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USE OF SEMANTIC DIFFERENTIAL FACTORS AS INDICES OF STRESS IN FREE INTER-  
ACTION CONVERSATION

by

Donna Bedgood Rosen

Submitted to the

Faculty of the College of Arts and Sciences

of The American University

in Partial Fulfillment of

the Requirements for the Degree

of

Master of Arts

in

Psychology

Signatures of Committee:

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## Introduction

### BACKGROUND

The 20th century has seen the beginning of man's attempts to extend and maintain himself in hostile environments beneath the sea and in outer space. Isolation has now become a significant factor in many of man's explorations of his environment/universe. The intention of this research is to fit within a broader framework of experimental investigation on small group interaction looking toward future periods of extended isolation either under the sea or in space.

In the early 1960's the Navy Department funded an extensive five-year project at the Naval Medical Research Institute in Bethesda, Maryland, Project ARGUS (Advanced Research on Groups under Stress). The mandate of this program was to develop a body of knowledge as to the effects, good and bad, of isolation and confinement on the performance of small groups. One of the initial experiments in this project was addressed to the question of whether individual personalities could be selected through pre-experimental testing, in such a way as to facilitate interpersonal adaptation to the experimental condition of isolation. There were other related experiments involving stimulus reduction (Smith, S. and Myers, T., 1966), physical confinement (Myers, T., Smith, S., and Murphy, D., 1968) (Rasmussen, J. and Haythorn, W., 1963), privacy (Taylor, D., Wheeler, L., and Altman, I., 1968), group characteristics (Haythorn, 1953, 1963b, 1964, 1968), computer modeling (Haythorn, 1962, 1963a), ecology design (Haythorn, 1966) (Altman and Haythorn, 1967a), etc. For the purposes of this paper, however, it will be adequate to discuss major variables of the initial experiment as they also extended to the latter experiments. In most of the Project ARGUS experiments as in the initial experiment the group size

was limited to two male Ss, a dyad. The conceptual framework of the initial research experiment in Project ARGUS is described in Table 1.

- - - - -

Insert Table 1 about here

- - - - -

The focus of the experiment was on the effect of variation in three major areas, a. the physical environment, isolation versus nonisolation, b. the task environment, group and individual functioning on three different tasks, and c. interpersonal characteristics of group and individual functioning. Table 2 describes the focal points of the study.

- - - - -

Insert Table 2 about here

- - - - -

A brief discussion of each of the above major variables will give an overview of the entire ARGUS Project.

Physical environment: The isolation conditions were 12 x 12 foot reasonably soundproofed rooms having chemical toilets, bunk beds, one table, a lamp and two chairs. Also in the room was a large easel type board which was part of the task equipment; and a loudspeaker, a one-way mirror and a microphone. The nonisolation circumstances involved working in rooms comparable to those of the isolation groups for the task portion of the day but the control Ss were not confined to these rooms. They ate and slept in regular crew quarters on the Naval base and were free to come and go during the 10 minute breaks between the task periods. The Ss in the experimental-isolation situation were not permitted to have any communication with the outside and could not have radios, watches, calendars, etc. They were not told the length of the

TABLE 1

## Conceptual Framework of Key Social Isolation Research Variables

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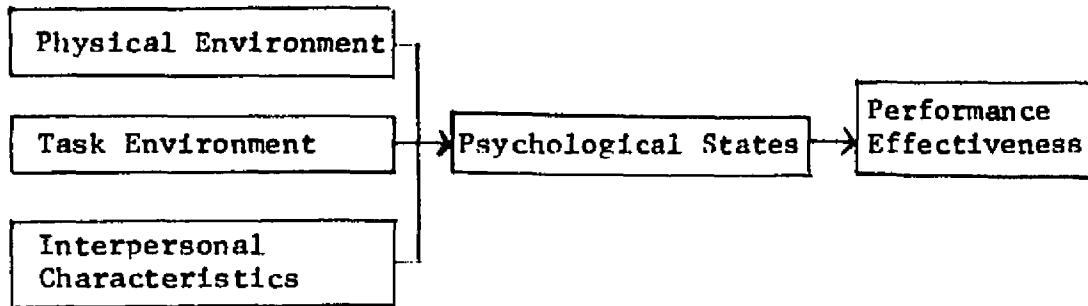
| INDEPENDENT   | → INTERVENING  | → DEPENDENT   |
|---|--|---|
| 1. Environmental variables<br>2. Task variables<br>3. Personality differences<br>4. Interpersonal relations | 1. Stress<br>a. Psychological<br>b. Physiological<br>2. Cognitive processes<br>3. Motivational variables<br>4. Group processes | 1. Viability measures<br>2. Performance effectiveness<br>a. Cognitive<br>b. Psychomotor<br>c. Monitoring<br>3. Social-emotional adjustment<br>a. Psychiatric<br>b. Interpersonal difficulties |

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Note--Reprinted from a chapter by William W. Haythorn and Irwin Altman published in Psychological Stress, (Eds.) Mortimer H. Appley and Richard Trumbull. Copyrighted by Appleton-Century-Crofts, 1967.

TABLE 2

## Relationship Chain of Initial Project ARGUS Study



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experiment but most assumed that it would be terminated sometime within their two week orders to Bethesda. They had self-selected reading materials as follows: one magazine and one book on day one, additional requested materials on days 4, 7 and 10 of the ten day period of isolation. The isolation Ss were told that mission control, the loudspeaker, would follow a regular work schedule, reveille at 7:30 am and taps at 11:00 pm. There were a deck of cards, a cribbage board, a checker game and religious reading matter in the room for recreation purposes. A portable light-tight closet rolled up to the door of the experimental chamber, provided for the exchange of supplies, food, laundry, etc.

Task Environment: All Ss worked a total of six hours each day, two in the morning, three in the afternoon and one in the evening. There were three tasks each theoretically tapping a different dimension of functioning. There were high versus low requirements for group cooperation, there was a perceptual motor task as well as an abstract reasoning task, and there was a distinct difference in the degree of realism of the tasks. The group task was the combat information center task (CIC). This involved the easel type board in the room and was a realistic simulation of a plotting board. The loudspeaker gave various coordinates and other information on simulated reports of sonar targets which the Ss were to plot and then, using predetermined specifications, determine real tracks from random noise. A sequence on this task took about an hour. There also was a decoding or syllogistic reasoning task requiring cooperation in abstract reasoning with each S given a different set of premises from a deck of cards, the Ss had to exchange information to reach a conclusion as to the truth or falsity of a given statement. There were thirteen problems--easy, medium, and hard--in each hour session of

this task. The third task was a one-man perceptual/vigilance task. It required the S to monitor a console having eight lights and to press a button when any of the lights flashed on. This task did not require any cooperation and required little skill. A work session on this task was also of an hour's duration. Mission control began these tasks at a scheduled time and also indicated when the work period was completed. Instructions were either prerecorded or read from a set of standard instructions. Mission control was always a male voice.

Interpersonal characteristics: The Ss in Project ARGUS were volunteer sailor recruits from the Great Lakes Naval Training Center, Illinois. The recruits who were finally selected out of the large number tested were those who fit into the experimental Greco-Latin square design. As a control measure, the Ss in Project ARGUS were also matched as closely as possible on age, IQ, socioeconomic background, birth order, place of birth, and level of education, but the primary area of interest was in manipulation of personality characteristics toward the goal of compatible and incompatible personality compositions in the dyads. The underlying hypotheses about personality characteristics and in this case about the resultant personality interactions in the experimental situation, can be briefly classed in three areas: relationships that are complementary or not, relationships that are competitive or not and relationships that are congruent or not. To briefly expand on the above concepts; a congruent relationship is one in which the individuals have much in common, meaning similar personality structures. It denotes the situation wherein individuals find similar personal/social pursuits satisfying. An incongruent relationship is one that denotes the reverse (i.e. nothing in common), but at the same time does not neces-



sarily lead to conflict.

A complementary relationship, is one in which the individuals have distinctly different personality characteristics but these are mutually supportive and do not produce conflict. A noncomplementary relationship is the case where individuals "do nothing for each other". Again as in the case with an incongruent relationship a noncomplementary relationship does not necessarily produce conflict.

A competitive relationship on the other hand definitely does produce conflict. While in Western personal/cultural terms this may be advantageous it obviously can easily get to the point where the conflict is detrimental to the group functioning when by definition what satisfies the needs of one individual frustrates the needs of the other. A noncompetitive relationship, on the other hand, implies some of the same mutually-supportive meshing of characteristics as a complementary relationship. It was argued in this research that incongruent, noncomplementary, and/or competitive relationships are stress-inducing in that personal/social needs are not being satisfied, and that especially in an isolated experimental situation where there was only one other individual as an immediate referent, these particular types of relationships would be stressful.

The measures which were selected to tap the personality dimensions to produce these types of relationships in the experimental situation were a modified version of the Edwards Personal Preference Schedule (EPPS, 1959) and the Rokeach Dogmatism Scale (RDS, 1960). The Ss were selected for being either in the upper or lower tertile on four characteristics: need dominance, need affiliation (nAff), need achievement (nAch) from the EPPS, and dogmatism from the RDS.

These four needs were selected because a number of factor analytic studies in various laboratories have repeatedly suggested the importance of task, self, and group orientations as determinants of behavior in groups. To the degree that these represent important independent individual needs, it was hypothesized that need congruency and complementarity between individuals would significantly affect their compatibility and therefore their ability to adapt to the isolated situation (Haythorn, 1967).

To deal with multiple personality composition effects, the subject characteristics were placed within a Greco-Latin square experimental design. Table 3 shows just how this design was composed.

-----  
 Insert Table 3 about here  
 -----

The actual experimental translation of the personality composition variables into compatible and incompatible aspects depended on how the pairings of characteristics were thought to interact. The specific dyadic compositions which were thought to be especially significant were as follows: it was expected that need achievement (nAch) and need dominance (nDom) would be the most salient and important personality composition sources of incompatibility in task-oriented isolated groups. Given tasks which required cooperation, heterogeneous nAch composition forced a situation in which the high nAch member of the dyad would quite likely perceive his partner as lazy and uncooperative. The low nAch member in turn would quite possibly perceive his partner as overbearing and overly concerned about inconsequential.

TABLE 3  
Greco-Latin Square Experimental Design

|           |                  | NEED ACHIEVEMENT |               |                 |
|-----------|------------------|------------------|---------------|-----------------|
|           |                  | Homogeneous High | Heterogeneous | Homogeneous Low |
| DOGMATISM | Homogeneous High | aC               | bA            | yB              |
|           | Heterogeneous    | yA               | aB            | bC              |
|           | Homogeneous Low  | bB               | yC            | aA              |

NEED AFFILIATION  
a. Homogeneous High  
b. Heterogeneous  
y. Homogeneous Low

NEED DOMINANCE  
A. Homogeneous High  
B. Heterogeneous  
C. Homogeneous Low

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Homogeneous need dominance was seen as perpetrating a situation that was rather pervasively incompatible, with each member of the dyad wanting to dominate the situation. These groups were expected to experience a great deal of difficulty in establishing any sort of mutually satisfactory relationship.

Heterogeneous need affiliation (nAff) composition was, over a short period of time, expected to be a relatively mild source of incompatibility. Reversely, homogeneous nAff was expected to be a strong source of compatibility and possibly to mitigate some of the other sources of incompatibility. Homogeneity with regard to dogmatism was expected to be a source of compatibility in that both members would have similar value systems and would possess similar styles of dealing with problems. Heterogeneous dogmatism was expected to be a secondary source of incompatibility, here again the short time of the experiment being significant.

The next major variables in the Project ARGUS study to consider were the intervening variables of psychological states. For the purposes of this study, the major psychological state under consideration was that of stress, and to a lesser extent emotional symptomatology. The discussion here will be limited to how the concept of stress was defined. Stress was conceptualized as an intraorganismic concept encompassing physiological, perceptual and of particular interest for this study--interpersonal dimensions.

