scales (including "static-dynamic") none of the five test concepts showed a significant F ratio. The analysis of scores determined from three activity scales (omitting "static-dynamic"), however, resulted in generally increased F ratios, one of which reached the necessary significance level. This change seems accounted for by the observation that the increased reliability is a reflection of greatly reduced differences from scores on form 1 of the semantic differential and form 2 in the control group. This reduces the mean of the control group's set of score differences or shifts. This tended to increase the variability of the distribution of the means of the three groups and result in a larger F ratio.

This suggests that although the correlation coefficients for the potency and activity factors that were computed from control group data were reasonably satisfactory, an increase in the reliability might well have tended to produce more significant F ratios that were observed.

It is possible that the initial difficulties with reliability in the first check on reliability are chiefly traceable to the attitudes of the subjects taking part in the investigation. As was indicated, the students used as subjects were not volunteers, but rather "conscripts" in a sense of the word. Osgood, Suci and Tannenbaum indicate in their

investigations that the subjects were paid volunteers. The extent to which the attitude of the subjects toward their task contributed to poor reliability in the first pilot test is indeterminate because of the previously noted influences of the statements of the concepts, the appropriateness of the scales and the interaction of the two. However, the reliability of the forms did increase considerably in the second pilot study in which volunteers were used.

Further investigation of the degree to which the attitude of the subjects toward their task affects reliability seems worthwhile in view of these results. More importantly, however, the nature of concept-scale interaction and the ambiguity of scales and concepts seems to require investigation.

At this point, considerations of reliability and sensitivity aside, the use of the semantic differential rather than other methods, such as attitude measurement, might well be questioned. Two advantages of the semantic differential prompt its projected use as a measure of the effects of speeches.

The first of these is its promise of great adaptability, of quick and simple application to a wide range of subjects. While there are as yet no universally correct scales for use in representing the three major factors so far isolated in factor studies, many of the scales already tested seem to have very broad application. Further investigation of the factor structure of the semantic differential and of the nature of concept-scale reaction could result in the increase in numbers of scales available and some indication of methods for selecting particular scales for specific types of concepts.

The second, and most significant reason for the use of the semantic differential lies in its relationship to behavioral prediction. It is not intended to represent this investigation as a validity study, but certain of its results seem relevant.

If the semantic differential is intended as a measure of the effectiveness of speeches, what would determine its validity, whether it measures what we want it to measure? The point was early made that the basic criterion of speech effectiveness is influence on behavior. If so, then the measuring instrument that allows us the most accurate prediction of behavior resulting from a speech is the most desirable one. The question would seem to be, does the semantic differential allow better prediction than other previous forms of measurement? The question is not answerable from the results of this investigation or of other investigations previously conducted with the semantic differential, however, there is some support for such a contention.

The use of attitude measurement as a common method of assessing the effects of speeches was earlier discussed (Chapter I, pp. 10-14). It was noted that here too there is the problem of relating scores on the attitude test to the behavior of the subject taking the test. As Brown pointed out, attitude scores have been used in attempting to predict behavior without clear demonstration of the relationship between attitude test scores and non-verbal behavior.

The factor structure of the semantic differential as it is related to attitude is the first support for the hypothesis that the semantic differential may constitute a more accurate predictor of behavior than attitude measurement alone. Osgood, Suci and Tannenbaum indicate that the evaluative factor of the semantic differential is in large measure identifiable with the concept of attitude. The remaining two major

factors of potency and activity seem to tap additional information of the subject's disposition toward the concept in question. Simply on the basis of including more information of quite a different nature from attitude, the semantic differential seems to be a step in the right direction.

The investigation of the prediction of voting behavior from semantic differential scores was earlier offered as an indication of the possible increased accuracy of prediction. It should be remembered, however, in connection with that investigation that it was not designed to test the assumption of increased predictive value of the semantic differential. The data cited was extraneous to the central purpose of the investigation which was to determine the meanings of political concepts and investigate the frame of reference in which political judgments are made.

In the present investigation, the results may be interpreted in the light of their possible value in prediction of the non-verbal behavior of the subjects toward the concepts involved in the speeches.

For the concept "Our Natural Resources", no significant change was observed in scores for the evaluative factor for any of the test groups. If a prediction of changed behavior were made on the basis of this factor (attitudinal) alone, it would seem that the conclusion would be that the speeches did not succeed in inducing some change. If, however, the results of the potency and activity factors were included, the conclusion might be that even though the subjects attitude (favorable) remained the same, the speeches did change the subjects view of the adequacy of our natural resources. Whether, of course, this is related to

the subject's subsequent behavior toward natural resources is not determined.

The concept "An Ideal Conservation Program" showed a significant shift for Group II scores on all three of the factors. Though a change is shown by the evaluative factor (attitudinal) alone, knowledge that the subjects also perceive "An Ideal Conservation Program" as being much stronger and more active seems to indicate more clearly the successful intended effect of the speech.

The concept "The Function of Wildlife Preserves" showed no change on the evaluative factor or the activity factor. Subjects judgments for these factors might be characterized as quite favorable (evaluation) and slightly passive (activity). However, the scores for Group II did show a significant shift for the potency factor for this concept, being perceived by Group II as somewhat less effective, as weaker than initially.

The concept "The Effect of Soil Erosion" did not show a significant shift for any of the groups on any of the three factors.

The concept "Conservation as it is Practiced Today" showed a significant shift for the evaluative factor in Group II scores and a significant shift on the potency factor for Group I scores. In the case of Group II scores in which only a shift in the evaluative factor is revealed, it might be considered in trying to relate the semantic differential to behavior that the failure to produce a change on these factors is quite as significant as the presence of a marked change. For the Group I scores the presence of any change in the group judgment of the concept would, obviously, not be revealed if only the evaluative factor were used.

It would appear from this that had the judgment of the effects of the speeches in this experimental investigation been made from the evaluative or attitudinal factor alone, several results of the speeches would have been undetected. The possibility that these additional differences might prove valuable in determining the behavior resulting from the speeches emphasizes their importance.

In view of this, further investigations directed specifically at the determination of the relationship between factor scores and the behavior of the persons making these scores seem strongly indicated. Should such relationships be discovered and explored, the use of the semantic differential as a measure of speech effects would seem to recommend itself.

CHAPTER V

SUMMARY AND CONCLUSIONS

This investigation was concerned, broadly, with the problem of assessing speech effectiveness. It was suggested that the principal criterion for determining speech effectiveness is in terms of its basic communicative purpose, i.e., to allow the speaker to exercise some measure of control over the behavior of his listeners.

In the field of speech, past efforts to relate verbal and non-verbal behavior were shown to be concerned with a view of man as a creature with a dual nature, as being governed by and explained in terms of his "reason" and his "emotions". This view was shown to be still reflected in modern persuasion theory, in the form of principles of speaking or statements about persuasive methods. The need for experimental verification of these principles of speech was noted.

The use of attitude measurement as a criterion of speech effectiveness was discussed as a factor in the interpretation of the results of experimental investigation. Some of the investigations dealing with the relative effects of speeches labeled "logical" and "emotional" were reviewed, illustrating the possible variations due to differential methods of assessing the effects of test speeches. Attitude, considering the basic criterion of effectiveness as influence on behavior, was shown to require some relationship to behavior in order to accurately gauge speaking effectiveness.

The view that attitudes comprise only a part of the total judgmental structure was introduced, indicating the possible presence of

other elements which influence behavior. At this point, the investigations of the factor structure of the semantic differential were offered as an indication of the possible nature of such other elements.

The purpose of the investigation was identified as an exploratory use of the semantic differential in measuring some of the effects of verbal behavior.

In carrying out this purpose, an aspect of the problem dealt with by investigators of the logic-emotion dichotomy was used. Two characteristics generally recognized as related to what is described as "emotional" speaking were used as test variables. These were the use of "figures of speech" and "vividness" in word choice. Two persuasive appeals were constructed using these variables; one of the speeches avoided the use of these devices as much as possible, the other employed them wherever possible. These two speeches were tape recorded for later presentation. Five concepts common to both of the speeches were selected for use with the semantic differential forms.

In using the semantic differential, the three dominant factors of evaluation, potency and activity were used in preparing the forms. The measure of the effects of the speeches was determined by reference to changes in factor scores for each of the five concepts from before and after the subjects were exposed to the tape-recorded test speeches.

Predictions were made of the direction of the shift in factor scores for each concept on each factor; a total of fifteen predicted shifts. In each case, the hypothesis was that the shifts produced in factor scores by the speech employing relatively greater use of the selected test variables would be larger.

The data was analyzed using two types of statistical techniques. The non-parametric Wilcoxon's matched-pairs signed-ranks test was used to determine the significance of the shifts from scores on form 1 of the semantic differential to scores on form 2. A Wilcoxon test was used to determine significance of shifts for each groups' scores on every concept and every factor.

The parametric analysis of variance was used to compare the shifts occurring in the three groups with each other. Where a significant F ratio occurred, the "t" test was used to assess the significance of the differences between the groups.

Conclusions

The data suggest the following conclusions:

- (1) A speech employing relatively greater use of "figures of speech" and "vividness" in word choice will produce greater changes in factor scores (evaluation, potency and activity) of the semantic differential than will a speech in which there is relatively little use of these devices.
- (2) The semantic differential is a promising instrument for making discriminations in the effects of test speeches.
- (3) The reliability of the semantic differential while reaching satisfactory levels, under the conditions of this investigation, demands further study of the factors influencing it.
- (4) The semantic differential may reveal some effects of test speeches not measured or revealed by attitude measurement. Such additional differences may prove relevant to the prediction of the non-verbal behavior resulting from verbal behavior.

- (5) The greatest value of the semantic differential as a measure of the effects of speeches will not be realized until the relationship of semantic differential scores and non-verbal behavior is explored and defined.