Stress for the purposes of Project ARGUS was more broadly defined than the strictly physiological definition of Selye (1956). It encompassed not only the physiological aspects but also included perceptual stress and, of major concern, interpersonal stress resulting from the personality interactions. Even the physiological aspect of stress was defined somewhat dif-

ferently than Selye's. Rather, it was much closer to that of Parson (1966). In this view, stress is described broadly and covers a variety of conditions resulting in escape and avoidance conditioning.

Stress will be regarded rather broadly as an intraorganismic state, largely instigated by environmental stimuli, and capable of generating fight or flight response tendencies on the part of the organism. Some degree of organismic arousal is implied, but it is not necessary to assume a unidimensional arousal system...Stress then will be regarded...as an intervening variable between environmental stimuli and behavioral responses. It is only one of many such intraorganismic intervening variables and can therefore not be expected to account for a majority of variance in social behavior except in the most extreme situations. It is regarded as a variable capable of assuming many values to the organism, generating an instigation to fight or flight behavior (Haythorn, 1967, p. 4).

Stress is considered a continuous variable encompassing at its lower end a mild degree of anxiety and discomfort to the other end of the continuum of incapacitating fear. In the same paper Haythorn (1967) mentions perceptual factors in relationship to stress. He discusses the significance of the S's perception of threat to his well-being or integrity, prior to any evaluation of threat and reaction to it. In this area Haythorn quotes Lazarus, "The appraisal of threat is not a simple perception of the elements of the situation, but a judgment, an inference in which the data are assembled to a constellation of ideas and expectations" (Haythorn, 1967 p. 6).

The dimension of stress which was of major significance to the study was interpersonal stress. "One can speak of interpersonal stress to the degree that individuals perceive or behave as though they perceive other

individuals as stressors" (Haythorn, 1967, p. 7). For the purpose of Project ARGUS, interpersonal stress/incompatibility was considered to exist when:

...(a) the individual needs of group members are competitive such that satisfying the needs of one individual automatically frustrates the needs of another; (b) incongruencies between the need patterns of group members exist such that an interpersonal relationship satisfactory to one member would be unsatisfactory to the other; and (c) there is a low level of complementarity of need patterns such that the kinds of responses one member seeks from others is not likely to be generated by the behavioral predispositions of those others. All three kinds of incompatibility would be likely to generate interpersonal stress, but they would differ in the degree to which fight as compared to flight response tendencies were instigated. Competitive incompatibility, one might assume, would make fight responses salient while incongruent or non-complementary incompatibilities would be more likely to instigate flight or withdrawal patterns (Haythorn, 1967, pp. 7-8).

Other possible sources of interpersonal stress in the experimental situation were: (a) the social confinement per se which limited access to normal social/personal mechanisms eg. displaced aggression, and severely restricted the absolute variety of stimuli available to the Ss; (b) the lack of privacy with its attendant aspect of enforced socialization; and (c) the lack of broad social reinforcement for role expectations.

Interpersonal stress was measured by the Subjective Stress Scale (Kerle and Bialek, 1958). It was also measured by a subjective symptomatology questionnaire (Myers et al, 1962).

The major dependent variable of the initial study in Project ARGUS

was performance effectiveness as measured by speed and accuracy on the three types of tasks, cognitive, psychomotor, and monitoring (Altman and Haythorn, 1967b). There were however a number of other dependent variables studied such as (a) viability (Haythorn and Altman, 1967), (b) personality factors in the experimental situation (Haythorn and Altman, 1967), (c) territoriality and social behavior (Altman and Haythorn, 1965), and (d) a number of social-emotional adjustment variables such as (1) emotional-symptomology and subjective stress (Haythorn, Altman, and Myers, 1966), and from taped time-sampled segments of verbal interaction during non-task periods (2) information exchange (Altman and Haythorn, 1965), (3) the incidence of agreement and disagreement (Haythorn, 1966a), and (4) the present study to be reported below, dealing with affect in compatible and incompatible groups as measured by scores on Semantic Differential factors.

Some of the more interesting results of the initial study in Project ARGUS are as follows:

1. The findings on performance are consistent with an inverted U relationship between stress and performance level. "...as the number of sources of stress increased, i.e., social isolation and incompatibility, a point was approached where the enhancing effect of stress on performance began to level off" (Haythorn and Altman, 1967, p. 384). This was contrary to the hypotheses which posited only a performance decrement for isolation and incompatible dyads. Except for minor deviations, this finding describes the results with all types of tasks.

2. "...the results generally confirm the hypothesis that a condition of social isolation is associated with increased stress and emotional symptomatology...(Dyad) composition is a significant determinant of

subjective response to the stress of isolation..." (Haythorn and Altman, 1967, p. 375). Interaction with compatible personalities was markedly different from interaction with incompatible personalities and the difference was much greater under isolation conditions. This appeared most true for need dominance and need achievement, perhaps indicating the salience of these characteristics for the population and situation studied.

3. Results indicated that "...Isolates revealed more about intimate topics to partner than controls, although less than to best friend. Controls revealed in intimate areas comparable to disclosure to average persons. Isolates also achieved a depth of disclosure similar to that achieved with close friends, although the magnitude of such disclosure was small" (Altman and Haythorn, 1965).

#### SEMANTIC DIFFERENTIAL TECHNIQUE

The Semantic Differential scales which are employed in this research concerning the verbal affect of the dyads in the initial Project ARGUS study, are the end product of many years refinement. The idea of the Semantic Differential technique was proposed by Charles Osgood (Osgood, Suci and Tannenbaum, 1957). His deceptively simple yet brilliant and valid idea was twofold; first, he proposed the existence of rather universal emotional and physical dimensions across language groups, and, second, he suspected that these relatively few major dimensions were applicable to individual words within the language groups. A selective literature review of the various applications of the Semantic Differential technique is available in Appendix I. For our purposes here it will be adequate to note that Osgood's initial hypotheses have resulted in a computer assisted Semantic Differential technique to measure emitted language comprised of multiple factors or vectors, usually three dimensional, which



are themselves derived from basic dimensions represented on bipolar scales.

The Semantic Differential concept is an exciting development in language measurement because of "how" it measures as well as because of "what" it measures. It is an instrument for measuring the emotional affect of words via factor analyzed loadings on pairs of bipolar adjectives. Adjectives which represent significant "affective" and physical dimensions in the English language are paired and made into seven unit scale continuums. For example, good-----bad are placed on opposite ends of a seven space scale. The subject is asked to rate a given word as to "where" it lies along the good-----bad dimension, whether it is very close, close, or just fairly near to either good or bad, or whether it is midway, i.e., neutral with respect to good and bad. As an example, in English the word "time" is quite neutral relative to a meaning of good or bad, while the word "mother" is very good and the word "trouble" is bad in connotation or "affect". As with any scoring procedure of this sort there is a double meaning of the neutral rating; it can be a genuine neutral, i.e., essentially without affect, or it can be a resolved neutral, i.e., a midway rating which is a balance of both positive and negative affect. In most instances this distinction does not affect the analysis, but it should be noted.

The variance of the individual bipolar scale scores is factor analyzed and in almost all instances three major affective dimensions have resulted. These have been labeled evaluation, activity, and potency (Heise, 1965, p.3). As a consequence of a vast amount of varied replication there now exists what can be termed a "conventional" set of scales which have been found to tap each dimension most effectively: (a) evaluation, good-----bad, and pleasant-----unpleasant, (b) activity, active-----passive,

and lively-----still, and (c) potency, strong-----weak, and tough -----tender. There also is a fourth composite factor which is usually employed in Semantic Differential research. This is termed polarity and is an index of extremeness. It is not measured by bipolar scales, each individual word's score on this factor is the square root of the sum of the squares of the same word's evaluation, activity, and potency scores.

Here then is a methodology for measuring affective meaning which allows for analysis by the bits and pieces distribution approach of modern statistics. The "how" was particularly critical as it allowed for computer analysis of an otherwise unwieldy subject area. Conventional content analysis can provide approximately the same information but there are the imposing and unsolved problems of valid categorization, comparability of categories, and interrater reliability.

There are several dictionaries of Semantic Differential factor weights available (DiVesta, F., 1966) (Jenkins, J.J., Russell, W.A. and Suci, G.J., 1958, 1959). One of the most interesting and recent of these was published by Heise in 1965. With slight modification this was the dictionary of weights used in this research. One advantage was that the two research projects had the same subject population, i.e., Navy recruits. Two, the Heise dictionary is a relatively large dictionary based on the number frequency phenomena documented by Zipf (1949). This phenomena says that "---among speakers of any language a few words occur very frequently and constitute a large proportion of the total number of verbal emissions" (Heise, 1965, p.2). The Heise dictionary is based directly on a frequency count of English words by West (1953). And,

three, it has two scales based on the Thematic Apperception Test (TAT) variables, need achievement and need affiliation. This in addition to the four conventional Semantic Differential scales of evaluation, activity, potency and polarity.

In the Heise dictionary the conventional scale ratings are a product separate from the TAT need affiliation and need achievement word weights. In the first section, Heise had each of the 1000 most frequently used words in the English language (excluding articles, pronouns, function words etc. which are dictated largely by grammatical rules) rated by 16 Navy recruit subjects. These 1000 words included different meanings of the same word. Each word meaning to be rated was presented within the context of a simple defining sentence. These eight scales used for rating included the six "conventional" scales mentioned earlier plus two other scales to tap a possible fourth primary factor, stability. These scales were, rational-----emotional, and tamed-----untamed. Heise's research found only the three conventional primary factors, evaluation, activity, and potency. The stability factor was subsumed within the first three. Polarity was computed as usual. In the second section of the research by Heise (1965) he constructed need achievement and need affiliation scores on the same 1,000 dictionary words. Through ratings of adjectives purported to be descriptive of states of high need achievement (nAch) and high need affiliation (nAff), a point was defined in three dimensional space which was designated maximum arousal for each of these two motivations. For each motivation nAch and nAff this was called the motivation reference point. A difference, "D", score was then derived for

all of the same 1,000 words relative to their proximity in three dimensional space to this motivation reference point. Heise described the derivation of the values as follows:

The profile of the motivation reference point can be represented as  $E_m, A_m, P_m$ . The profile of a word to be scored can be represented as  $E_w, A_w, P_w$ . The distance between the word and the motivation reference point is  $D_{mw} = \sqrt{(E_m - E_w)^2 + (A_m - A_w)^2 + (P_m - P_w)^2}$ . If  $D_{mw}$  was greater than or equal to 4.0 then  $D_{mw}$  was set equal to 4.5; otherwise  $D_{mw}$  was the same as  $D_{mw}$ . To obtain the final score----(which increases as the motivation word association increases)  $D_{mw}$  was subtracted from 4.5. For words outside the motive region, this score is always zero; for words within the region the score varies from 0.5 to 4.5 (Heise, 1965, p. 15). Relatively few words were inside the nAch and nAff motive regions, most had zero scores. See Appendix III for a list of all words having nAch and nAff scores.

As evidence of the validity of these weightings he used a set of published stories that were rated on their amount of nAch and nAff imagery by two independent methods. In comparing the two types of motivation scores he found that TAT imagery scores for nAch and nAff and Semantic Differential factor scores for nAch and nAff were significantly correlated for the set of published stories. To compute the amount of motivation by the Semantic Differential scores, he used the mean scores of the words in the story that were in his dictionary. This mean score was correlated with TAT imagery scoring; "----for nAff,  $r=.43$ , and for nAch  $r=.40$  ( $N=69$  and  $p<.001$  in both cases)" (Heise, 1965). There is a more detailed explanation of the scoring of the nAff and nAch factors in Heise, 1966.

Unlike the scale-defined factors--evaluation, activity and potency--need affiliation and need achievement seem to need more face validity to account for the various word ratings, especially in that they have not been replicated. It is in these two factors that the influence of sub-group values on word ratings seems to become particularly apparent. For both need achievement and need affiliation factors the highly rated words are those for which that particular classification is most readily understandable. In that many fewer words are involved and that the absolute scoring range is less, the hypotheses about the function of these factors are somewhat tenuous at this time.