BIBLIOGRAPHY

BIBLIOGRAPHY

- Berlo, David K. The Process of Communication. New York: Holt, Rinehart and Winston, 1960.
- Blommers, Paul, and Lindquist, E. F. Elementary Statistical Methods. Boston: Houghton Mifflin Co., 1960.
- Braden, Waldo W., and Brandenburg, Ernest. Oral Decision Making. New York: Harper and Brothers, 1955.
- Brigance, W. Norwood. Speech Composition. New York: McGraw Hill Book Company, 1936.
- Brown, Roger. Words and Things. Glencoe, Illinois: The Free Press, 1958.
- Campbell, George. The Philosophy of Rhetoric. London: W. Strahan, T. Cadell, W. Creech, 1776.
- Cooper, Lane. Trans. The Rhetoric of Aristotle. New York: Appleton-Century-Crofts, 1932.
- Fearnside, W. Ward, and Holther, William B. Fallacy. Englewood Cliffs, N. J.: Prentice-Hall, 1959.
- Gray, G. W., and Wise, C. M. The Bases of Speech. 3rd edition. New York: Harper and Brothers, 1959.
- Hartmann, G. W. "A Field Experiment on the Comparative Effectiveness of Emotional and Rational Political Leaflets in Determination of Election Results," Journal of Abnormal and Social Psychology, XXXI (1936-37).
- Knower, Franklyn H. "Experimental Studies on Changes in Attitude: I, A Study of the Effect of Oral Argument on Changes of Attitude," Journal of Social Psychology, VI (1935).
- Lomas, C. W. "An Experimental Study of the Effect of Provocative Language on Audience Reaction to Political Speeches," Unpublished Ph. D. dissertation, Northwestern University, 1940.
- Matthews, Jack. "A Proposed Technique for Measuring the Type and Amount of Loaded Language Used in a Speech and the Application of this Technique to the Study of the Effect of Loaded Language on the Amount of Information Audiences Remember from Two Recorded Speeches Dealing with Capital-Labor Disputes." Unpublished Ph. D. dissertation, Ohio State University, 1946.

- Mennefee, S. C., and Granneberg, A. G. "Propaganda and Opinions on Foreign Policy," Journal of Social Psychology, XI (1940).
- Minnick, Wayne C. The Art of Persuasion. Boston: Houghton Mifflin, 1947.
- Monroe, Alan H. Principles and Types of Speech. Chicago: Scott Foresman, 1939.
- Ogden, C. K., and Richards, I. A. The Meaning of Meaning. New York: Harcourt Brace, 1923.
- Oliver, Robert. The Psychology of Persuasive Speech. New York: Longmans Green, 1942.
- Osgood, Charles E., Suci, George J., and Tannenbaum, Percy H. The Measurement of Meaning. Urbana: University of Illinois Press, 1957.
- Remmers, H. H. Introduction to Opinion and Attitude Measurement. New York: Harper and Brothers, 1954.
- Siegel, Sidney. Non-Parametric Statistics for the Behavioral Sciences. New York: McGraw Hill, 1956.
- Skinner, B. F. Verbal Behavior. New York: Appleton-Century-Crofts, 1957.
- Sledd, James. A Short Introduction to English Grammar. Chicago: Scott Foresman, 1959.
- Snedecor, George W. Calculation and Interpretation of Analysis of Variance and Covariance. Ames, Iowa: Collegiate Press, 1934.
- Walpole, Hugh R. Semantics. New York: W. W. Norton, 1941.
- Winans, James A. Public Speaking. New York: Century, 1917.

APPENDICES

APPENDIX A

Speech A

A Copy of the Manuscript Used in
Recording the Test Speech

The wealth of our country is something we are all proud of. Yet, we seem not aware of the first source of the prosperity we enjoy. Seldom do we hear it named as derived from the stores of natural resources we, as a nation, possess today and have had advantage of it in the past.

It is apparent that even though there are many factors entering into the process that has resulted in our present status, it cannot be denied that the wildlife, timber, water, soil and minerals we possessed determined the extent to which other factors might be effective. Conservation is the term we use to refer to the maintenance of these natural resources. Yet, conservation is a subject most of us know little about and care less. The intent, then, of this speech is to heighten your awareness of the importance to you and your nation of conservation.

In order to correctly distinguish conservation practices, it is first necessary to classify natural resources. Class one: Materials and sources of power that exist in abundance for all time. For instance, common salt, water power, sunlight, etc. Such resources should be made available in as great quantities as usable and should be substituted wherever possible for resources limited in quantity or non-renewable in character. Class two: Resources permanent in nature but limited in amount, as soil and water. Such should be safeguarded to insure their constant availability. Class three: Resources that are reproduced as crops, renewing themselves periodically. Some of these are forests, fish and wildlife. These are, in contrast to classes one and two, exhaustible and may be exterminated. Such should have their amounts constantly replenished in a quantity equal to their use. Class four:

Resources of limited accumulation and not replenished at an appreciable rate. Once used many are gone forever. Most important of these are minerals, especially mineral fuels and metallic ores. Such should be used only as required and waste scrupulously avoided in order to preserve as long as possible.

Obviously, the same principles of conservation do not apply to all these natural resources. The correct principle for class two may be entirely wrong for class four. We must be careful to distinguish between losses in use of natural resources which are avoidable under present circumstances and those which are unavoidable. Failure to see the difference between these types of use is failure to see the difference between possible and impossible, between the feasible and the impractical.

With this rather dry, but necessary introduction to the nature of natural resources, let us proceed to examine some facts demonstrating that conservation is actually worth being concerned with. It certainly is unnecessary to remind intelligent persons of the utter dependence of civilization's comforts, both the necessities and the luxuries, upon the four classes of resources outlined. Yet possession of knowledge does not insure concern. For, the significance of this dependence does not seem to have very seriously affected our behavior.

Our actions seem to belie our protests of respect for our dependence on nature. In fact, we treat our resources as though they were inexhaustible. We ignore the pressure of a rising population on the resources we still possess. Just for purposes of comparison, today's world population stands at 2.7 billion and we add millions every year.

In less than a half century the world population is due to at least double. The United States is not exempt from this biological certainty. The figures that follow, keep in mind, are based on the usages of present and past smaller numbers of people. Consider the effect on our resources of twice our numbers and twice our demands.

Let us first consider the status of the most "perishable" of our resources -- the minerals of class four. Our society is one that is in great measure based upon this category of resources. Petroleum products and metals play roles that are basic to our industry and our daily affairs. Petroleum producers in the United States predict that production of oil will begin to decline in this country in ten to fifteen years and in the rest of the world not long after. It would appear that the world's annual production of petroleum will fall behind the demand in less than a half century. The United States is using its minerals at a rate unparalleled by any nation in the world. The supply is non-renewable. The known reserves of twenty-two essential minerals in this country stands at less than thirty years. With the increase of world industrialization and the increased demand of larger and more acquisitive foreign populations, there seems to follow the conclusion that without some restrictions on the use of these resources we shall encounter certain deprivation in the next century. We cannot prevent the use of limited resources but we can extend the period of their accessibility and thereby permit future generations a measure of the benefits we have assumed as our due.

In reverse order of their description, let us continue to the third class described, that of periodically renewed resources, wildlife, forests, etc. Forests are considered a renewable crop but unfortunately most

lumbermen of the past viewed them as a mine. The United States had originally a forest area of 822 million acres of virgin forest and a lumber reserve of eight billion board feet. Today, of the 624 million acres of "forest" land remaining, much of it has little timber, only about 44 million acres are virgin forest and the lumber reserve stands at about 1.7 billion board feet. Moreover, the growth of saw timber is only about 4/5 of the drain or use. Obviously, there is a serious possible deficit between the time of exhaustion of virgin timber and the time when second growth will be sufficient. Notwithstanding this, waste on a large scale persists. The chief of the United States Forest Service a few years ago complained that at least half of the timber cutting practices on private land were "poor" or "destructive". Even closer to our own personal actions and certainly more objectionable, is the loss of over ten million acres annually to forest fires started nine out of ten times by men. The United States may find itself in the position of a debtor nation in timber resources without some reduction in wasteful deforestation of this nature.

The story of our wildlife policies of the past is perhaps more serious in its implications. Brief mention of some of the most notorious examples of this past should make the point clear.

Of sixty to seventy-five million bison that inhabited the North American continent at the beginning of its settlement, there remained only scattered bands at the start of this century. The American bison is today found largely on game preserves.

Of several species of birds that might be noted here the best example of the damage resulting from civilization's pressure on bird-life

is that of the passenger pigeon. This bird that about a century ago was numbered at over five billion is now extinct. This extinction was accomplished in somewhat over a half century of unrestricted exploitation by both commercial and private interests. Considerable effort and search has been made since the early 1900's to find some trace of the bird but such attempts at restoration have been unsuccessful.

The list of exterminated or nearly extinct species that are the result of man's brief span, by natural reckoning, of three hundred years on this continent, contains five species of mammals and fifteen species and subspecies of birds completely extirpated; of those brought close to the vanishing point, twenty-four more species of mammals and thirty-three species of American birds.

Of course, unless there is some appreciation of the value of wildlife there is little point in pointing out the destruction of it in the past. The recreation value of wildlife in a complex society such as ours is inestimable. The value of recreation opportunities is not easily expressed in financial terms but there is little question of the need for maintaining to as great an extent as defensible this recreation outlet. The temporary gain secured by exploitation of a wildlife form cannot match its long term value for recreation. Moreover, there is the matter of maintaining controls on insects and pests. The most efficient and economical way of doing this is through the use of competing or predatory forms of wildlife. When we upset the balance that has been achieved in nature for the prevention of a superabundance of any creature we can expect to have to provide ourselves the same control that we have removed. This oftentimes proves a costly and frustrating experience while seldom

attaining the degree of effectiveness that the original natural controls were capable of.

The rise of population, bringing with it increased loss of habitat, rising hunting pressure, industrial wastes and other encroachments show us that this is no time for complacency simply because we've stopped the disappearance of some threatened species by recent measures. The problem of reconciling an ever upswinging human population and its attendant ever increasing demands on the wildlife population, with a constantly shrinking habitat for wildlife poses serious questions for all of us.

The second class we named on our list was of "permanent" resources that are limited in amount--soil and water were given as examples. It is difficult to consider these two separately--their relationship is so close that we must necessarily refer to them together in order to understand the situation that exists.

Soil and water are, needless to say, critical to life, and one would suppose that we would in turn, protect these things with all our energies. A look at our muddy, soil-clogged and sewage contaminated rivers ought to convince anyone that once again we're not doing the expectable. The deforestation, overgrazing and poor farming methods that were common for the first two hundred years of the stay of Europeans on this continent, resulted inevitably in soil erosion. The extent of this damage may be seen if one realizes that the average nine inches of topsoil this country had at the beginning of its settlement has been reduced by an average of three inches, or by one-third. This would give us about another five hundred years before we lose all of the productive earth on our

continent for all practical purposes. That's five hundred years at the rate that has prevailed so far. It should also be pointed out here that three hundred to one thousand years are required for replacement of a single inch of topsoil we lose. So replacement is hardly the answer to our problems.

This tremendous loss of topsoil is aggravated by the inability or eroded land to hold back the water. This also contributes to water shortage, since the water table then falls--as it has in the United States. The reason for this is that the loss of spongy topsoils permits rapid runoff and relatively little retention of rainfall.