#### HYPOTHESES TO BE TESTED

This part of the initial Project ARGUS study sought to find a reliable computer-calculated index of the "affect" of free interaction conversation, and in this way avoid the large unsolved difficulties which lie in a conventional content analysis of affect. The Semantic Differential technique seemed to offer a very real methodology for doing this. The Semantic Differential factors had been proven to tap universal emotional/connotative meaning dimensions in language. The Semantic Differential technique also provided an established way of computer analyzing emitted speech data. In that Heise (1965) successfully employed mean scores to test the validity of nAff and nAch motivations it was considered feasible to extend this type of analysis. The daily means for each subject on each Semantic Differential factor were the data of this research. The Semantic Differential values, including nAff and nAch values from Heise's 1965 dictionary, were used with the following modification: Heise's dictionary listed a separate value for each different meaning of a word. In this research on affect in emitted speech only one value per word was

used, the mean value of the multiple values for each word with multiple listings was used. A new polarity weight was computed. This procedure reduced the number of words from 1,000 to 730. The dictionary of all words and word derivations as well as their respective Semantic Differential weights is in Appendix II. See Appendix III for a list of words having high, neutral/medium, and low values for the evaluation, activity, potency, and polarity factors respectively.

The hypotheses of this research on speech affect have to do with differential mean Semantic Differential factor weights corresponding to demonstrated differential amounts of interpersonal stress for the eighteen dyads in the initial study of Project ARGUS. It was hypothesized that mean Semantic Differential factor scores would vary differentially with the following experimental circumstances which as measured by other indices produced differential amounts of stress:

1. the state of isolation versus non isolation or control, 2. the state of incompatibility versus compatibility in group composition with regard to selected personality variables, and 3. an increasing amount of time in the experimental situation. Of particular interest will be any clues to a possible index of rising interpersonal hostility /interpersonal stress, and the possibility of defining absolutely or relatively, a level of interpersonal stress which may be antagonistic to effective crew performance.

The specific hypotheses follow. They are tested as to whether they occur due to condition, i.e., isolation or control or non-isolation, composition, i.e., compatibility or incompatibility in dyad composi-

tion, or time i.e., time in the experimental situation, or due to some interaction of condition, composition, and/or time.

Hypothesis 1: There are differential loadings on the Semantic Differential evaluation factor with differential stress.

Some of the scales which define the evaluation dimension are good-----bad, pleasant-----unpleasant, nice-----awful, sweet-----sour, and helpful-----unhelpful. Some of the concepts which lie toward the positive or high end of the evaluation dimension are beauty, friend, god, music, and peace. Some of the concepts which are essentially neutral on the evaluation factor dimension are man, box, doorway, mountain, and leader. Some of the concepts which lie toward the negative or low end of the evaluation dimension are argue, terrible, battle, danger and disease. It was hypothesized that with increasing stress the aspect of personal, subjective evaluation would come to have greater significance in lieu of outside, possibly more objective, but definitely more diverse opinions. A main condition effect was hypothesized: under the condition of isolation the subjects were expected to evidence negative evaluative affect than the control subjects. A composition effect was anticipated; incompatible dyads were expected to have greater negative evaluation affect than compatible dyads. Also a third main effect of time in the experimental circumstance was hypothesized; generally evaluation factor scores were expected to be significantly more negative on days 5 and 9 than on day 1. A composition by time interaction effect was anticipated with incompatible dyads expected to be significantly more negative in evaluative affect over time than compatible dyads. A condition by time interactive effect was also expected to be significant. The isolation

dyads were again expected to be more negative in evaluative affect over time than the control dyads. Finally, a composition by condition effect was considered likely with the incompatible subjects expected to be significantly more negative on the evaluation factor over both conditions than compatible subjects.

Hypothesis 2. There are differential loadings on the Semantic Differential activity factor with differential stress.

Some of the scales which define the activity dimension are active-----  
 -----passive, lively-----still, alive-----dead, fast-----  
 slow, and noisy-----quiet. Some of the concepts which lie toward the positive or high end of the activity dimension are attack , fire, child, sailor, war and bird. Some concepts which are generally neutral with respect to the activity scale are fact, good, parent, and read. Some concepts which lie toward the negative or low end of the activity dimension are dead, alone, egg, iron, old, rock and silent.

It is hypothesized that language may function as a partial substitute for normal activity and reflect what is lacking in a physically restricting circumstance. With increasing time in the situation the confinement should impinge more and hypothetically the substitute activity "talking about" what is denied may increase. A main time effect was predicted with mean activity scores expected to be much higher on days 5 and 9 than on day 1. A main condition effect was expected to, in that isolation dyads were predicted to have significantly higher mean activity scores than control dyads who had access to outside physical resources. A main composition effect was considered possible because compatible dyads would be more likely to discuss the things they missed; therefore compatible dyads were expected to have higher mean activity scores than



incompatible dyads. An interaction effect between condition and time was hypothesized, as isolation subjects were expected to have significantly greater mean activity values over time than control subjects. A composition by time interaction effect was thought quite likely, again for the same reason as the expected main composition effect; the compatible subjects were expected to have higher mean activity scores over time than the incompatible subjects. Lastly a composition by condition interaction effect was predicted. The compatible dyads were expected to have much higher mean activity scores over days 1, 5 and 9, than incompatible dyads.

Hypothesis 3. There are differential loadings on the Semantic Differential potency factor with differential stress.

Some of the bipolar scales which define the potency dimensions are strong-----weak, tough-----tender, big-----little, powerful-----powerless, and deep-----shallow. Some of the concepts which lie toward the positive or high end of the potency dimension are brave, building, iron, duty, law, power and stone. Some of the concepts which are essentially neutral on the potency dimension are father, rich, center, apprentice, and debt. Some of the concepts which lie toward the negative or low end of the potency dimension are baby, family, kiss, love, wife and woman. It is hypothesized that as stress increases within an interpersonal situation, the dimensions of toughness and strength will become more salient for the individuals involved. From this a main condition effect was hypothesized. The isolation dyads were expected to have significantly higher mean potency scores than the control groups. Also a main time effect was predicted in that mean potency scores were

anticipated to be significantly higher on days 5 and 9 of the experimental situation than on day 1. In addition it was considered highly probable that the main composition effect would be significant. Incompatible subjects were expected to find the potency dimension much more salient than compatible subjects but in a negative direction; therefore the incompatible subjects were predicted to have significantly more negative mean potency scores than compatible subjects. An interaction effect between condition and time was expected; the isolation dyads were predicted to have higher mean potency values over the duration of the experiment than the control dyads. Also the composition by time interaction effect was predicted to be significant. Incompatible subjects were expected to have higher mean potency scores across days 1, 5 and 9 than compatible subjects. The third predicted interaction effect was that of condition by composition. The compatible groups were predicted to have lower mean potency values over both isolation and control conditions than the incompatible groups. A three-way interaction was predicted with the isolation-incompatible group again expected to be the primary source of variance. The isolation-incompatible group was expected to be significantly more positive in mean potency values over time than the other groups.

Hypothesis 4: There are differential loadings on the Semantic Differential polarity factor with differential stress.

As was noted earlier polarity is a composite factor derived from the square root of the sum of squares of the evaluation, activity, and potency factors. Because of its manner of derivation all polarity scores are positive. It theoretically is an index to the intensity dimension in language connotation. Some words which have relatively high polarity

scores are mother, silent, happy, disease, steel, and dead. Some words which are in the middle range of polarity values are believe, literature, supply, newspaper, money, hour and position. Some words which have relatively low polarity values are name, year, product, consider, main, and difference. It is hypothesized that the polarity factor may function as a general barometer to the overall level or intensity of affect within the particular group. However by itself it would not be an index to the valence of the affect and could not differentiate between equivalent happy affect and sad affect for example. In many ways the hypotheses for the polarity factor for this particular experiment, are parallel to those for the potency factor because it was considered quite likely that for this group of subjects due to their age, sex, educational level, etc. the dimension of strength would be closely equated with intensity. In that incompatible dyads were expected to generate more interpersonal stress than compatible dyads, and that this may be reasonably translated as intensity of affect in speech, a main composition effect was predicted with the incompatible dyads expected to have significantly higher mean polarity scores than the compatible groups. Along the same lines of reasoning a main condition effect was expected. Isolation subjects were predicted to have significantly higher mean polarity values than control groups. Also a main time effect was predicted with the intensity or mean polarity values of the sampled conversations rising significantly across time in the experimental situation. An interaction between condition and time was predicted in that the isolation dyads were expected to have significantly higher mean polarity scores than the control groups with the difference increasing from day 1 through day 9. This was also true for the composition by time interaction effect which was predicted. The

incompatible subjects were expected to have considerably higher mean polarity values in their speech from day 1 through days 5 and 9 as compared to the compatible group. A composition by condition interaction was predicted too. The incompatible group, because of the expected arguing, was predicted to have higher mean polarity values through the duration of the experiment than the compatible groups.

Hypothesis 5: There are differential loadings on the Semantic Differential need affiliation factor with differential stress.

As was noted earlier the need affiliation factor is derived differently from the bipolar scales used to define the conventional factors. Of the basic 730 words in the modified Heise dictionary there are only 90 which have any value other than zero on the need affiliation factor and these are all positive. Some of the words which have relatively high ratings on this factor are family, baby, girl, home, kiss, music and mother. Some of the words which have relatively middle range values are, again, country, know, people, and take. Some of the words which have relatively low scores are artist, church, freedom, good, laugh, soul, and together. Need affiliation was expected to be of secondary significance relative to the other factors, however it was anticipated that there would be an interaction between time and condition with the isolation group having significantly higher need affiliation scores than the control group. A condition effect was hypothesized in that dyads in isolation were expected to have higher need affiliation scores than dyads in non-isolation or control circumstances. In addition a main effect of time was predicted because need affiliation scores were expected to be significantly higher on days 5 and 9 than on day 1. Talking about affiliative matters was theoretically seen as a partial substitute activity for af-

filial behaviors which the subjects would normally experience; for this reason a main composition effect was considered likely, with the compatible dyads verbalizing their affiliative needs more than incompatible dyads. Also for this same reason a composition by time interaction effect was predicted with the compatible group having significantly higher mean need affiliation values than the incompatible dyads over increasing time in the experimental situation.

Hypothesis 6: There are differential loadings on the Semantic Differential need achievement factor with differential stress.

There are 104 basic words in the modified Heise dictionary which have need achievement scores other than zero. Again as in the case of need affiliation scores, because of the way these scores are derived all values are positive. Some of the words which have relatively high values on the need achievement factor are farmer, industry, sailor, navy, college, successful, and officer. Some of the words which have relatively middle range values on the need achievement factor are admiral, control, discovery, job, leader, and wise. Some of the words which have relatively low values are answer, demand, interest, make, office, and step. Need achievement incompatibility in personality composition was expected to be a primary source of interpersonal stress; the Semantic Differential factor measurement of this dimension was of particular interest. A main composition effect was hypothesized; Dyads heterogeneous with regard to this factor (for these purposes incompatible dyads) were expected to have higher mean scores on need achievement than homogeneous dyads (compatible dyads). An interaction effect of time by condition was expected, in that isolation groups were hypothesized to have higher need achievement scores from day 1 to day 9 than

control groups. Also a time by composition interaction effect was predicted, with the incompatible dyads expected to have higher need achievement scores over time than control incompatible dyads. And, because the circumstances were thought to be somewhat restricting for all dyads a main time effect was expected, with need achievement scores being higher on days 5 and 9 than on day 1. A three-way interaction was considered probable with the need achievement factor, in that the isolation-incompatible dyads were predicted to have much higher mean need achievement values than the remainder of the subjects. It was recognized however that some of these above effects might possibly arise due to the fact that if the dyad was homogeneous they may not have experienced any circumstance where communication about achievement orientation was necessary. This would apply to those dyads homogeneously high with regard to need achievement as well as to those homogeneously low.