More disturbing than these present losses is the possibility that they are only a foretaste. The prospect is for the rate of soil erosion to accelerate since under certain conditions erosion progresses at a geometric rate. With the loss of a substantial amount of plant cover the topsoil is exposed to erosion forces. As we can see from the deforestation already mentioned and from the large amount of marginal lands under intensive cultivation, this country has certainly made the requisite step in that direction. The second condition for this swifter rate of erosion is the initial erosion of the topsoil. As we can see from our experience with dust bowls and from the hundreds of millions of tons of topsoil carried out of rivers in the Missouri Basin alone in times of heavy rain, there is little room for doubt that our erosion losses at present are most serious. The eroded lands of the southeastern part of our nation are examples of the kind of damage that has in the past resulted in the loss of one-third of our topsoil. We can see from this that the matter of eroded topsoils is advanced enough to permit consideration of the third

step. This is the already mentioned fact that eroded lands hold less water and runoff is more rapid. This more rapidly running water is able to both cut more quickly into the land and to carry more earth with it. This destroys more vegetation and since it also, as mentioned, cuts down the water table, indirectly destroys the plant cover in this way, too. The prairie states show this water table drop graphically in conjunction with wind erosion. This water table drop is evident throughout the nation even in areas where rainfall is abundant, such as California. The nature of the erosion cycle and our susceptibility to it should now be evident. The evidence indicates, in short, that without extraordinary measures we can expect the overall rate of erosion to accelerate rather than hold constant.

Birds, mammals, fish, plants, grasslands, forests, soils, water and minerals. A catalog of the most valuable possessions of this or any nation. Conservation consists in the attempt to preserve those that are preservable and to get the most out of those that are not. In light of this, it would seem that conservation is the most important of our pursuits. It is imperative that we have a correlated program for the application of the varying types of conservation measures appropriate to the several classes of natural resources. Recognition and understanding by all individuals and vigorous support of conservation practices by them and their governmental representatives is the only way we can achieve the essential measures upon which the future of our nation depends. The policies of this nation's governments are determined by the attitudes and actions of individuals. I ask only that your action when you are called upon be in accord with your

evaluation of the importance of conservation as you have assessed it from the facts you have been presented with.

APPENDIX B

Speech B

A Copy of the Manuscript Used in
Recording the Test Speech

The wealth of this nation is a topic of conversation we never tire of exploring and dissecting from as many view-points as there are talkers. Yet, rarely do we hear our profusion of goods ascribed to the proper source--the profligate hand of a God who stocked this continent with an unequalled store of natural resources.

Let me ask how rich we would be in ice-boxes and guided missiles if we retained democratic government, free-enterprise, and the AFL-CIO, but this land of ours were not endowed with its vast stores of timber, water, fertile soil, minerals, and wildlife? Here lies the fountain of our riches. Conservation is the preservation of these indispensables, yet its practices are shrouded in undeserved mystery and ignorance. In this speech let us try to pull aside that veil and expose to our eyes some hard truths concealed beneath.

First we must learn not to lump natural resources into one great amorphous mass. We can do this with four simple distinctions. There are some resources such as salt, water power and sunshine, that are as limitless as the sun and the sea. It's easy to see that these resources are the ones that should be used in place of those that are exhaustible. Somewhat similar resources are the kinds that are permanent, like soil or water, but are limited in their quantity. Since there is only so much and no more, these should be used with great care and minimum waste. Now to the things most people think of when they hear the word conservation. Fish, forest, grasslands, wildlife, etc., make up only one of the several classes of natural resources. But perhaps because these are so vulnerable, they attract most attention; for the distinctive feature of these is that they are so immediately subject to the pressures of men.

They are a guttering flame before the winds of civilization---without constant protection, bound to flicker out. The final class is the one certain of ultimate exhaustion. These are the minerals, especially mineral fuels and metallic ores. These resources are only accumulations of the past and once used they are gone forever.

We can see from this that conservation practices must vary--- that conservation is a dynamic process involving all the methods of best utilizing these several kinds of power and materials. If we keep these simple distinctions before us as we view the struggles of man with nature, we will see the ineptitude of many of our actions while marking the fruitful courses for what they are and can be.

One could ask, "Why should we need concern ourselves with argument for conservation? Isn't it readily apparent that this is an important task?" Yet, for most of the nation's citizens the water still flows and the sun still shines, life is pretty good and who cares about fifty years from now anyway? It's hard to get excited about anything so prosaic as conservation of natural resources. It's later than we think, friends.

The folly of our actions in the past and at present will shrink to the merest shadow of the terror that lies in wait for our prodigal civilization. We blithely ignore the pressures of an exploding world population on the remnant of our resources. But the appalling fact is that the population of this tired old planet is due to at least double in the next fifty years---wellwithin the lifespan of every person in this room! The ravages of the past, please remember, were accomplished by mere fractions of today's 2.7 billions---ponder if you will, the

consequences of double our teeming mass as they seek the good things of life in eternally proliferating shirt-sleeved, burmuda-shorts clad hordes.

What are we doing to husband our natural resources--what provision are we making for steadily spiralling demand for resources that by their very nature are tragically limited? Our society moves on a thin film of grease and oil, of petroleum products. The skeletons of our cities are minerals wrested from the earth in gigantic quantities. How many of you are aware that production of oil in this country will become steadily less from 1970 onward, instead of expanding to meet increased need? The world will soon follow, for the supply of fossil fuels is finite but human greed is a fathomless chasm that knows no depths and allows no restraint. The United State's pace-setting use of resources already has reduced at least twenty-two essential minerals to less than a thirty year supply. How can we remain so complacent with the exhaustion of our mines and wells the inevitable fruit of our actions, needing only time to bring it to maturity? In the face of the fact that none can deny, we shrug off conservation of petroleum and mineral resources as an "impossible task". Your father and your father's fathers could say, "...it doesn't affect me....,"--but you will see the end of more than one essential mineral before your children must assume the burden of subsisting on a played-out planet.

Remember the resources we said were replenishable--the ones that with care will remain with us--forest lands for instances? We have an outstanding record here, one that any good lumberman could be proud of. With typical American ingenuity, zeal, and initiative we've managed to denude 3/4 of the country by all available means--fire, flood, axe and

disease. We axed 'em down and left the slashings for tinder. And in due course, at cost of much sweat and expense, we had left hundreds of lovely collections of black smoldering stumps and ashes as testimony to our industry. The result is that the forest area of 822 million acres of virgin forest and the lumber reserve of eight billion board feet we originally had, have been reduced to 624 million acres of what is laughingly referred to as forest land, only 44 million acres of which are virgin forest, and a lumber reserve of 1.7 billion board feet. Since the growth of saw timber is exceeded by the speed with which this nation sucks up timber to spew forth mountains of magazines, matches, toothpicks and bridge-tables, we may find ourselves required to import increasing amounts of our timber based raw materials. It seems not to matter--we continue on our merry way, flipping a cigarette butt here and a lighted match there. With a mere flick of the wrist we manage to burn down ten million acres a year. We feel we live in an age of enlightened use of timber resources, but at least half of the timber cutting practices on private land are poor or destructive even today.

Our wastrel psychology could not be more clearly evident than as shown by the shameful story of our wildlife. There always seemed to be more--surely we could never seriously impair their endless numbers!

And so the plainsmen shot a whole half-ton of bison just to eat the tongue. Visiting European potentates were encouraged to shoot at buffalo herds from train widows, leaving the carcasses to rot in the sun--America's open air shooting gallery! Of sixty to seventy-five million, there remain today a few hundred scattered stragglers, largely on game preserves.

And the fat grey passenger--was ever a bird so numerous? In Audubon's time the flights of these birds darkened the heavens in hundreds of millions. Why not slaughter them indiscriminately? The inevitable happened. In 1905 the Audubon Society offered a five thousand dollar reward for just one solitary nesting passenger pigeon. The prize lies unclaimed. If our planet endures for the three billion years predicted for it, not another passenger pigeon will be found. What once was the most numerous bird in the United States has been slaughtered to the last feathered survivor.

These are only two of the five species of mammals and fifteen species and subspecies of birds that have, so far, been sacrificed on the altar of man's greed; 24 more species of mammals and 33 species of birds cling precariously to a seriously threatened existence.

Some pragmatic souls would like to put a price tag on wildlife and reckon its preservation against the value of their habitat if converted into a new sub-division. How can you hand a price tag on the scarlet flash of a tanager that flits fleetingly into view--on the quiet electric thrill of the fisherman watching the floating rise of silver through clear depths--on even the solitude of the green fastnesses of fir and spruce and pine? No! Instead it's "What's the revenue from sale of hunting and fishing licenses versus the value of the preserves on the real estate market?" Spiritual poverty is as much to be feared as the material variety.

Value obstinately remains a relative thing. Yet even coin-jinglers can understand the cost of pest control. Our upset of the fine balance of nature invariably has some disastrous repercussion in the shape of swarms of insects and rodents, as well as the eternal loss of

the creatures that controlled these things. We are meddling with forces of life when we deal in nature's realm and good sense and an appreciation of the knowledge we don't have would seem enough to insure caution even without the reminder of past error. But our mastery of physical forces has bred in us a foolish and unseemly contempt for the elusive mysteries of the wilderness. Whoever has a spark of the natural man in him will mourn the passing of those few places yet remaining where human kind can still retreat from the ant hills of civilization.

There remains to be considered now only those most fundamental and most abused of natural resources--soil and water. "Here's mud in yer eye!" goes an old toast---and had we a healthy gob in both eyes, we could hardly have been blinder to the oceans of water and the mountains of topsoil we're been using to construct giant stinking mud pies at the ends of most of our rivers for three hundred years. Of all the things critical to the existence of man on this earth, soil and water are the most crucial and these are the ones that suffer most from our pressures.

It takes three hundred to one thousand years to build one single inch of topsoil--the earth that produces our sustenance. In three centuries since the white man first stepped ashore on this continent, he has stripped it of one-third of its topsoil--three of nine inches--the product of millenia, flushed down the muddy, sewage-clogged rivers to stain the oceans a dirty brown for miles at sea. At our present rate of mining the soil we have about another five hundred years before we lose all the productive earth on this continent. That's five hundred years at the present rate, and without extraordinary measures the rate will increase, since soil erosion progresses at a geometric pace. You see, the spongy,

absorbent topsoils hold water--retain rainfall and thus cut down on the runoff that carries soil with it. But with the topsoil eaten away by the cancer of soil erosion, the bare hard subsoil pokes through and the waters run faster and bite deeper. This loss of soil is compounded by the loss of water as the water-table plunges because of too rapid runoff. It's a vicious unending cycle--the waters become scarier--the plant cover suffers and the soil is rendered more vulnerable to erosion.