See Table 4 for a summary of all hypotheses made relative to the six Semantic Differential factors.

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Insert Table 4 about here

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TABLE 4  
 Summary of Hypotheses Made Relative to Six Semantic Differential Factors

|                 | Evaluation Factor  | Activity Factor   | Potency Factor   |
|-----------------|--|---|--|
| Condition (A)   | I <sup>a</sup> group more negative than C <sup>b</sup> group                 | I group more positive than C group                      | I group more positive than C group                                       |
| Composition (B) | Incomp. <sup>c</sup> group more negative than Comp. <sup>d</sup> group       | Comp. group more positive than Incomp. group            | Incomp. group more positive than Comp. group                             |
| Time (C)        | Increasingly negative means from day 1 through days 5 and 9                  | More positive mean values on days 5 and 9 than on day 1 | More positive mean values from day 1 through days 5 and 9                |
| A X B           | Incomp. group more negative than Comp. group over I and C conditions         | Comp. group more positive across I and C conditions     | Comp. group lower mean values than Incomp. group over I and C conditions |
| A X C           | I group more negative than C group from day 1 through days 5 and 9           | I group more positive values than C group over time     | I group more positive over time than C group                             |
| B X C           | Incomp. group more negative than Comp. group from day 1 through days 5 and 9 | Comp. group more positive values than Incomp. over time | Incomp. group more positive over time than Comp. group                   |
| A X B X C       | I-Incomp. group more negative than other three groups over time              | No hypothesis   | I.-Incomp. group more positive than others over time                     |

- a abbreviation for Isolation
- b abbreviation for Control
- c abbreviation for Incompatible
- d abbreviation for Compatible

TABLE 4 (continuation)

|                 | Polarity Factor                                     | Need Affiliation Factor                         | Need Achievement Factor                                    |
|-----------------|---|---|--|
| Condition (A)   | I group higher mean values than C group             | I group higher mean values than C group         | No hypothesis  |
| Composition (B) | Incomp. group higher values than Comp. group        | Comp. group higher values than Incomp. group    | Incomp. group higher than Comp. group                      |
| Time (C)        | Lower values on day 1 than on days 5 and 9          | Higher values on days 5 and 9 than on day 1     | Higher mean values on days 5 and 9 than on day 1           |
| A X B           | Incomp. group higher values over I and C conditions | No hypothesis                                   | No hypothesis  |
| A X C           | I group higher over time than C group               | I group higher over time than C group           | I group higher values over time than C group               |
| B X C           | Incomp. group higher over time than Comp. group     | Comp. group higher over time than Incomp. group | Incomp. group higher values over time than Comp. group     |
| A X B X C       | No hypothesis                                       | No hypothesis                                   | I Incomp. group higher mean values than other three groups |



## Method

DESIGN

On the basis of theoretical hypotheses and post-hoc evidence the dyad compositions were divided into two general personality type classifications, compatible and incompatible. Need achievement and need dominance were the most critical variables in the determination of incompatible groupings. Using the previously discussed theoretical hypotheses about the stressful interaction of heterogeneous need achievement and homogeneous need dominance, ten of the eighteen experimental dyads were labeled incompatible. For the experimental design this meant that five of the experimental isolation dyads were labeled incompatible and four of them were labeled compatible, with the same breakdown applying to the comparable control dyads. It was recognized that there were numerous dimensions of compatibility and incompatibility involved but the practical aspects of the research indicated use of a very rough classification. Table 5 presents a diagrammatic summary of the dyad numbers and personality designations which were used in the Greco-Latin square design.

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 Insert Table 5 about here  
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Post-hoc evidence which supports the above determination of compatible and incompatible dyads is as follows; isolation dyads  $I_2$  and  $I_5$  aborted their missions even though their understanding was that this action on their part was equivalent to going AWOL from a duty station. Isolation dyads  $I_1$  and  $I_4$  had very serious altercations. None of the control dyads evidenced interactions of such a hostile nature.

TABLE 5

Experimental Design of Study with Designation  
of Compatible<sup>a</sup> and Incompatible<sup>b</sup> Groupings

|           |                     | NEED ACHIEVEMENT     |                      |                      |
|-----------|---------------------|----------------------|----------------------|----------------------|
|           |                     | Homogeneous<br>High  | Heterogeneous        | Homogeneous<br>Low   |
| DOGMATISM | Homogeneous<br>High | aC<br>C <sub>1</sub> | bA<br>I <sub>1</sub> | yB<br>C <sub>2</sub> |
|           | Heterogeneous       | yA<br>I <sub>2</sub> | aB<br>I <sub>3</sub> | bC<br>C <sub>3</sub> |
|           | Homogeneous<br>Low  | bB<br>C <sub>4</sub> | yC<br>I <sub>4</sub> | aA<br>I <sub>5</sub> |

## NEED AFFILIATION

- a. Homogeneous  
High
- b. Heterogeneous
- y. Homogeneous  
Low

## NEED DOMINANCE

- A. Homogeneous  
High
- B. Heterogeneous
- C. Homogeneous  
Low

Note--Each of the nine table divisions represents four Ss, two matched dyads, one in the isolation condition and one in the control condition.

- a. Represented as C in the table
- b. Represented as I in the table.

SUBJECTS

The Ss of Project ARGUS were volunteer Navy recruits from the Great Lakes Naval Training Center, Illinois. Out of the 85 percent who volunteered to participate in an experiment only those individuals were selected who fit the predetermined personality requirements of the experimental Greco-Latin square design. Eighteen dyads were selected to fit need achievement, need affiliation, need dominance, and dogmatism personality configurations: nine matched dyads for the isolation condition and nine for the control/nonisolation condition. The recruits were tested early in their hospital corpsman training program and those Ss selected reported to the Naval Medical Research Institute, Bethesda, Maryland, when their program was completed. The experimental Ss were matched on several other criteria; (a) they were between 17 and 21 years of age, (b) they had a General Classification Test (GCT) score between 46 and 59 (this is a verbal IQ test, part of a larger Basic Test Battery which is administered by the Navy to all accepted recruits for classification purposes, with the Ss' mean of 49.9 being slightly above average for the subject population taking the GCT indicating an IQ factor of slightly over 100); (c) the Ss within each dyad were matched as closely as possible on size of home town, birth order, family size, age, religion, and level of education and (d) the Ss within a given dyad were required to be relative strangers and to come from different boot camp (recruit training) companies.

APPARATUS AND MATERIALS

The only apparatus unique to this particular section of the Project ARGUS research were tape recorders. Obviously the audio equipment mentioned earlier was used in common. The material of this research was the dictionary of Semantic Differential factor weights for each of the 730 words in the

modified Heise dictionary. See Appendix II for a complete listing of both the weights and all forms of the words included in the calculation of means for further data analysis.

#### DATA PREPARATION

The data of this research derive from the audio taped periods of free interaction conversation between all dyads on days 1, 3, 5, 7, and 9 of their ten day period of isolation or in the case of the control group of the time they spent in the chamber. As would be expected, the amount of interaction conversation varied greatly both from one period to another, and also between dyads. Some dyads talked hardly at all, some talked almost continuously. Also there was more conversation taped from the isolation as opposed to the control group. This quantity variable, however, should not necessarily alter the "affect" of the interaction as it is computed in this research. The daily arithmetic mean of the Semantic Differential dictionary factor loadings are the data. Mean scores for each factor have been computed across all of the randomly sampled free interaction on days 1, 5, and 9. For each S there are six mean scores per day; evaluation, activity, potency, polarity, need affiliation, and need achievement.

In that data were available for days 3 and 7 as well as days 1, 5, and 9 of the experimental period it may be asked why the intervening two days worth of data were not incorporated into the analysis. The answer is that computer facilities were not available for running the analysis of variance and limits on experimenter time did not allow for all possible analyses to be explored. Subsequent analysis may uncover additional information.

The computer treatment of the data involved matching all those words common to both the typed protocols and the modified Heise dictionary.

Repetitions of words and accepted derivations/forms of a word were treated as separate occurrences. Each dictionary word as defined above which appeared in a protocol was assigned that word's appropriate weight on each of the six factors of the dictionary. The computer printout was a summation by factor of the weights of those words which appeared for a given S by day. For each protocol then, there are six factor sums for each S for each day 1, 3, 5, 7, and 9. The computer format for each S by day listed the following statistics for each Semantic Differential factor; sum, mean, sum of squares, variance, standard deviation, standard error and correlation. The total N was also listed and was the same across all of the factors. Also the number of unique words for the dyad and for each S was listed by day. The working matrix for this research derived from the computer printout described above; it was divided by Semantic Differential factor and only the mean values were used. It was subdivided by isolation and control, compatible and incompatible groupings. In the cases of the two isolation dyads who aborted early the data for day 7 was used in place of the day 9 data rather than seriously skew the data distribution with false zero entries. A plus one data transformation was employed to eliminate minus values in evaluation, activity, and potency Semantic Differential factors.

#### PROCEDURE

The Ss reported to the Naval Medical Research Institute in Bethesda, Maryland. At that time, according to the predetermined personality variable compositions, dyad assignment was made. Prior to assignment all Ss were tested on questionnaires and other materials and also trained on the three tasks of the experiment: (a) the combat information center task (CIC) which was cooperative sonar tracking with information input from simulated

mission control over the loudspeaker, (b) monitoring task, a one man attention type problem, the S being required to push a button below a given light when that light came on; and (c) syllogistic reasoning task (decoding), a cooperative task involving exchange of information between the Ss to come to a valid conclusion concerning the validity of a statement.

With the understanding that this was an experiment simulating future submarine missions the isolation dyads were confined in heavily soundproofed 12 x 12 rooms. They were equipped with basic conveniences only, a chemical toilet (curtained off), bunk beds, two upright chairs with arms, one table approximately 3 x 4 on top, one storage cabinet, and one lamp. There were overhead lights in the room which operated on the conventional Navy work schedule with reveille at 7:30 a.m. and taps at 11:00 p.m. There also were two pieces of task equipment in the room, the easel type plotting board for the combat information center task, and the smaller monitoring console for the attention type task. The abstract reasoning task on a deck of cards was brought into the room daily with the other supplies, water, food, laundry, etc., in the portable, lighttight closet which rolled up to the door of the experimental chamber. There were unconcealed TV cameras and microphones plus a loudspeaker in the experimental chamber, in addition to a one-way mirror for direct experimenter observation. "During the experiment, verbal interaction between Ss during non-task periods was recorded on a time-sampling basis. Each day, nine samples of time were tape-recorded, ranging from ten to thirty minutes, for a total of two hours 20 minutes of free interaction"(Haythorn, 1966, p. 13). The isolation Ss were allowed to take one self-selected book and one magazine in with them on day one and were allowed additional self-selected material on days 4, 7 and 10. A deck of regular playing cards, a cribbage board, a checker game and re-

ligious reading material were already in the room. Other than contact with mission control, the Ss were not permitted to have any other materials which allowed contact with the outside, such as watches, calenders, or radios.

The control Ss were required to work in the same circumstances as the isolation Ss but were free to leave the experimental chamber between tasks (10 minute break), plus they ate and slept in regular crew quarters on the base and were free to use the base recreation facilities in off-work hours. The control Ss worked the same schedule as the isolation Ss, two hours in the morning, three hours in the afternoon, and one hour in the evening, but other than this they had access to outside social and personal stimulation. The dyads were not informed that they were being observed but most came to this conclusion independently. The dyads adjusted to this condition readily. A more detailed description of the experimental procedure is available in Haythorn and Altman, 1967.

## Results

STATISTICS TO ESTABLISH DATA VALIDITY

Considering the highly exploratory and unreplicated nature of this research, two statistical procedures were deemed absolutely necessary to establish minimal data validity prior to any ANOVA procedures: One was correlation coefficients run between individual Semantic Differential factor word values in the dictionary. The results of this procedure are presented in Table 6 and are within acceptable levels.