By deforestation and intensive farming of marginal lands, we destroyed the cover that prevented the soil erosion cycle from getting its toe-hold. That toe-hold is turning into a strangler's grip that threatens to reduce the deep fertile soils of this country into a pitted, gullied wasteland on a continental scale. You can read the handwriting on the wall in the sand-dunes of the pillaged tobacco lands of the eastern seaboard and southland, in the billowing black clouds of the dust bowls, in the hundreds of millions of tons of topsoil that run into the Gulf of Mexico every time there's heavy rain in the Missouri Basin. You can hear it in the whine of futilely spinning windmills sucking vainly at dry holes in the prairie states, in the busy, interminable, day and night purr of electric pumps in California valleys, drawing deep to pull up to the surface the waters that less than fifty years ago gushed naturally and effortlessly from dozens of artesian wells. You can taste it in the chlorine loaded waters you are forced to drink from rivers that carry more than commerce. You can smell it in the stinking miasma that rises from Louisiana mud flats composed of the earth of Ohio, and Iowa and Montana. We've lifted the lid on a Pandora's box that puts the myth to shame. We're due to reap the whirlwind--and it's laden with dust that will grit the teeth

of generations to come.

All of man's riches and all of his most precious possessions are bound up in the thin little skin that covers this earth---the skin, the minerals under it, the plants and creatures that it harbors and the waters that fill its hollows---all are measured by the hand of man and found to be more fragile and destructible than he reckoned. Conservation--that dull, dull word---is all that stands between man and desolation-- conservation in all its myriad forms and practices is the determinant of your destiny and your nation's future, whether you know it or not. It is an unreasonable and shortsighted man who feels he can afford to remain in his cocoon of ignorance and apathy. We're part of a whole and survival lies in preserving that whole intricately connected web of nature upon which we depend so intimately. We cannot equate policy with desire-- we cannot balance three inches of topsoil with forty billion in gold reserves --we cannot close our eyes to the green wilderness become the asphalt desert--God help us when we can.

APPENDIX C

A Random Order Listing of the Sentences in
Test Speech A, with Figures of Speech
Identified by Two Judges

KEY TO IDENTIFICATION OF FIGURES OF SPEECH

- | | |
|----------------|---------------------|
| 1. Allusion | 8. Interrogation |
| 2. Analogy | 9. Irony |
| 3. Antithesis | 10. Metaphor |
| 4. Climax | 11. Metonymy |
| 5. Epigram | 12. Personification |
| 6. Exclamation | 13. Simile |
| 7. Hyperbole | 14. Synecdoche |

In each sentence (in the random listings of the sentences of speeches A and B that follow in appendices C and D) will appear the identifying numbers of the figures of speech identified by either or both of the two judges. Where the figure of speech was identified by only one of the two judges, it is noted. Where the same expression was identified differently by the two judges, the identifying numbers will be enclosed in the same parenthesis.

* * * * *

1. Brief mention of some of the most notorious examples of the past should make the point clear.
2. This destroys more vegetation and since it also, as mentioned, cuts down the water table, indirectly destroys the plant cover in this way too.
3. The evidence indicates, in short, that without extraordinary measures we can expect the overall rate of erosion to accelerate rather than hold constant.
4. So replacement is hardly the answer to our problem.
5. Such resources should be made available in as great quantities as usable and should be substituted wherever possible for resources limited in quantity or non-renewable in character.
6. The eroded lands of the southeastern part of our nation are examples of the kind of damage that has in the past resulted in the loss of one-third of our topsoil.

7. Notwithstanding this, waste on a large scale persists.
8. This more rapidly running water is able to both cut more quickly into the land and to carry more earth with it.
9. With the loss of a substantial amount of plant cover the topsoil is exposed to erosion forces.
10. Some of these are forests, fish, and wildlife.
11. This is the already mentioned fact that eroded lands hold less water and runoff is more rapid.
12. Moreover, there is the matter of maintaining controls on insects and pests.
13. Petroleum products and metals play roles (12*) that are basic to our industry and our daily affairs.
14. Obviously, the same principles of conservation do not apply to all these natural resources.
15. The rise of population, bringing with it increased loss of habitat, rising hunting pressure, industrial wastes and other encroachments show us that this is no time for complacency simply because we've stopped the disappearance of some threatened species by recent measures.
16. The known reserves of twenty-two essential minerals in this country stands at less than thirty years.
17. Of sixty to seventy-five million bison that inhabited the North American continent at the beginning of its settlement, there remained only scattered bands at the start of this century.
18. The United States may find itself in the position of a debtor (12) nation in timber resources without some reduction in wasteful deforestation of this nature.
19. In fact, we treat our resources as though they were inexhaustible.
20. Failure to see the difference between these types of use is failure to see the difference between possible and impossible, between the feasible and the impractical. (3)
21. It is difficult to consider these two separately--their relationship is so close that we must necessarily refer to them together in order to understand the situation that exists.
22. Class two: Resources permanent in nature but limited in amount, as soil and water.

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23. The reason for this is that the loss of spongy topsoils permits rapid runoff and relatively little retention of rainfall.
24. The problem of reconciling an ever upswinging human population and its attendant ever increasing demands on the wildlife population, with a constantly shrinking habitat for wildlife poses serious questions for all of us.
25. Consider the effect on our resources of twice our numbers and twice our demands.
26. Most important of these are minerals, especially mineral fuels and metallic ores.
27. It is imperative that we have a correlated program for the application of the varying types of conservation measures appropriate to the several classes of natural resources.
28. It would appear that the world's annual production of petroleum will fall behind the demand in less than a half century.
29. Even closer to our own personal actions and certainly more objectionable, is the loss of over ten million acres annually to forest fires started nine out of ten times by men.
30. With this rather dry, but necessary introduction to the nature of natural resources, let us proceed to examine some facts demonstrating that conservation is actually worth being concerned with.
31. Considerable effort and search has been made since the early 1900's to find some trace of the bird but such attempts at restoration have been unsuccessful.
32. It certainly is unnecessary to remind intelligent persons of the utter dependency (12*) of civilization's comforts, both the necessities and the luxuries, upon the four classes or resources outlined.
33. Of course, unless there is some appreciation of the value of wildlife there is little point in pointing out the destruction of it in the past.
34. The United States is not exempt (12*) from this biological certainty.
35. The second class we named on our list was of "permanent" resources that are limited in amount -soil and water were given as examples.
36. The policies of this nation's governments are determined by the attitudes and actions of individuals.
37. This bird that about a century ago was numbered at over five billion is now extinct.

*By Speech Faculty Only.

38. We cannot prevent the use of limited resources but we can extend the period of their accessibility and thereby permit future generations a measure of the benefits we have assumed as our due.

39. Such should be used only as required and waste scrupulously avoided in order to preserve as long as possible.

40. The list of exterminated or nearly extinct species that are the result of man's brief span, by natural reckoning, of three hundred years on this continent, contains five species of mammals and fifteen species and subspecies of birds completely extirpated; of those brought close to the vanishing point, twenty-four more species of American birds.

41. As we can see from the deforestation already mentioned and from the large amount of marginal lands under intensive cultivation, this country has certainly made the requisite step (12**) in that direction.

42. Our society is one that is in great measure based upon this category of resources.

43. The United States had originally a forest area of 822 million acres of virgin forest and a lumber reserve of eight billion board feet.

44. As we can see from our experience with dust bowls and from the hundreds of millions of tons of topsoil carried out of rivers in the Missouri Basin alone in times of heavy rain, there is little room for doubt that our erosion losses at present are most serious.

45. Such should be safeguarded to insure their constant availability.

46. The story of our wildlife policies of the past is perhaps more serious in its implications.

47. More disturbing than these present losses is the possibility that they are only a foretaste.

48. Forests are considered a renewable crop but unfortunately most lumbermen in the past viewed them as a mine. (13**)

49. We must be careful to distinguish between losses in use of natural resources which are avoidable under present circumstances and those which are unavoidable. (3*)

50. This also contributes to water shortage, since the water table then falls--as it has in the United States.

51. In reverse order of their description, let us continue to the third class described, that of periodically renewed resources, wildlife, forests, etc.

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**By Investigator Only.

52. Of the several species of birds that might be noted here the best example of the damage resulting from civilization's pressure on bird-life is that of the passenger pigeon.
53. The prairie states show this water table drop graphically in conjunction with wind erosion.
54. The prospect is for the rate of soil erosion to accelerate since under certain conditions erosion progresses at a geometric rate.
55. The recreation value of wildlife in a complex society such as ours is inestimable.
56. Recognition and understanding by all individuals and rigorous support of conservation practices by them and their governmental representatives is the only way we can achieve the essential measures upon which the future of our nation depends.
57. These are, in contrast to classes one and two, exhaustible and may be exterminated.
58. We can see from this that the matter of eroded topsoils is advanced enough to permit consideration of the third step.
59. Seldom do we hear it named as derived from the stores of natural resources we, as a nation, possess today and have had advantage of in the past.
60. The intent, then of this speech is to heighten your awareness of the importance to you and your nation of conservation.
61. In general, it may be said that there are four classes.
62. Class four: Resources of limited accumulation and not replenished at an appreciable rate.
63. The wealth of our country is ~~something we are~~ all proud of.
64. In order to correctly distinguish conservation practices. it is first necessary to classify natural resources.
65. Today, of the 624 million acres of "forest" land remaining, much of it has little timber, only about 44 million acres are virgin forest and the lumber reserve stands at about 1.7 billion board feet.
66. Conservation consists in the attempt to preserve those that are preservable and to get the most out of those that are not.
67. The temporary gain secured by exploitation of a wildlife form cannot match its long term value for recreation.

68. This tremendous loss of topsoil is aggravated by the inability of eroded land (12*) to hold back the water.

69. The American bison is today found largely on game preserves.

70. The extent of this damage may be seen if one realizes that the average nine inches of topsoil this country had at the beginning of its settlement has been reduced by an average of three inches.

71. Such should have their amounts constantly replenished in a quantity equal to their use.

72. Let us first consider the status of the most "perishable" of our resources--the minerals of class four.

73. The figures that follow, keep in mind, are based on the usages of present and past smaller numbers of people.

74. Class one: Materials and sources of power that exist in abundance for all time.

75. The supply is non-renewable.

76. That's five hundred years at the rate that has prevailed so far.

77. In less than a half century the world population is due to at least double.

78. With the increase of world industrialization and the increased demand of larger and more acquisitive foreign populations, there seems to follow the conclusion that without some restriction on the use of these resources we shall encounter certain deprivation in the next century.

79. It should also be pointed out here that three hundred to one thousand years are required for replacement of a single inch of topsoil we lose.

80. The correct principle for class two may be entirely wrong for class four.

81. Class three: Resources that are reproduced as crops, renewing themselves (12*) periodically.

82. The deforestation, overgrazing and poor farming methods that were common for the first two hundred years of the stay of Europeans on this continent, resulted inevitably in soil erosion.

83. The nature of the erosion cycle and our susceptibility to it should now be evident.

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84. It is apparent that even though there are many factors entering into the process that has resulted in our present status, it cannot be denied that the wildlife, timber, water, soil and minerals we possessed determined the extent to which other factors might be effective.