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 Insert Table 6 about here  
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The other procedure was a coefficient of reliability run between computer scoring and manual scoring. Given the large amount of data involved this was done for only one dyad through the entire experimental period. The coefficient of reliability was .996 which indicated that the between scales discrimination by the two scoring methods, computer and manual, yielded essentially identical results. Thus the computer scoring was equivalent to manual scoring (interaction MS = .62 as compared to between scales MS = 441.48,  $F_{2,3} = 712.06$ ,  $p < .001$ ). Therefore it was possible to accept computer scoring as identical with manual scoring.

Tables 7, 8, and 9 present a listing of the total and unique numbers of words from the Heise dictionary contained in the random samples of conversation.

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 Insert Tables 7, 8, and 9 about here  
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It is obvious that the amount of conversation varied greatly between the dyads. Some dyads talked continuously such as dyad #6 in isolation, some



TABLE 6  
 Correlation Coefficients Between Four  
 Conventional Semantic Differential Factors

|            | Evaluation | Activity | Potency | Polarity |
|------------|------------|----------|---------|----------|
| Evaluation | 1          |          |         |          |
| Activity   | .10        | 1        |         |          |
| Potency    | -.17       | .02      | 1       |          |
| Polarity   | -.06       | .02      | -.12    | 1        |

TABLE 7

Total<sup>1</sup> and unique number of words from Heise dictionary contained in random samples of free interaction conversation by dyad<sup>2</sup>, condition, and composition for Day 1 of the experimental period

| Day 1       |                                  |                     |                                  |                                   |    |     |    |     |
|-------------|----------------------------------|---------------------|----------------------------------|-----------------------------------|----|-----|----|-----|
| Dyad Number | Isolation                        |                     | Control                          |                                   |    |     |    |     |
|             | N <sub>total</sub><br>compatible | N <sub>unique</sub> | N <sub>total</sub><br>compatible | N <sub>unique</sub><br>compatible |    |     |    |     |
| 1.          | a.                               | 179                 | a.                               | 83                                | a. | 430 | a. | 137 |
|             | b.                               | 277                 | b.                               | 114                               | b. | 259 | b. | 109 |
| 2.          | a.                               | 998                 | a.                               | 220                               | a. | 455 | a. | 142 |
|             | b.                               | 1702                | b.                               | 289                               | b. | 973 | b. | 206 |
| 3.          | a.                               | 1410                | a.                               | 227                               | a. | 51  | a. | 35  |
|             | b.                               | 1096                | b.                               | 201                               | b. | 69  | b. | 43  |
| 4.          | a.                               | 133                 | a.                               | 63                                | a. | 305 | a. | 116 |
|             | b.                               | 109                 | b.                               | 53                                | b. | 292 | b. | 118 |
|             |                                  | incompatible        |                                  | incompatible                      |    |     |    |     |
| 5.          | a.                               | 1575                | a.                               | 249                               | a. | 167 | a. | 73  |
|             | b.                               | 2236                | b.                               | 251                               | b. | 126 | b. | 63  |
| 6.          | a.                               | 1414                | a.                               | 245                               | a. | 34  | a. | 20  |
|             | b.                               | 1080                | b.                               | 275                               | b. | 34  | b. | 27  |
| 7.          | a.                               | 130                 | a.                               | 66                                | a. | 496 | a. | 142 |
|             | b.                               | 116                 | b.                               | 68                                | b. | 463 | b. | 142 |
| 8.          | a.                               | 238                 | a.                               | 101                               | a. | 117 | a. | 69  |
|             | b.                               | 539                 | b.                               | 172                               | b. | 145 | b. | 71  |
| 9.          | a.                               | 1736                | a.                               | 274                               | a. | 676 | a. | 150 |
|             | b.                               | 987                 | b.                               | 210                               | b. | 672 | b. | 133 |

- Total number of words equals the unique words plus the repetitions of those words contained in free interaction conversation. There is a greater volume of material in the isolation condition because the Ss were there during all of the sampling periods while the control Ss were not.
- The dyads are matched across the page; eg. #1 dyad in the control condition is comparable to #1 dyad in the isolation condition.

TABLE 8

Total<sup>1</sup> and unique number of words from Heise dictionary contained in random samples of free interaction conversation by dyad<sup>2</sup>, condition, and composition for Day 5 of the experimental period.

| Day 5       |    |                    |    |                     |                    |     |
|-------------|----|--------------------|----|---------------------|--------------------|-----|
|             |    | Isolation          |    |                     | Control            |     |
| Dyad Number |    | N <sub>total</sub> |    | N <sub>unique</sub> | N <sub>total</sub> |     |
|             |    | compatible         |    |                     | compatible         |     |
| 1.          | a. | 418                | a. | 141                 | a.                 | 22  |
|             | b. | 934                | b. | 220                 | b.                 | 14  |
| 2.          | a. | 843                | a. | 212                 | a.                 | 327 |
|             | b. | 1668               | b. | 269                 | b.                 | 465 |
| 3.          | a. | 1621               | a. | 246                 | a.                 | 1   |
|             | b. | 942                | b. | 179                 | b.                 | 22  |
| 4.          | a. | 138                | a. | 63                  | a.                 | 313 |
|             | b. | 155                | b. | 83                  | b.                 | 191 |
|             |    | incompatible       |    |                     | incompatible       |     |
| 5.          | a. | 1070               | a. | 229                 | a.                 | 0   |
|             | b. | 1372               | b. | 223                 | b.                 | 0   |
| 6.          | a. | 2842               | a. | 317                 | a.                 | 43  |
|             | b. | 3919               | b. | 387                 | b.                 | 136 |
| 7.          | a. | 588                | a. | 196                 | a.                 | 108 |
|             | b. | 268                | b. | 109                 | b.                 | 87  |
| 8.          | a. | 32                 | a. | 18                  | a.                 | 6   |
|             | b. | 141                | b. | 70                  | b.                 | 5   |
| 9.          | a. | 132                | a. | 77                  | a.                 | 255 |
|             | b. | 2826               | b. | 336                 | b.                 | 0   |

- Total number of words equals the unique words plus the repetitions of those words contained in free interaction conversation. There is a greater volume of material in the isolation condition because the Ss were there during all of the sampling periods while the control Ss were not.
- The dyads are matched across the page, eg. #1 dyad in the control condition is comparable to #1 dyad in the isolation condition.

TABLE 9

Total<sup>1</sup> and unique number of words from Heise dictionary, contained in random samples of free interaction conversation by dyad<sup>2</sup>, condition, and composition for Day 9 of the experimental period.

| Day 9          |                    |                     |                    |                     |    |     |    |     |
|----------------|--------------------|---------------------|--------------------|---------------------|----|-----|----|-----|
| Isolation      |                    |                     | Control            |                     |    |     |    |     |
|                | N <sub>total</sub> | N <sub>unique</sub> | N <sub>total</sub> | N <sub>unique</sub> |    |     |    |     |
| compatible     |                    |                     | compatible         |                     |    |     |    |     |
| Dyad Number 1. | a.                 | 104                 | a.                 | 57                  | a. | 221 | a. | 97  |
|                | b.                 | 513                 | b.                 | 167                 | b. | 180 | b. | 89  |
| 2.             | a.                 | 289                 | a.                 | 119                 | a. | 10  | a. | 9   |
|                | b.                 | 416                 | b.                 | 151                 | b. | 50  | b. | 27  |
| 3.             | a.                 | 1500                | a.                 | 254                 | a. | 0   | a. | 0   |
|                | b.                 | 842                 | b.                 | 206                 | b. | 0   | b. | 0   |
| 4.             | a.                 | 716                 | a.                 | 181                 | a. | 231 | a. | 92  |
|                | b.                 | 779                 | b.                 | 182                 | b. | 161 | b. | 77  |
| incompatible   |                    |                     | incompatible       |                     |    |     |    |     |
| 5.             | a.                 | 1070                | a.                 | 229                 | a. | 535 | a. | 153 |
|                | b.                 | 1372                | b.                 | 223                 | b. | 175 | b. | 82  |
| 6.             | a.                 | 1881                | a.                 | 262                 | a. | 335 | a. | 104 |
|                | b.                 | 2817                | b.                 | 318                 | b. | 379 | b. | 127 |
| 7.             | a.                 | 567                 | a.                 | 138                 | a. | 927 | a. | 145 |
|                | b.                 | 69                  | b.                 | 39                  | b. | 457 | b. | 209 |
| 8.             | a.                 | 15                  | a.                 | 12                  | a. | 830 | a. | 184 |
|                | b.                 | 90                  | b.                 | 54                  | b. | 610 | b. | 148 |
| 9.             | a.                 | 1490                | b.                 | 206                 | a. | 639 | a. | 182 |
|                | b.                 | 1706                | b.                 | 298                 | b. | 389 | b. | 150 |

1. Total number of words equals the unique words plus the repetitions of those words contained in free interaction conversation. There is a greater volume of material in the isolation condition because the Ss were there during all of the sampling periods while the control Ss were not.

2. The dyads are matched across the page, eg. #1 dyad in the control condition is comparable to #1 dyad in the isolation condition.

such as dyad #3 in control said very little. In that means were used the differential quantity variable should not alter the Semantic Differential factor values which were used in the ANOVA computations.

#### INDIVIDUAL SEMANTIC DIFFERENTIAL FACTOR RESULTS

Tables 10, 12, 14, 16, 18, and 20 present the individual 3-way ANOVA's on each of the six Semantic Differential factors. Each 3-way ANOVA incorporated condition (isolation versus control or nonisolation), composition (compatible versus incompatible personality composition), and time (days 1, 5, and 9), and their interactions. It should be kept in mind that the values of the Semantic Differential factors analyzed are mean values. Compatible and incompatible groups had unequal N's. In that most of the mean raw data scores for evaluation, activity, and potency factors were minus values (none of which were less negative than -1), a plus 1 data transformation was employed to allow for ANOVA analysis. It is not yet possible to say what the absolute value of a factor score indicates. For this reason discussion of the results will only be in terms of these relative similarities and differences between the various groups.

Hypothesis 1 posited differential loadings on the Semantic Differential evaluation factor with differential stress. Analysis of variance of the evaluation factor scores which is presented in Table 10 showed two effects indicative of stress reactions.

- - - - -  
 Insert Table 10 about here  
 - - - - -

One main effect between isolation ( $\bar{X} = .824$ ) and control ( $\bar{X} = .742$ ) conditions and the other an interaction effect between composition and time in the experimental situation (Figure 1).

TABLE 10  
 Analysis of Variance: Evaluation Factor

| Source          | df | MS   | F    | p   |
|-----------------|----|------|------|-----|
| Condition (A)   | 1  | .192 | 5.05 | .05 |
| Composition (B) | 1  | .026 |      |     |
| Time (C)        | 2  | .000 |      |     |
| A X B           | 1  | .004 |      |     |
| A X C           | 2  | .052 |      |     |
| B X C           | 2  | .119 | 3.61 | .05 |
| A X B X C       | 2  | .058 |      |     |

-----  
 Insert Figure 1 about here  
 -----

In the evaluation factor ANOVA as with several of the others, the significant interaction of composition and time (Figure 1) derived from widely divergent group mean scores on day 5 of the experimental period. Incompatible groups were much more negative in the evaluation factor on day 5 than the corresponding compatible groups. Data from days 1 and 5 support the hypothesis that incompatibility in group composition would produce a decrease in evaluative affect in speech but data on day 9 is inconsistent with the predicted results. Both of these effects were significant at  $p < .05$ . Although the condition by time interaction was not statistically significant ( $p < .25$ ) Figure 2 suggests that the differences between isolation and control in evaluative affect in speech in isolation and control conditions is great on days 5 and 9 but negligible on day 1.

-----  
 Insert Figure 2 about here  
 -----

In both conditions the overall evaluative affect measured was negative but contrary to the condition by time interaction hypothesis the isolation group showed less rather than more negative evaluative affect. See Table 11 for a summary of the predicted hypotheses relative to the observed data for the evaluation factor.

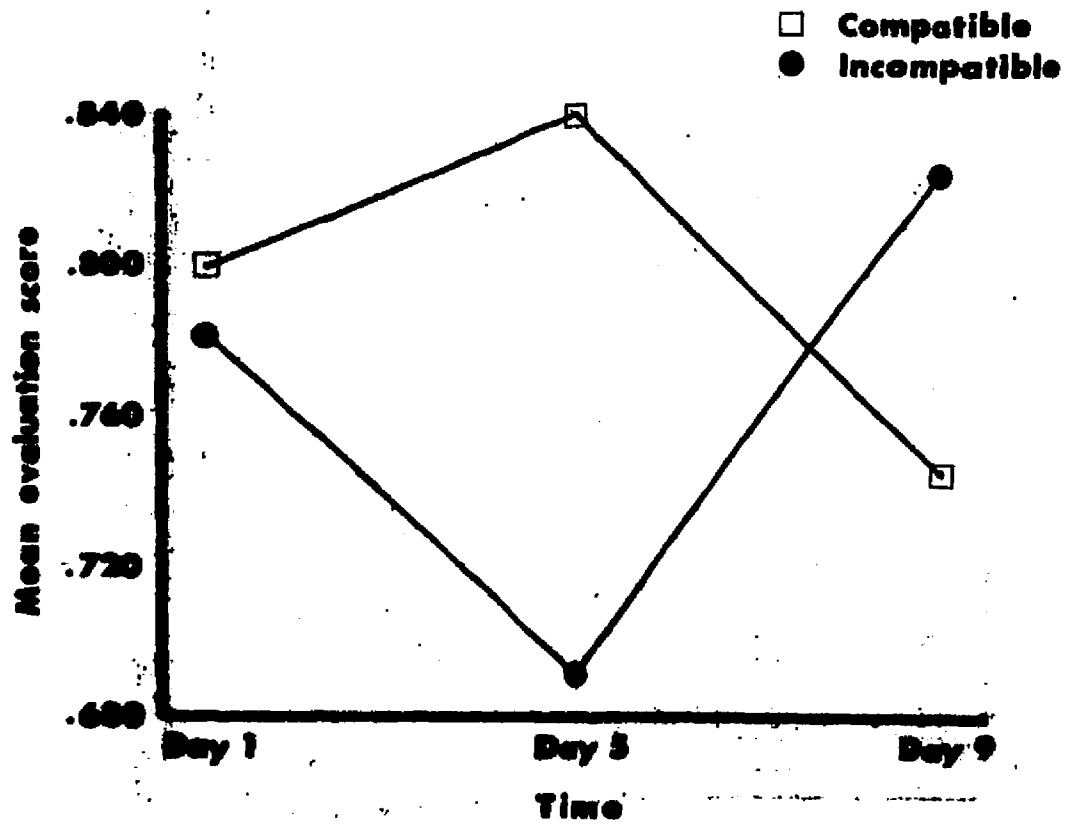
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 Insert Table 11 about here  
 -----

Hypothesis 2 posited differential loadings on the Semantic Differential activity factor with differential stress. The activity factor was one of two of the Semantic Differential factors which showed marked differences

FIGURE 1

Effects of Time in Experiment and Compatibility on  
Evaluation Factor Scores





## FIGURE 2

Effects of Time in Experiment and Isolation and  
Control Conditions on Evaluation Factor Scores

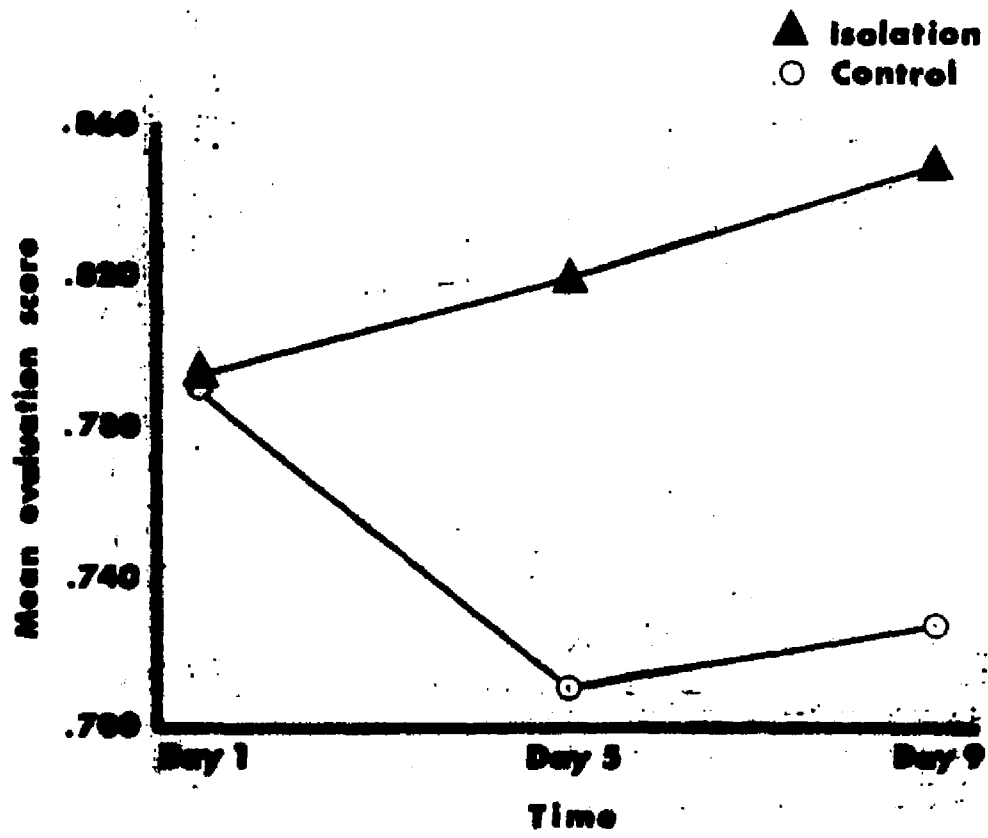


TABLE 11

## Evaluation Factor: Hypotheses Relative to Observed Data

|                 | Predicted  | Observed   |
|-----------------|--|--|
| Condition (A)*  | I <sup>a</sup> group more negative than C group.                             | C <sup>b</sup> group more negative values than I group   |
| Composition (B) | Incomp. <sup>c</sup> group more negative than Comp. <sup>d</sup> group       | Not significant  |
| Time (C)        | Increasingly negative means from day 1 through days 5 and 9                  | Not significant  |
| A X B           | Incomp. group more negative than Comp. group over I and C conditions         | Not significant  |
| A X C           | I group more negative than C group from day 1 through days 5 and 9.          | Not significant  |
| B X C*          | Incomp. group more negative than Comp. group from day 1 through days 5 and 9 | Incomp. group more negative on days 1 and 5 not on day 9 |
| A X B X C       | I -Incomp. group more negative than other three groups over time             | Not significant  |

- a Abbreviation for Isolation  
 b Abbreviation for Control  
 c Abbreviation for Incompatible  
 d Abbreviation for Compatible  
 \*  $p < .05$ , or  $p < .01$

for most variables, both between subject and within subject variables. This analysis is presented in Table 12, and shows two significant main effects and three significant interaction effects.

-----  
 Insert Table 12 about here  
 -----

The significant main time effect ( $p < .05$ ) was largely a result of the day 5 activity scores ( $\bar{X} = .879$ ) being lower than day 1 ( $\bar{X} = .944$ ) and day 9 ( $\bar{X} = .980$ ): day 9 had the highest activity score.

The significant main composition effect between compatible ( $\bar{X} = .976$ ) and incompatible ( $\bar{X} = .886$ ) groups ( $p < .01$ ) shows that compatible groups had higher activity group scores. Contrary to the condition hypothesis the overall activity values for the isolation Ss were not significantly higher than those for the control group though the data were in the predicted direction and approached significance ( $p < .10$ ). However there was a significant condition by time interaction ( $p < .01$ ). Figure 3 shows this interaction.

-----  
 Insert Figure 3 about here  
 -----

The condition by time hypothesis that activity would be highest in the isolation group was supported on day 5 but not on day 9. No differences were expected on day 1. Figure 4 shows the interaction between group composition and time ( $p < .05$ ).

-----  
 Insert Figure 4 about here  
 -----

Although the 3-way interaction was not significant, the 2-way interaction effect of composition and time is attributable to the large differences on day 5 between the control-incompatible group and the other three con-

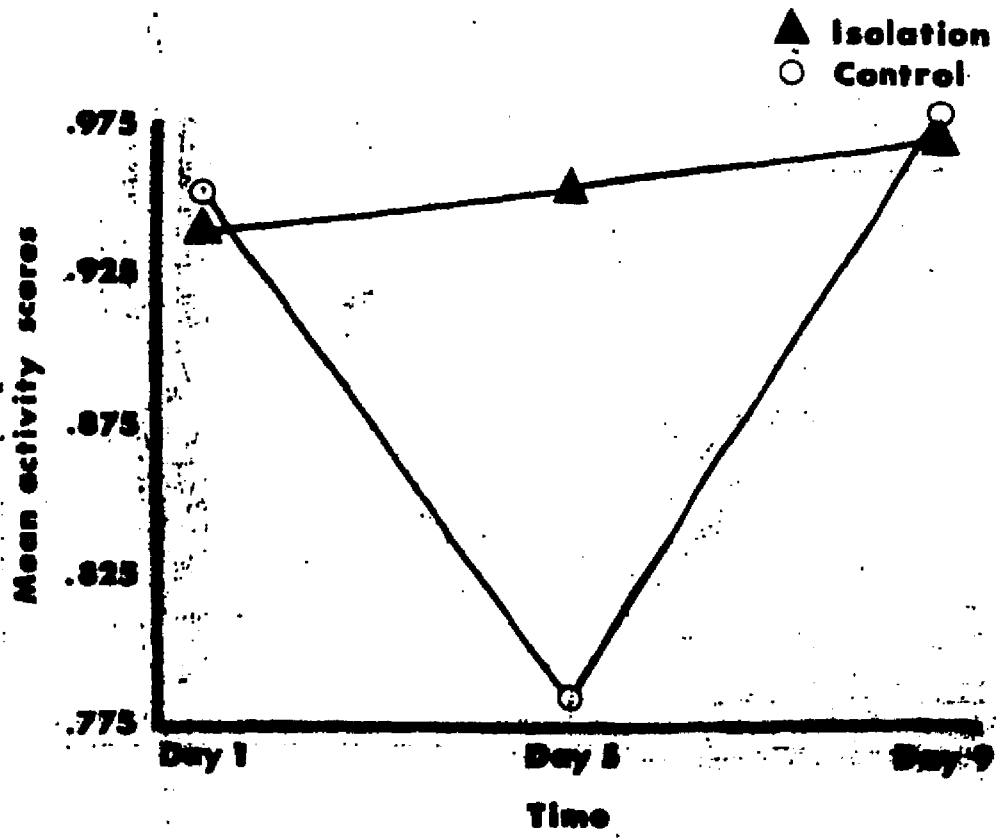
TABLE 12

## Analysis of Variance: Activity Factor

| Source          | df | MS   | F    | p     |
|-----------------|----|------|------|-------|
| Condition (A)   | 1  | .089 | 3.07 | (.10) |
| Composition (B) | 1  | .220 | 7.59 | .01   |
| Time (C)        | 2  | .131 | 3.97 | .05   |
| A X B           | 1  | .123 | 4.24 | .05   |
| A X C           | 2  | .278 | 8.42 | .01   |
| B X C           | 2  | .113 | 3.42 | .05   |
| A X B X C       | 2  | .014 |      |       |