85. In light of this, it would seem that conservation is the most important of our pursuits.

86. Conservation is the term we use to refer to the maintenance of these natural resources.

87. For instance, common salt, water power, sunlight, etc.

88. This would give us about another five hundred years before we lose all of the productive earth (12*) on our continent for all practical purposes.

89. The chief of the United States Forest Service a few years ago complained that at least half of the timber cutting practices on private land were "poor" or "destructive".

90. Obviously, there is a serious possible deficit between the time of exhaustion (12*) of virgin timber (12*) and the time when second growth will be sufficient.

91. Yet, conservation is a subject most of us know little about and care less.

92. Yet, possession of knowledge does not insure concern.

93. The value of recreation opportunities is not easily expressed in financial terms but there is little question of the need for maintaining to as great an extent as defensible this recreation outlet.

94. This oftentimes proves a costly and frustrating experience while seldom attaining the degree of effectiveness that the original natural controls were capable of.

95. Our actions seem to belie our protests of respect for our dependence on nature.

96. A catalog of the most valuable possessions of this or any nation.

97. Soil and water are, needless to say, critical to life, and one would suppose that we would in turn, protect these things with all our energies.

98. Moreover, the growth of saw timber is only about 4/5 of the drain of use.

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99. When we upset the balance that has been achieved in nature for the prevention of a superabundance of any creature we can expect to have to provide ourselves the same control that we have removed.

100. Just for purposes of comparison, today's world population stands at 2.7 billion and we add millions every year.

101. This extinction was accomplished in somewhat over a half century of unrestricted exploitation by both commercial and private interests.

102. The United States is using its minerals at a rate unparalleled by any nation in the world.

103. A look at our muddy, soil-clogged and sewage contaminated rivers ought to convince anyone that once again we're not doing the expectable.

104. This water table drop is evident throughout the nation even in areas where rainfall is abundant, such as California.

105. We ignore the pressure of a rising population on the resources we still possess.

106. Birds, mammals, fish, plants, grassland, forests, soils, water and minerals--a catalog of the most valuable possessions of this or any nation.

107. Petroleum producers in the United States predict that production of oil will begin to decline in this country in ten to fifteen years and in the rest of the world not long after,

108. For the significance of this dependence does not seem to have very seriously effected our behavior.

109. The most efficient and economical way of doing this is through the use of competing or predatory forms of wildlife.

110. Once used many are gone forever.

111. Yet, we seem not aware of the first source of the prosperity we enjoy.

112. I ask only that your action when you are called upon be in accord with your evaluation of the importance of conservation as you have assessed it from the facts you have been presented with.

113. The second condition for this swifter rate of erosion is the initial erosion of the topsoil.

APPENDIX D

A Random Order Listing of the Sentences in
Test Speech B, with Figures of Speech
Identified by Two Judges

1. These resources are only accumulations of the past and once used they are gone forever.
2. Whoever has a spark of the natural man in him will mourn the passing of those few places yet remaining where humankind can still retreat (7*) from the ant hills of civilization. (10**)
3. But the appalling fact is that the population of this tired old planet (12) is due to at least double in the next fifteen years--well within the lifespan of every person in this room!
4. We have an outstanding record (9**) here, one that any good lumberman could be proud of. (9**)
5. Our society moves on a thin film of grease and oil (12) of petroleum products.
6. You see, the spongy, absorbent topsoils hold water--retain rainfall and thus cut down on the runoff that carries soil with it.
7. We axed 'em down and left the slashings for tinder.
8. How can you hang a price tag on the scarlet flash of a tanager (8**) that flits fleetingly into view--on the quiet electric thrill of the fisherman (8**) watching the floating rise of silver, (12*, 14**) through clear depths--on even the solitude of the green fastnesses of fir and spruce and pine? (8**)
9. The skeletons of our cities (12) are minerals wrested from the earth in gigantic quantities.
10. There remains to be considered now only those most fundamental and most abused of natural resources--soil and water.
11. And so the plainsman shot a whole half-ton of bison just to eat the tongue. (7**)
12. That's five hundred years at the present rate, and without extraordinary measures the rate will increase since soil erosion progresses at a geometric pace. (12*)
13. The ravages of the past, please remember, were accomplished by mere fractions of today's 2.7 billions---ponder if you will, the consequences of double our teeming mass (7) as they seek the good things of life in eternally proliferating shirt-sleeved, burmuda-shorts clad hordes. (7)
14. "Here's mud in yer eye!" goes the old toast--and had we a healthy gob in both eyes, we could hardly have been blinder to the oceans (7) of water and the mountains (7) of topsoil we've been using to construct giant

*By Speech Faculty Judge Only.

**By Investigator Only.

stinking (7) mud pies (2*,10**) at the ends of most of our rivers for three hundred years.

15. Our upset of the fine balance of nature invariably has some disastrous repercussion in the shape of swarms of insects and rodents, as well as the eternal loss of the creatures that controlled these things.

16. We blithely ignore the pressures of an exploding (7) world population on the remnant of our resources.

17. Conservation is the preservation of these indispensables yet its practices are shrouded (12*) in undeserved mystery and ignorance.

18. Visiting European potentates were encouraged to shoot at buffalo herds from train windows, leaving the carcasses to rot in the sun--America's open air shooting gallery! (7)

19. And the fat grey passenger pigeon--was ever a bird so numerous? (8)

20. It's a vicious unending cycle (12)--the waters become scarcer--the plant cover suffers (12*) and the soil is rendered more vulnerable to erosion.

21. It's easy to see that these resources are the ones that should be used in place of those that are exhaustible.

22. Here lies the fountain of our riches. (7*, 10**)

23. Let me ask how rich we would be in ice-boxes and guided missiles if we retained democratic government, free-enterprise, and the AFL-CIO, but this land of ours were not endowed with its vast stores of timber, water, fertile soil, minerals, and wildlife? (8)

24. But with the topsoil eaten (12*) away by the cancer of soil erosion (12*,10**) the bare hard subsoil pokes (12) through and the waters run (12) faster and bite (12) deeper.

25. Fish, forest, grasslands, wildlife, etc., make up only one of the several classes of natural resources.

26. Isn't it readily apparent (8) that this is an important task?*

27. That toe-hold (12) is turning into a strangler's grip (12) that threatens to reduce the deep fertile soils of this country into a pitted, gullied wasteland (7**) on a continental scale.

28. Since the growth of saw timber is exceeded by the speed with which this nation sucks up (12) timber to spew forth (12) mountains of magazines (7) matches, toothpicks and bridge-tables, we may find ourselves required to import increasing amounts of our timber based raw materials.

*By Speech Faculty Judge Only.

**By Investigator Only.

29. How many of you are aware (8) that production of oil in this country will become steadily less from 1970 onward, instead of expanding (3*) to meet increased needs?

30. By deforestation and intensive farming of marginal lands, we destroyed the cover that prevented the soil erosion cycle from getting its toe-hold. (12)

31. And in due course, at a cost of much sweat and expense, we had left hundreds of lovely collections of black smouldering stumps and ashes as testimony (13*) to our industry. (9**)

32. There are some resources such as salt, water power, and sunshine, that are as limitless as the sun and the sea. (7*, 13**)

33. The United State's pace-setting (12) use of resources already has reduced at least twenty-two essential minerals to less than a thirty year supply.

34. In the face of fact (12**) that none can deny, we shrug off conservation of petroleum and mineral resources as an "impossible task". (7*)

35. The final class is the one certain of ultimate exhaustion. (12*)

36. This loss of soil is compounded by the loss of water as the water-table plunges (12*) because of the too rapid runoff.

37. What once was the most numerous bird in the United States has been slaughtered to the last feathered survivor. (3)

38. You can hear it in the whine (12) of futilely spinning windmills sucking (12) vainly at dry holes in prairie states, in the busy, interminable, day and night purr (12) of electric pumps in California valleys, drawing deep (12*) to pull up (12*) to the surface the waters that less than fifty years ago gushed naturally and effortlessly (3**) from dozens of artesian wells.

39. We are meddling with forces of life when we deal in nature's realm and good sense and an appreciation of the knowledge we don't have would seem enough to insure caution even without the reminder of past error.

40. There always seemed to be more---surely we could never seriously impair their endless numbers! (6)

41. First we must learn not to lump natural resources into one great amorphous mass.

42. These are the minerals, especially mineral fuels and metallic ores.

*By Speech Faculty Judge Only.

**By Investigator Only.

43. The wealth of this nation is a topic of conversation we never tire of exploring and dissecting (12*) from as many view-points as there are talkers.

44. We can do this with four simple distinctions.

45. In this speech let us try to pull aside that veil and expose to our eyes some hard truths concealed beneath.

46. Yet, rarely do we hear our profusion of goods ascribed to the proper sources-- the profligate hand (14*, 11**) of a God who stocked this continent with an unequalled store of natural resources.

47. We cannot equate policy with desire (3**)--we cannot balance three inches of topsoil with forty-billion in gold reserves (3**) ~~we~~ cannot close our eyes to the green wilderness become the asphalt desert (3)-- } (4*)
God help us when we can. (6*)

48. They are a guttering flame (1) before the winds of civilization (7*, 10**) without constant protection, bound to flicker out.

49. Yet even coin-jinglers can understand the cost of pest control.

50. We're due to reap the whirlwind (1**)--and it's laden with dust that will grit the teeth of generations (14) to come. } (7*)

51. These are only two of the five species of mammals and fifteen subspecies and species of birds that have, so far, been sacrificed on the altar of man's greed; (7) 24 more species of mammals and 33 species of birds cling precariously to a seriously threatened existence.

52. With a mere flick of the wrist we manage to burn down ten million acres a years.

53. You can taste it in the chlorine loaded water you are forced to drink from rivers that carry more than commerce. (7**)

54. Yet, for most of the nation's citizens the water still flows and the sun still shines, life is pretty good and who cares about fifty years from now anyway? (8)

55. We feel we live in an age of enlightened use of timber resources, but at least half of the timber cutting practices on private land are poor or destructive even today.

56. We've lifted the lid on a Pandora's box (1) that puts the myth to shame.

57. In 1905 the audubon Society offered a five thousand dollar reward for just one solitary nesting passenger pigeon.

*By Speech Faculty Judge Only.

**By Investigator Only.

58. Now to the things most people think of when they hear the word conservation.

59. It is an unreasonable and short-sighted man who feels he can afford to remain in his cocoon of ignorance and apathy. (7*, 5**)

60. Our wastrel psychology could not be more clearly evident than as shown by the shameful story of our wildlife.

61. Your father and your father's fathers could say, "...it doesn't affect me...", --but you will see the end of more than one essential mineral before your childre must assume the burden of subsisting on a played-out planet. (12)

62. Conservation--that dull, dull word---is all that stands between man and desolation--conservation in all its myriad forms and practices is the determinant of your destiny and your nation's future, whether you know it or not.