## FIGURE 3

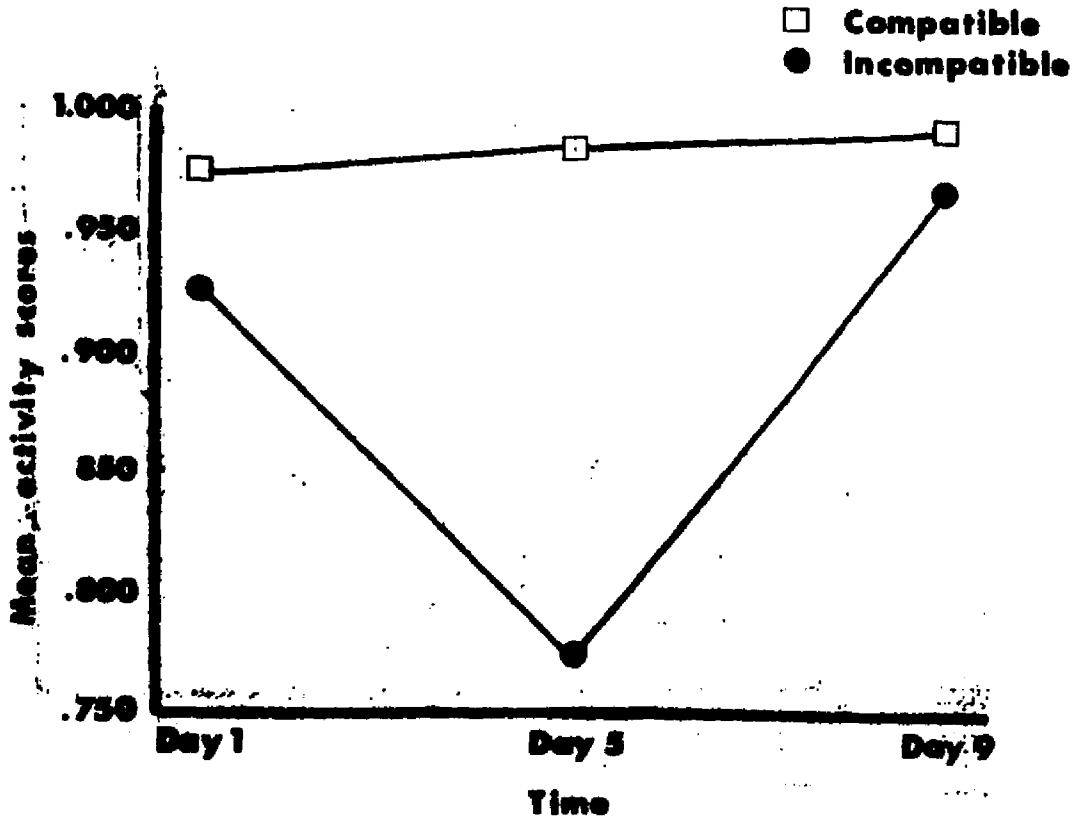
Effects of Time in Experiment and Isolation and Control  
Conditions on Activity Factor Scores





**FIGURE 4**

**Effects of Time in Experiment and Compatibility on Activity Factor Scores**



ditions. (See Figure 5),

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 Insert Figure 5 about here  
 -----

On days 1 and 9 the differences between groups were small. The interaction between composition and condition ( $p < .05$ ) presented in Figure 6 showing the main effect of composition also resulted primarily from the very large disparity between the control-incompatible group on day 5 and the other groups all of which have essentially the same activity values on all days tested.

-----  
 Insert Figure 6 about here  
 -----

See Table 13 for a summary of the predicted hypotheses relative to the observed data for the activity factor.

-----  
 Insert Table 13 about here  
 -----

Hypothesis 3 posited differential loadings on the Semantic Differential potency factor with differential stress. The analysis presented in Table 14 shows that potency also showed generalized differential loadings across the three variables of condition, composition, and time in the experimental situation.

-----  
 Insert Table 14 about here  
 -----

The potency factor showed five significant effects all at the  $p < .05$  level, three main effects -- condition, composition and time -- and two interaction effects -- condition by composition, and condition by time. As predicted by the hypothesis, the isolation groups ( $\bar{X} = .930$ ) did have significantly higher potency scores than the control groups ( $\bar{X} = .872$ ).

## FIGURE 5

Effects of Time in Experiment, Compatibility, and Isolation  
and Control Conditions on Activity Factor Scores

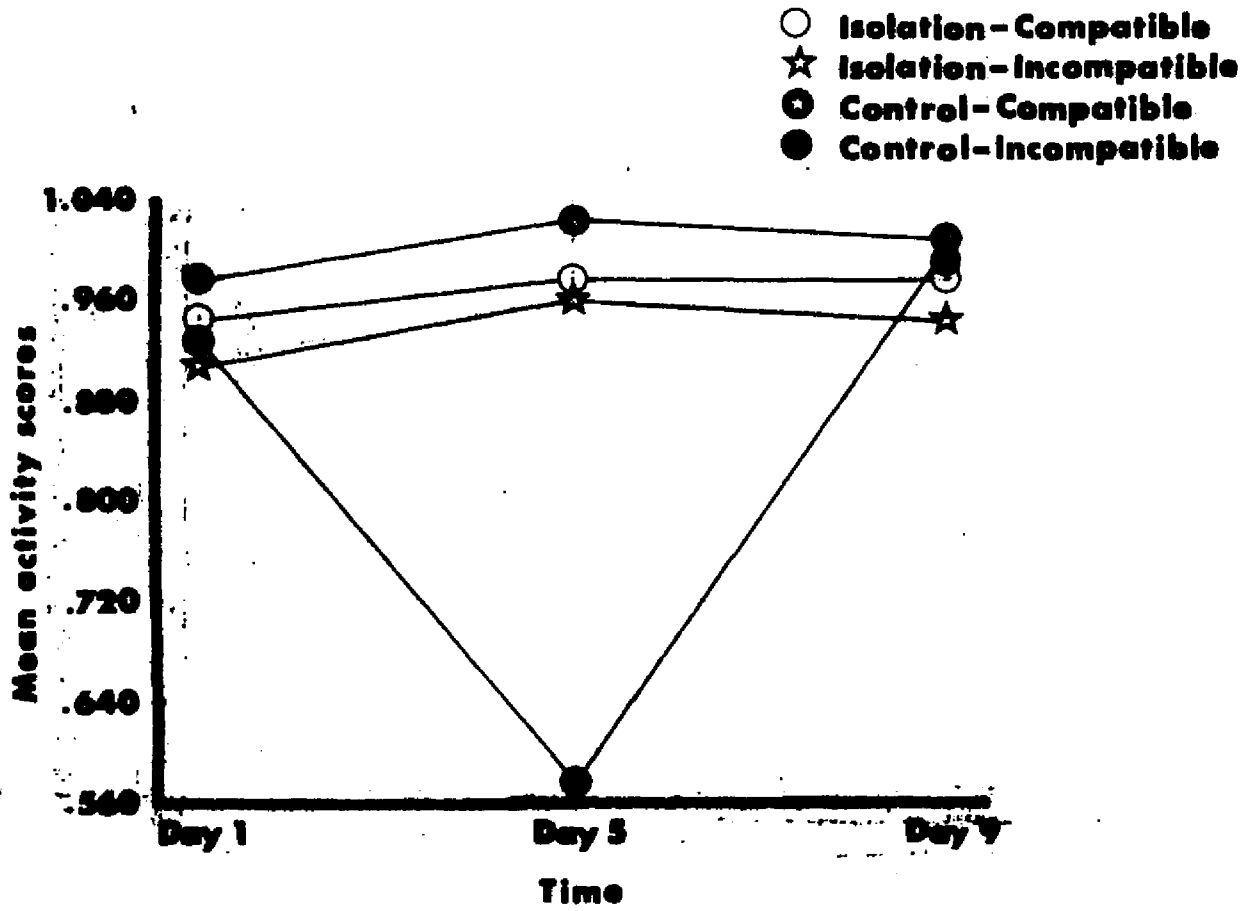


FIGURE 6

Effects of Isolation and Control Conditions and Compatibility  
on Activity Factor Scores

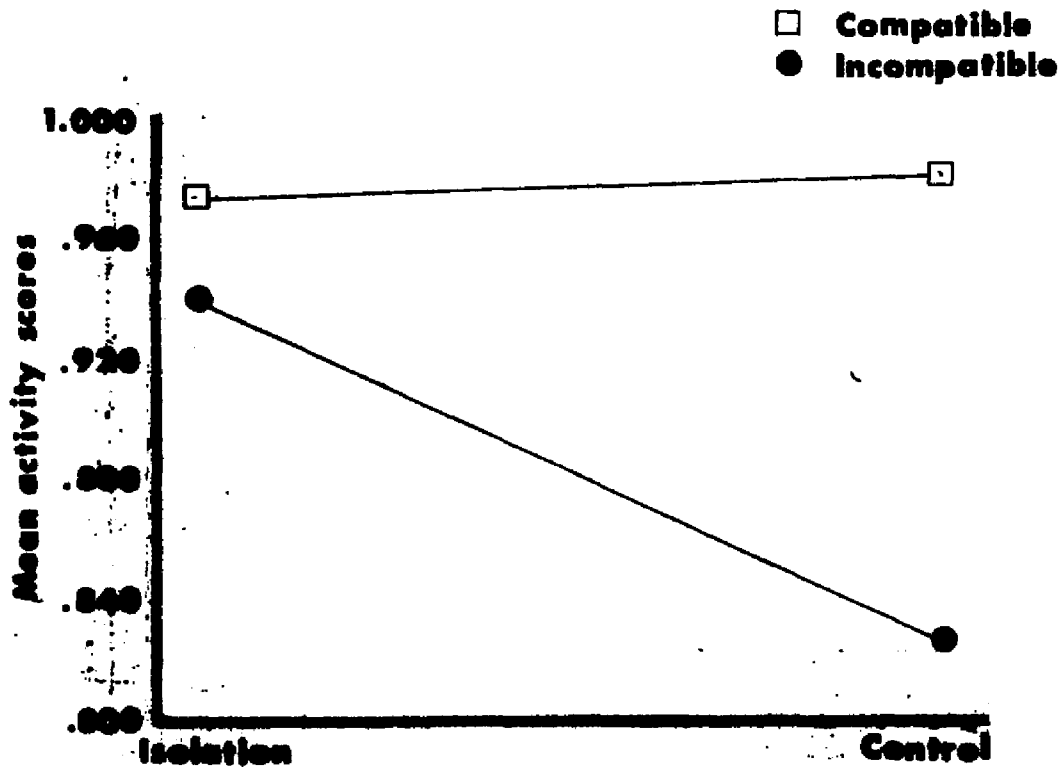


TABLE 13

## Activity Factor: Hypotheses Relative to Observed Data

|                  | Predicted   | Observed   |
|------------------|---|--|
| Condition (A)    | I <sup>a</sup> group more positive values than C <sup>b</sup> group           | Approached significance (.10) in predicted direction |
| Composition (B)* | Comp. <sup>c</sup> group more positive values than Incomp. <sup>d</sup> group | As predicted   |
| Time (C)*        | More positive mean values on days 5 and 9 than on day 1                       | Lower values on day 5 than on day 1 or day 9         |
| A X B*           | Comp. group more positive values across I and C conditions                    | As predicted   |
| A X C*           | I group more positive values than C group over time                           | More positive values only on day 5                   |
| B X C*           | Comp. group more positive values than Incomp. over time                       | As predicted   |
| A X B X C        | No hypothesis   | Not significant                                      |

a Abbreviation for Isolation

b Abbreviation for Control

c Abbreviation for Compatible

d Abbreviation for Incompatible

\*  $p < .05$ , or  $p < .01$



TABLE 14  
 Analysis of Variance: Potency Factor

| Source          | df | MS   | F    | P     |
|-----------------|----|------|------|-------|
| Condition (A)   | 1  | .112 | 5.60 | .05   |
| Composition (B) | 1  | .087 | 4.35 | .05   |
| Time (C)        | 2  | .111 | 4.83 | .05   |
| A X B           | 1  | .114 | 5.70 | .05   |
| A X C           | 2  | .112 | 4.87 | .05   |
| B X C           | 2  | .040 |      |       |
| A X B X C       | 2  | .056 | 2.44 | (.10) |

However, contrary to the second stated hypothesis regarding potency, the incompatible group had significantly lower potency values ( $\bar{X} = .865$ ) than the compatible group ( $\bar{X} = .922$ ). These differences were also significant across time with day 5 ( $\bar{X} = .834$ ) being significantly lower than day 1 ( $\bar{X} = .926$ ) and day 9 ( $\bar{X} = .921$ ). Figure 7 depicts the interaction between condition and composition.