63. Spiritual poverty is as much to be feared as the material variety.

64. If we keep these simple distinctions before us as we view the struggles of man with nature, we will see the ineptitude of many of our actions while marking the fruitful courses for what they are and can be.

65. It seems not to matter--we continue on our merry way, flipping a } (7**) cigarette butt here and a lighted match there.

66. Some pragmatic souls would like to put a price tag on wildlife and reckon its preservation against the value of their habitat if converted into a new sub-division.

67. In three centuries since the white man first stepped ashore on this continent, he has stripped it of one-third of its soil---three of nine inches--the product of millenia flushed down the muddy, sewage-clogged rivers to stain the oceans a dirty brown for miles at sea. (7**)

68. The world will soon follow, for the supply of fossil fuels is finite but human greed is a fathomless chasm (10) (3**) that knows (12) no depths and allows (12) no restraint.

69. Value obstinately remains a relative thing.

70. The folly of our actions in the past and at present will shrink to the merest shadow of the terror that lies in wait (12) for our prodigal (1**) civilization.

71. No! Instead it's, "What's the revenue (8) from sale of hunting and fishing licenses versus the value of the preserve on the real estate market?"

*By Speech Faculty Judge Only.

**By Investigator Only.

72. In Audubon's time the flights of these birds darkened the heavens (7**) in hundreds of millions.

73. With typical American ingenuity, zeal, and initiative (9**) we've managed to denude 3/4 of the country by all available means---fire, flood, axe and disease.

74. We can see from this that conservation practices must vary--that conservation is a dynamic process involving all the methods of best utilizing these several kinds of power and materials.

75. How can we remain so complacent (8) with the exhaustion of our mines and wells the inevitable fruit of our actions, needing only time to bring it to maturity?

76. It takes three hundred to one thousand years to build one single inch of topsoil--the earth that produces our sustenance.

77. You can smell it in the stinking miasma (7) that rises from Louisiana mud flats composed of the earth of Ohio, and Iowa and Montana.

78. Since there is only so much and no more, these should be used with great care and minimum waste. (3*)

79. At our present rate of mining the soil we have about another five hundred years before we lose all the productive earth on this continent.

80. What are we doing to husband our natural resources (8**)--what provision are we making for steadily spiralling demand (8**) for resources that by their very nature are tragically limited? (8*)

81. It's hard to get excited about anything so prosaic as conservation of natural resources.

82. If our planet endures for the three billion years predicted for it, (7**) not another passenger pigeon will be found.

83. Why not slaughter them indiscriminately? (8)

84. The result is that the forest area of 822 million acres of virgin forest and the lumber reserve of eight billion board feet, we originally had, have been reduced to 624 million acres of what is laughingly referred to as forest land, only 44 million acres of which are virgin forest, and a lumber reserve of 1.7 billion board feet.

85. Of all the things critical to the existence of man on this earth, soil and water are the most critical and these are the ones that suffer (12*) most from our pressures.

86. One could ask, "Why should we need concern ourselves with argument for conservation?" (8)

*By Speech Faculty Judge Only.

**By Investigator Only.

87. Remember the resources we said were replenishable--the ones that with care will remain with us--forest lands for instance? (8)

88. But our mastery of physical forces has bred (12**) in us a foolish and unseemly contempt for the elusive mysteries of the wilderness.

89. But perhaps because these are so vulnerable, they attract most attention; for the distinctive feature of these is that they are so immediately subject to the pressures of men.

90. All of man's riches and all of his most precious possessions are bound up in the thin little skin (12**) that covers this earth--the skin, the minerals under it, the plants and creatures that it harbors and the waters that fill its hollows--all are measured by the hand of man (14*, (11**)) and found to be more fragile and destructible than he reckoned.

91. Of sixty to seventy-five million, there remain today a few hundred scattered stragglers, largely on game preserves.

92. We're part of a whole and survival lies in preserving that whole intricately connected web of nature upon which we depend so intimately.

93. Somewhat similar resources are the kinds that are permanent, like soil and water, but are limited in their quantity.

94. You can read the handwriting on the wall (1**) in the sand-dunes of the pillaged tobacco lands of the eastern seaboard and southland, in the billowing black clouds of the dust bowls, in the hundreds of millions of tons of topsoil that run into the Gulf of Mexico every time there's heavy rain in the Missouri Basin.

95. The prize lies unclaimed.

96. It's later than we think, friends.

97. The inevitable happened.

APPENDIX E

Instructions and Word Lists Used to Demonstrate
Differences in Speeches A and B
for the Variable of Vividness

The terms you will use in classifying the words in these lists are attitude word, image word, and neutral word.

An attitude word is one that reveals the "feeling" or attitude of the user of the word toward the object or action which the word refers to. An example might be the words "objection" and "quibble"; these two words could refer to the same action, but the first seems essentially neutral while the second reveals an unfavorable attitude.

An image word is one that arouses some degree of the feeling of an action or situation, or gives rise to a "mental picture" of the object named. For example, the words "fast" and "wild" could both be used to modify the word "run" in describing an event. The first word, "fast", describes the action, the second word, "wild", attempts to convey some measure of the feeling of fast motion.

A neutral word is one that essentially conveys only basic information, neither arousing "images" nor expressing attitude. The examples for attitude words and image words also give examples of neutral words.

On the numbered sheets given to you, you are to place on the numbered line that corresponds to the number of the word in the list that you're judging an "A" if you think the word is dominantly an attitude word; an "I" if you think it is dominantly an image word; both an "A" and an "I" if the word, in your opinion, expresses both an attitude and is an image word; place an "N" on the line if you feel that the word is essentially neutral.

Words can serve several purposes simultaneously, as for instance, a word may convey certain basic information, express the attitude of the user of the word, and arouse some feeling in the hearer, etc. Some words

may do all of these things, others only one or two of them. The terms which we use to refer to these functions of words are common in our everyday affairs. We refer to some words as "objective", for instance, meaning that the usage is essentially "neutral"; it reveals or conveys only basic fact or information while not attempting to prejudice the hearer or reveal the attitude of the speaker. The terms we use to refer to language that does reveal the attitude of the speaker or arouses some "image", a picture or feeling, in the receiver are several; we refer to "colorful" words, to "image" words, to "emotional" words, to "pejorative" or "prejudicial" words, etc.

The lists of words you have been given range from "objective" or "neutral" words to words we might describe as "vivid", "colorful", "descriptive", "expressive", etc. There are of course, no sharp distinctions; all words contain all these characteristics to a greater or lesser degree. It is only possible to sometimes determine the dominant characteristic of a word, not to make some absolute statement about it. It is this dominant nature, this difference in degree in the words of the lists that you are being asked to help determine.

1	solitude		intent
	real		able
	steadily	30	prosaic
	recreation		debtor
5	inhabited		shoot
	spark		early
	laughingly		exploitation
	named	35	gob
	personal		evaluation
10	awareness		condition
	burn		constantly
	persists		seek
	comforts	40	requisite
	fossil		green
15	correct		situation
	position		bridge-tables
	trace		nonrenewable
	guided	45	stocked
	avoid		record
20	fathomless		follow
	repercussion		pies
	protests		notorious
	fine	50	blithely
	efficient		burden
25	outlined		busy
	billowing		"AFL-CIO"
	maintenance		crucial

55	necessary		aggravated
	respect		artesian
	preservable		unequaled
	indirectly	85	restriction
	free		prodigal
60	herds		necessities
	commercial		encourage
	attendant		sea
	comparison	90	revenue
	realm		left
65	unsuccessful		proceed
	doubt		vulnerable
	drain		contains
	mere	95	unclaimed
	shirt-sleeved		inexhaustible
70	failure		southeastern
	susceptibility		reproduced
	economical		stumps
	retain	100	grip
	visiting		support
75	prosperity		prize
	southland		tanager
	gulleys		ultimate
	whine	105	shape
	evidence		scarcer
80	viewpoints		problems
	exceeded		exploring

	chief		build
110	separately		tired
	prevent		determined
	safeguarded		web
	profusion	140	temporary
	maintaining		certainly
115	licenses		short
	age		energies
	description		whirlwind
	smell	145	biological
	renewable		suppose
120	word		clad
	noted		zeal
	answer		oceans
	lifespan	150	significance
	complained		careful
125	estate		vicious
	order		wilderness
	overgrazing		stopped
	actually	155	Audubon's
	conversation		obviously
130	exist		unfortunately
	sufficient		gushed
	producers		flick
	Iowa	160	endowed
	wrist		valuable
135	abundance		prevailed

	horde	190	exterminated
	attempt		implications
165	feasible		desolation
	smaller		apply
	figures		effect
	undeserved	195	toehold
	effortlessly		destruction
170	expectable		please
	poverty		appropriate
	considerable		principle
	spew	200	terms
	deep		span
175	profligate		offered
	desire		brown
	sweat		equate
	period	205	vanishing
	fruit		vigorous
180	direction		cultivation
	fractions		import
	annual		provide
	quickly	210	renew
	reminder		average
185	governmental		list
	gold		axe
	seldom		elusive
	impractical	215	damage
	eye		representatives

	derived		rest
	dissecting	245	laden
	prospect		problem
220	foretaste		consequences
	wasteful		secured
	marking		ashore
	North	250	industrialization
	enjoy		behavior
225	away		reconciling
	desert		search
	belie		shrug
	eat	255	prevented
	myriad		extirpated
230	remind		topic
	ant-hills		flow
	stain		guttering
	commerce	260	axed
	swifter		spiralling
235	indispensibles		indicates
	whole		millenia
	solitary		imperative
	distinctive	265	destiny
	retreat		wastrel
240	windmills		skin
	interests		substantial
	accelerate		variety
	affairs	270	air

	deprivation		removed
	destructible		unreasonable
	introduction	300	forms
	bound		eastern
275	outlet		reason
	status		general
	pace		deficit
	play	305	slashings
	mud		bands
280	proves		initial
	capable		feared
	luxuries		purposes
	equal	310	lovely
	financial		caution
285	opportunities		example
	achieve		degree
	pumps		extend
	encounter	315	start
	pokes		maturity
290	back		tinder
	stragglers		advanced
	basic		shrouded
	dust	320	eternal
	worth		toothpicks
295	connected		attract
	objectionable		ingenuity
	suffer		contributes

325	metals	possess
	scrupulously	catalog
	permits	slaughter
	eternally	355 look
	thin	train
330	bird-life	live
	children	interminable
	tobacco	understanding
	fire	360 consideration
	wrested	common
335	extinction	utilizing
	mention	collections
	brief	afford
	tremendous	365 face
	completely	disappearance
340	nearly	category
	spruce	add
	deal	indiscriminately
	conjunction	370 flats
	call	gain
345	difference	foolish
	upswinging	effective
	absorbant	circumstances
	settlement	375 retention
	sand-dunes	enlightened
350	limitless	shortsighted
	asphalt	demonstrating

	contrast		recent
380	pitted		subsisting
	depths		consists
	defensible		contaminated
	described	410	floating
	effort		classify
385	seaboard		spiritual
	clouds		flights
	graphically		unavoidable
	survival	415	unrestricted
	denude		outstanding
390	vainly		Ohio
	roles		assessed
	wasteland		question
	replenishable	420	benefits
	possibility		shame
395	protect		reward
	individuals		rodents
	disturbing		realizes
	practical	425	fragile
	pragmatic		citizens
400	apathy		buffalo
	flame		expressed
	flits		mass
	conclusion	430	Pandora's Box
	amorphous		complex
405	meet		pretty

fundamental	460	think
stay		replacement
435 poses		fall
substituted		cancer
intricately		relationship
correlated	465	difficult
drawing		crop
440 testimony		struggles
concealed		abused
spinning		ask
prevention	470	pursuits
fat		sucks
445 feature		endless
compounded		drink
reverse		extinct
program	475	flipping
advantage		attain
450 tongue		faster
feel		skeletons
bred		intimately
restoration	480	stripped
unending		dependence
455 altar		decline
convince		long
predatory		treat
unseemly	485	survivor
valleys		humankind

blind
similar
sewage-clogged
490 attitudes
windows
reap
mystery
intelligent
495 sacrificed
eroded
fruitful
immediately
examine
500 possible

APPENDIX F

Instructions, Concepts and Scales Used in Forms
1 and 2 of the Semantic Differential in
Two Preliminary Reliability Studies

INSTRUCTIONS

On each page of this booklet you will find a different concept to be judged and beneath it a set of scales. You are to rate the concept on each of these scales in order.

Here is how you are to use these scales:

If you feel that the concept is EXTREMELY RELATED to one end or other of the scale, you should place your check mark as follows:

wise X : ___ : ___ : ___ : ___ : ___ : ___ foolish

wise ___ : ___ : ___ : ___ : ___ : ___ : X foolish

If you feel that the concept is QUITE RELATED to one or the other end of the scale, you should place your check as follows:

weak ___ : X : ___ : ___ : ___ : ___ : ___ strong

weak ___ : ___ : ___ : ___ : ___ : X : ___ strong

If the concept seems only SLIGHTLY RELATED to one side as opposed to the other side (but is not really neutral), then you should check as follows:

active ___ : ___ : X : ___ : ___ : ___ : ___ passive

active ___ : ___ : ___ : ___ : ___ : ___ : ___ passive

The direction toward which you check, of course, depends on which of the two sides of the scale seems most characteristic of the concept you're judging.

If you consider the concept to be NEUTRAL on the scale (both sides equally associated with the concept) or if the scale is completely IRRELEVANT (unrelated to your feelings for the concept), then you should place your check mark in the middle space:

safe ___ : ___ : ___ : X : ___ : ___ : ___ : dangerous

IMPORTANT: (1) Place your check marks in the middle of the spaces, not on the boundaries

this not this

X : ___ : ___ : ___ : ___ : X : ___

(2) Be sure to check every scale for every concept.

(3) Never check more than once for each scale.

Here is a short example to work.

The concept to be judged is:

ECONOMIC AID TO FOREIGN COUNTRIES

The first scale is:

large ___ : ___ : ___ : ___ : ___ : ___ : ___ small

Make your check mark according to the meaning which this concept has for you; is it EXTREMELY RELATED, QUITE RELATED, SLIGHTLY RELATED or NEUTRAL on this scale?

The first scale is:

static ___ : ___ : ___ : ___ : ___ : ___ : ___ dynamic

Make your check mark according to the meaning which this concept has for you on this scale.

The third scale is:

good ___ : ___ : ___ : ___ : ___ : ___ : ___ bad

Make your check according to your meaning for this concept on this scale.

(Instructions to be Read Before Administration of Form 1)

Are there any questions concerning the operations you are to perform in filling out this booklet?

Before you begin there are some additional things you should know.

The purpose of this investigation is to study the meanings of certain concepts for various people. In taking this test it is important to make your judgments solely on the basis of what these things mean to you. We are interested not in what others say they should mean, but rather in what they do mean to you.

Sometimes you may feel as though you've had the same item before on the test. This will not be the case, so do not look back and forth through the items. Do not try to remember how you checked similar items earlier in the test. Try to make each item a separate and independent judgment on your part.

Do not worry or puzzle over individual items. There are no "right" answers. It is your first impressions, the immediate "feelings" about the items that we want. On the other hand, we ask you to be as careful and as discriminative in your use of the points on the scale as you can, since we want as true and accurate a picture of these meanings as possible.

We ask that you do not discuss the test among yourselves until after this hour. This is in order to insure independent judgments from each of you.

If there are any questions relating to the instructions and what you are to do, please ask them now. No questions will be answered during the test period.

After you begin to work the test, work only until you have completed the first two sheets. You will find a sheet of yellow paper between the second and third pages of the test. Do not work beyond this sheet of yellow paper. Begin to work now.

(To be Read After Completion of the First Two Pages)

Now that everyone has worked through two sheets of the actual test, is there any question as to how you are to proceed? If there is any difficulty please ask questions you may have now, before we continue with the remainder of the test booklet.

Begin to work now and work through the booklet to the end.

(Instructions to be Read Before Administration of Form 2)

The procedure you are to follow on this test is exactly similar to that of the test you took at the beginning of the hour. You are to rate the concepts at the top of the pages of the test booklets on each of the scales given. You will remember that you are to make your judgments according to the meaning which the concept has for you personally. Again, we ask you to please be careful to indicate a judgment for each concept on every scale.

Are there any questions relating to the instructions? No questions will be answered after the test begins. Begin to work now and work to the end of the test booklet.

Concepts for form 1:

American Foreign Policy Today
Strong Central Government
Natural Resources*
An Ideal President of the U. S.
The Principle of Conservation*
Russian Communism
Soil Erosion Today*
America's Sense of National Purpose
Wildlife Preserves*
The Democratic Party Today
Conservation Practices Today*

Concepts for form 2:

Wildlife Preserves*
The United Nations Today
Conservation Practices Today*
American Military Power
Soil Erosion Today*
The Republican Party Today
Natural Resources*
Worldwide Disarmament
The Principle of Conservation*

*Test Concept from speeches A and B

unimportant ___ : ___ : ___ : ___ : ___ : ___ : ___ important

strong ___ : ___ : ___ : ___ : ___ : ___ : ___ weak

slow ___ : ___ : ___ : ___ : ___ : ___ : ___ fast

valuable ___ : ___ : ___ : ___ : ___ : ___ : ___ worthless

inadequate ___ : ___ : ___ : ___ : ___ : ___ : ___ adequate

soft ___ : ___ : ___ : ___ : ___ : ___ : ___ hard

active ___ : ___ : ___ : ___ : ___ : ___ : ___ passive

foolish ___ : ___ : ___ : ___ : ___ : ___ : ___ wise

meaningful ___ : ___ : ___ : ___ : ___ : ___ : ___ meaningless

large ___ : ___ : ___ : ___ : ___ : ___ : ___ small

static ___ : ___ : ___ : ___ : ___ : ___ : ___ dynamic

good ___ : ___ : ___ : ___ : ___ : ___ : ___ bad

unnecessary ___ : ___ : ___ : ___ : ___ : ___ : ___ necessary

useful ___ : ___ : ___ : ___ : ___ : ___ : ___ useless

APPENDIX G

Concepts and Scales Used in Forms 1 and 2
of the Semantic Differential in
the Experimental Situation

Concepts for form 1:

American Foreign Policy Today

Strong Central Government

Our Natural Resources*

An Ideal President of the U. S.

An Ideal Conservation Program*

Russian Communism

The Effect of Soil Erosion*

America's Sense of National Purpose

The Function of Wildlife Preserves*

The Democratic Party Today

Conservation as it is Practiced Today*

Concepts for form 2:

The Function of Wildlife Preserves*

The United Nations Today

Conservation as it is Practiced Today*

A Dictatorship

The Effects of Soil Erosion*

The Republican Party Today

Our Natural Resources*

Worldwide Disarmament

An Ideal Conservation Program*

*Test Concept from speeches A and B

unimportant ___:___:___:___:___:___:___ important

strong ___:___:___:___:___:___:___ weak

slow ___:___:___:___:___:___:___ fast

valuable ___:___:___:___:___:___:___ worthless

unnecessary ___:___:___:___:___:___:___ necessary

soft ___:___:___:___:___:___:___ hard

active ___:___:___:___:___:___:___ passive

foolish ___:___:___:___:___:___:___ wise

sharp ___:___:___:___:___:___:___ dull

large ___:___:___:___:___:___:___ small

static ___:___:___:___:___:___:___ dynamic

good ___:___:___:___:___:___:___ bad

heavy ___:___:___:___:___:___:___ light

negative ___:___:___:___:___:___:___ positive

APPENDIX H

The Evaluative Factor

Individual Factor Scores of Groups I, II and III
for Five Test Concepts on Forms 1 and 2
of the Semantic Differential

Group I

	Our Natural Resources		An Ideal Conservation Program		The Function of Wildlife Preserves		The Effects of Soil Erosion		Conservation as it is Practiced Today	
	form 1	form 2	form 1	form 2	form 1	form 2	form 1	form 2	form 1	form 2
	12	9	12	9	12	8	-12	12	12	8
	9	9	12	9	6	9	-	9	8	10
	12	7	12	9	7	8	1	7	7	10
	12	6	12	4	11	2	3	4	4	4
	12	8	12	12	0	12	-	9	10	0
	2	1	-	6	4	0	0	5	8	8
	8	6	4	8	3	4	-	3	9	9
	6	4	9	6	9	9	-	8	9	9
	4	4	2	9	5	12	1	9	4	3
	4	4	12	12	12	12	-	4	11	8
	9	9	10	12	8	9	-	11	1	1
	9	9	10	12	5	8	-	4	-	2
	10	11	11	12	10	0	10	10	10	11
	4	4	9	7	12	11	-	5	5	6
	11	9	9	11	6	4	2	8	8	8
	11	6	11	7	7	9	2	8	8	8
	7	10	12	12	9	10	-	6	6	7
	7	9	11	12	10	12	-	11	11	9
			11	12	10	12	-	11		

Group II

	Our Natural Resources		An Ideal Conservation Program		The Function of Wildlife Preserves		The Effects of Soil Erosion		Conservation as it is Practiced Today	
	form 1	form 2	form 1	form 2	form 1	form 2	form 1	form 2	form 1	form 2
	11	11	11	12	9	11	5	4	11	10
	7	8	12	9	4	6	3	4	6	0
	3	-	9	12	7	8	2	6	5	5
	9	6	12	12	12	12	9	6	12	1
	7	8	9	12	7	8	4	8	2	7
	10	6	12	12	10	-10	-12	-12	9	8
	9	2	9	9	9	9	-12	-10	9	5
	2	5	6	9	1	3	3	-10	9	4
	5	4	10	12	5	8	9	8	10	2
	6	4	6	7	4	2	9	-10	4	4
	5	4	7	11	10	6	-10	9	5	3
	7	7	11	11	8	11	4	5	1	4
	6	4	7	9	9	6	6	0	9	9
	0	2	6	12	8	11	8	9	11	1
	6	5	12	12	10	12	9	-9	9	8
	9	7	11	12	9	9	3	-11	10	8
	6	7	7	12	9	12	3	2	8	8
	7	4	12	12	9	12	6	9	4	5
	11	9	11	12	7	10	-10	6	11	9
	3	3	9	10	5	6	4	1	2	2

Group III

Our Natural Resources		An Ideal Conservation Program		The Function of Wildlife Preserves		The Effects of Soil Erosion		Conservation as it is Practiced Today	
form 1	form 2	form 1	form 2	form 1	form 2	form 1	form 2	form 1	form 2
10	11	12	12	12	12	--	--	12	--
5	7	8	11	8	8	9	9	8	--
12	11	12	11	12	11	--	--	12	11
7	8	11	12	11	12	8	7	11	12
12	12	12	12	12	12	5	--	12	12
6	5	5	10	6	10	1	3	6	9
7	9	12	11	11	10	--	--	11	8
6	3	9	12	8	11	12	10	5	6
8	9	1	6	6	9	7	2	7	5
8	7	10	10	10	9	3	7	8	9
8	5	12	11	8	10	--	--	7	7
6	8	6	0	8	7	9	11	6	10
8	8	11	9	9	8	3	3	9	9
10	9	10	11	9	9	7	7	11	11
8	6	12	9	9	7	1	5	9	9
5	8	8	10	8	10	--	--	10	11
11	8	12	12	11	12	9	8	10	11
12	12	12	12	12	12	6	--	11	12
6	4	9	9	6	4	0	2	12	12
12	9	9	12	11	12	--	0	7	4
5	12	11	12	12	11	6	1	9	8
12	12	12	12	12	12	--	--	12	12
						4	6		

APPENDIX I

The Potency Factor

Individual Factor Scores of Groups I, II and III
for Five Test Concepts on Forms 1 and 2
of the Semantic Differential

Group I

Conservation as it is Practiced Today		The Effects of Soil Erosion		The Function of Wildlife Preserves		An Ideal Conservation Program		Our Natural Resources	
form 1	form 2	form 1	form 2	form 1	form 2	form 1	form 2	form 1	form 2
6	-1	7	7	6	6	7	9	8	0
6	3	11	9	2	5	5	6	4	4
-2	-2	2	2	2	-1	9	6	2	-1
1	2	0	3	2	4	3	5	5	3
6	3	-	1	3	3	6	4	6	2
-1	-2	6	3	1	-1	0	6	1	-2
3	2	-	0	0	0	1	6	4	1
2	0	2	4	-1	-1	5	0	5	4
0	0	6	8	4	2	4	8	1	-3
3	3	4	1	3	-2	6	6	3	5
2	0	3	7	0	1	6	6	2	2
0	1	2	9	2	2	8	6	9	5
1	5	9	9	3	6	7	6	5	3
5	1	5	6	7	3	8	5	5	5
3	5	11	12	2	3	7	8	2	3
6	5	3	2	4	4	8	8	6	7
6	5	1	2	6	3	5	3	4	7
6	2	3	7	4	4	9	5	9	7
2	7	11	12	3	3	8	3	6	7
6	2	3	6	2	3	7	8	4	7
3	5	8	7	8	3	9	11	9	7
5	3	12	9	5	8	8	11	10	7

Group II

	Our Natural Resources		An Ideal Conservation Program		The Function of Wildlife Preserves		The Effects of Soil Erosion		Conservation as it is Practiced Today	
	form 1	form 2	form 1	form 2	form 1	form 2	form 1	form 2	form 1	form 2
	6	5	6	6	4	3	3	4	4	0
	-3	-3	0	-1	1	-3	0	8	-4	-5
	6	2	8	10	3	-3	9	5	-2	-1
	5	4	5	5	1	3	7	12	-4	2
	9	7	9	9	6	4	12	12	1	-2
	9	7	8	12	4	-1	12	6	7	-1
	0	-2	6	6	6	5	6	4	4	0
	-2	-2	3	9	-2	-1	5	4	-4	-4
	3	0	4	6	0	-4	5	4	1	-3
	5	4	3	4	-3	-4	5	4	-5	-3
	5	2	4	4	0	0	4	6	0	-2
	4	2	5	4	4	3	5	3	2	2
	4	-2	4	12	0	2	1	2	2	-1
	6	-5	9	12	-2	-5	9	10	-7	-5
	1	-5	6	12	2	0	2	11	2	0
	4	1	4	6	5	4	3	4	3	3
	4	4	5	6	3	-1	4	9	4	2
	4	-2	7	6	-2	2	5	11	1	1
	6	8	8	6	3	1	9	8	1	5
	0	-4	9	8	-2	3	4	11	5	-4
	-3	-4	5	8	3	4	5	8	-5	-1

Group III

Our Natural Resources	form 1	5	3	8	4	9	3	4	4	0	8	0	3	9	3	5	3	8	11	12	0	2	1	1	10
	form 2	7	4	10	5	6	3	4	5	3	6	4	4	8	5	2	3	3	12	0	2	1	1	9	
An Ideal Conservation Program	form 1	8	2	9	6	10	3	4	10	4	7	8	8	6	4	6	2	4	9	6	1	7	8		
	form 2	4	5	9	6	10	5	5	12	5	9	5	9	6	6	2	4	5	8	3	2	9	8		
The Function of Wildlife Preserves	form 1	5	-1	9	5	9	2	2	5	2	4	4	-3	2	3	4	5	3	8	4	1	8	5		
	form 2	6	6	11	6	9	4	4	7	4	3	5	1	2	4	2	2	3	5	1	4	5	5		
The Effects of Soil Erosion	form 1	5	-	7	11	1	3	6	7	10	4	4	7	3	6	0	5	5	6	4	9	6	11		
	form 2	6	-	5	9	2	2	6	9	8	6	2	7	4	8	0	4	3	6	3	5	5	11		
Conservation as it is Practiced Today	form 1	-	-	11	5	10	5	4	6	-	3	3	1	9	3	4	4	4	3	8	0	2	1	6	
	form 2	-	-	9	5	9	2	2	3	4	2	6	3	3	4	4	0	3	5	0	1	4	6		

APPENDIX J

The Activity Factor

Individual Factor Scores of Groups I, II and III
for Five Test Concepts on Forms 1 and 2
of the Semantic Differential

Group I

Our Natural Resources		An Ideal Conservation Program		The Function of Wildlife Preserves		The Effects of Soil Erosion		Conservation as it is Practiced Today	
form 1	form 2	form 1	form 2	form 1	form 2	form 1	form 2	form 1	form 2
7	6	9	7	9	6	7	6	8	8
3	0	3	3	2	1	5	2	2	2
4	2	6	3	1	1	1	4	0	0
2	0	0	7	0	0	1	2	2	2
6	4	4	3	3	1	2	6	0	0
3	1	6	5	1	5	0	3	0	0
4	1	3	0	0	3	1	0	0	0
0	0	0	3	3	2	5	0	0	0
0	4	3	6	1	4	3	0	0	0
0	1	3	6	2	3	4	5	0	1
1	0	6	3	2	1	4	6	0	1
1	4	6	6	2	2	8	6	0	3
3	4	5	7	1	0	4	6	0	3
5	3	5	3	8	4	6	1	1	5
2	5	2	8	0	3	1	1	0	5
4	5	6	2	3	1	0	0	3	5
7	5	6	8	4	5	1	0	1	1
3	5	8	5	6	2	6	0	0	0

Group II

Conservation as it is Practiced Today	form	2	2	5	1	2	4	3	2	2	1	3	1	2	4	1	2	1	2	3
	form	1	3	2	1	4	5	5	2	2	4	1	1	5	5	0	2	1	4	5
The Effects of Soil Erosion	form	2	2	1	6	6	5	9	6	2	3	0	1	0	1	4	3	5	5	4
	form	1	0	1	7	9	6	3	6	4	2	1	2	0	0	5	2	4	4	5
The Function of Wildlife Preserves	form	2	1	4	3	3	3	4	3	2	1	0	0	2	2	1	2	1	0	4
	form	1	2	0	1	5	4	6	3	3	1	2	0	3	1	0	4	2	2	3
An Ideal Conservation Program	form	2	3	2	9	9	6	9	3	6	7	3	0	5	2	9	4	6	9	8
	form	1	3	6	3	9	5	4	3	2	4	4	3	4	2	6	3	2	5	6
Our Natural Resources	form	2	2	2	0	3	1	0	3	1	0	1	1	1	2	3	1	2	2	3
	form	1	2	6	3	9	2	6	0	3	2	1	0	3	1	1	2	0	2	2

Group III

Conservation as it is Practiced Today	form 1	form 2	-- --	6	2	2	3	2	4	1	3	1	5	3	2	0	2	4	8	0	2	0	8	
	form 1	form 2	-- --	7	4	0	2	4	3	-1	3	2	4	4	2	0	2	3	7	3	2	0	5	
The Effects of Soil Erosion	form 1	form 2	-2 -1	6	2	0	4	2	3	1	7	0	4	0	1	2	-1	2	0	6	3	2	0	
	form 1	form 2	-1 -1	0	6	4	-2	4	2	2	3	5	1	5	-1	3	4	-2	3	-2	7	1	3	2
The Function of Wildlife Preserves	form 1	form 2	7 6	5	8	5	3	0	4	6	3	3	3	4	1	3	0	2	2	9	1	3	3	8
	form 1	form 2	6 6	3	7	4	5	2	4	2	1	5	4	2	2	2	3	2	3	9	3	2	7	7
An Ideal Conservation Program	form 1	form 2	8 8	6	4	5	3	3	6	7	0	5	5	3	6	2	3	-1	4	9	2	3	3	8
	form 1	form 2	8 8	5	3	4	4	3	6	6	0	6	6	2	6	2	5	-1	5	9	1	1	4	8
Our Natural Resources	form 1	form 2	8 5	1	3	0	9	2	0	0	-1	1	3	3	5	4	-2	3	1	6	3	7	0	5
	form 1	form 2	5 -1	1	1	9	6	2	2	0	5	6	4	3	0	1	3	0	8	1	5	1	3	3