-----  
 Insert Figure 7 about here  
 -----

The control-incompatible groups diverged from the others resulting in this interaction. Figure 8 illustrates the interaction of condition by time.

-----  
 Insert Figure 8 about here  
 -----

While the condition by time interaction showed that the isolation and control groups began at approximately the same potency value in their speech, they were widely divergent on day 5 and became similar again on day 9. Again the wide divergence of the control-incompatible group from the others is apparent, but only on day 5. For this reason the composition by condition, by time interaction approached but did not reach statistical significance ( $p < .10$ ), (See Figure 9).

-----  
 Insert Figure 9 about here  
 -----

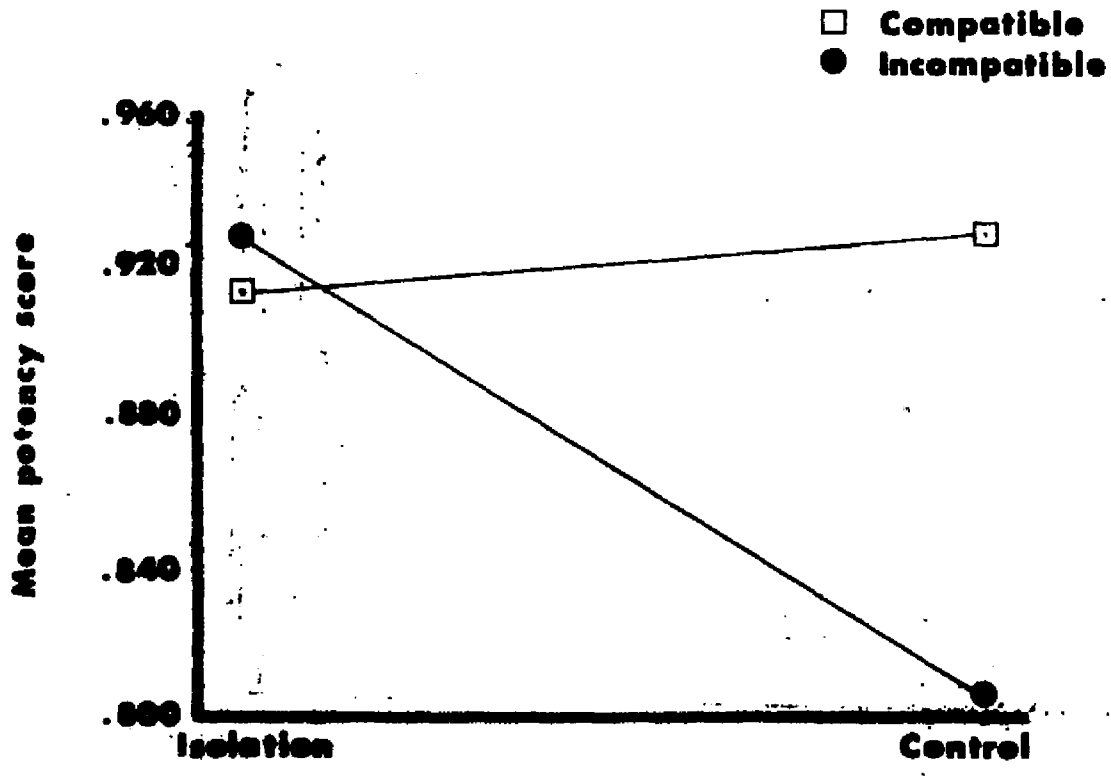
See Table 15 for a summary of the predicted hypotheses relative to the observed data for the potency factor.

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 Insert Table 15 about here  
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Hypothesis 4 posited a differential loading on the Semantic Differential polarity factor with differential stress. The analysis of this factor

FIGURE 7

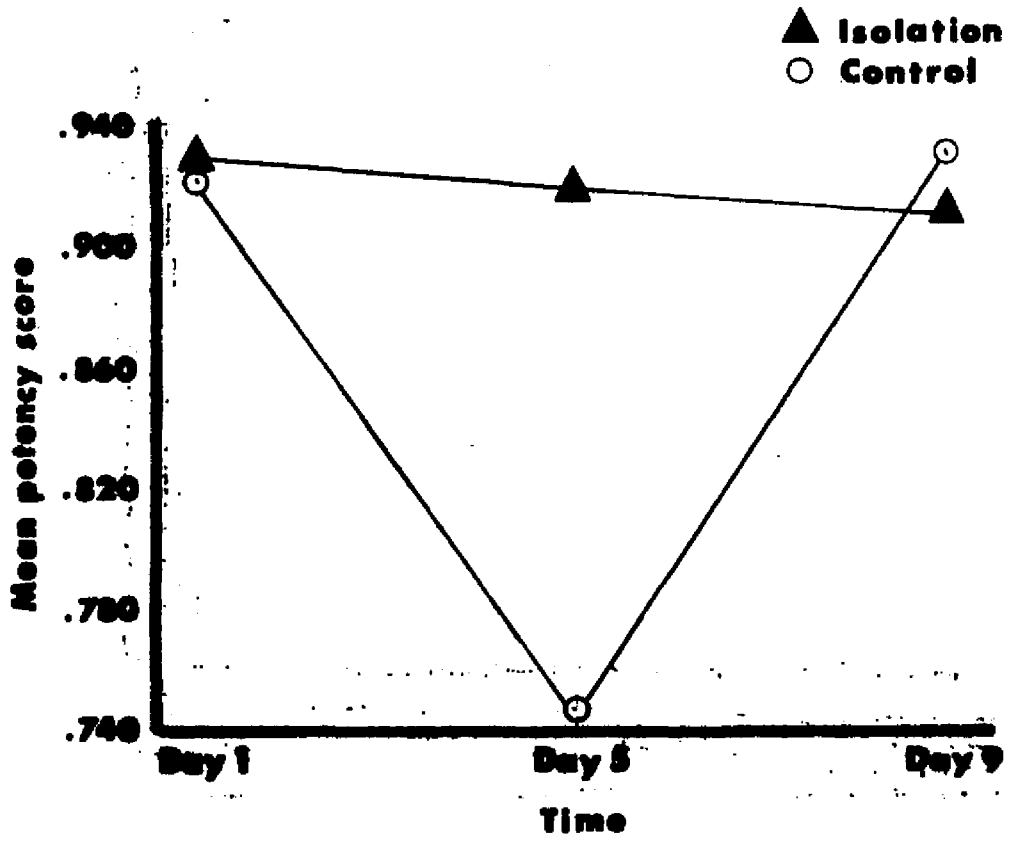
Effects of Isolation and Control Conditions and Compatibility on Potency  
Factor Scores



5

## FIGURE 8

Effects of Time in Experiment and Isolation and Control Conditions  
on Potency Factor Scores



4.5

FIGURE 9

Effects of Time in Experiment, Isolation and Control Conditions,  
and Compatibility on Potency Factor Scores

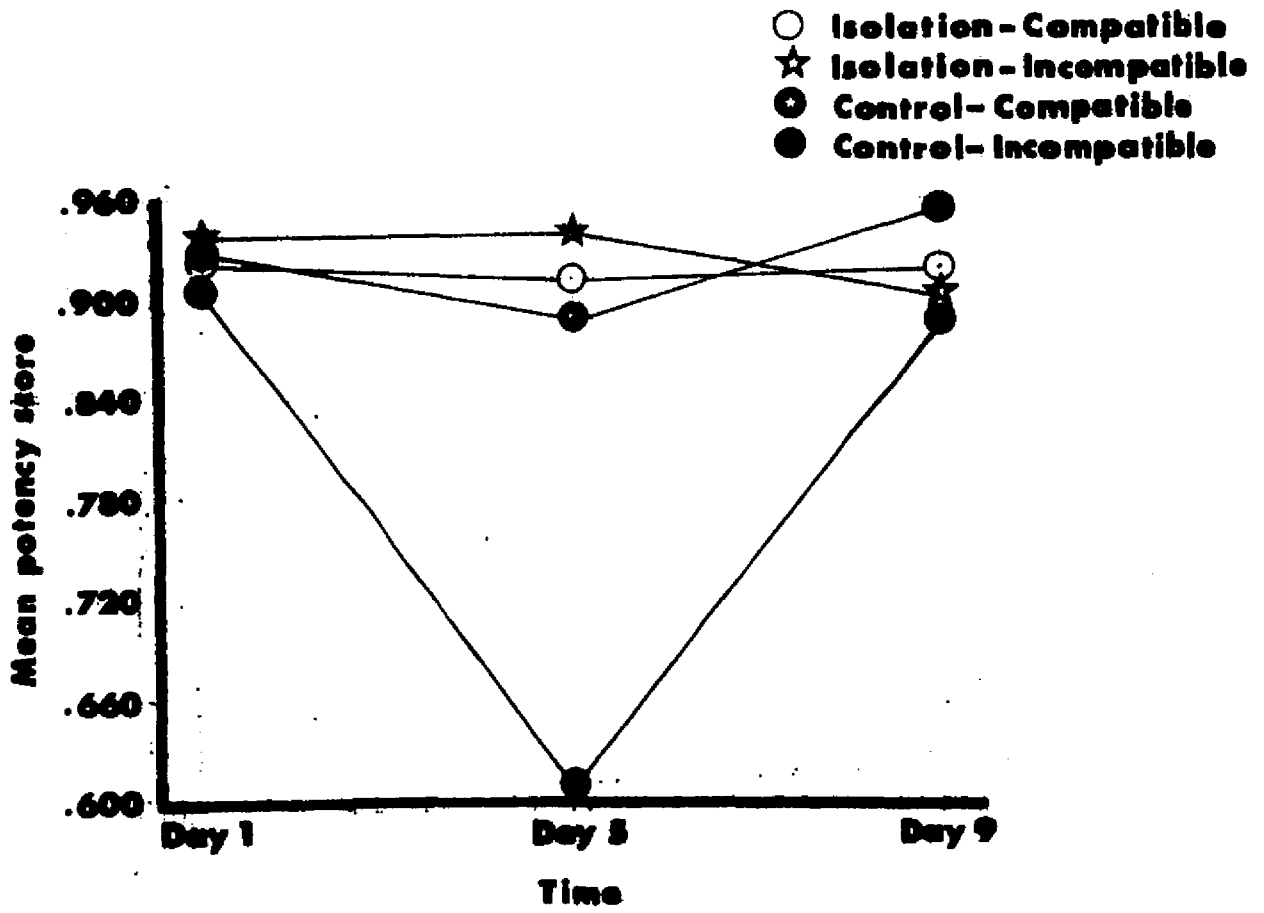




TABLE 15

## Potency Factor: Hypotheses Relative to Observed Data

|                  | Predicted   | Observed  |
|------------------|---|---|
| Condition (A)*   | I <sup>a</sup> group more positive values than C <sup>b</sup> group           | As predicted  |
| Composition (B)* | Incomp. <sup>c</sup> group more positive values than Comp. <sup>d</sup> group | Comp. group more positive values than Incomp. group   |
| Time (C)*        | More positive mean values from day 1 through days 5 and 9                     | Day 5 values more negative than day 1 or day 9  |
| A X B*           | Comp. group lower mean values than Incomp. group over I and C conditions      | Same values in I condition, Comp. higher values than Incomp. in C condition                         |
| A X C*           | I group more positive over time than C group                                  | As predicted  |
| B X C            | Incomp. group more positive over time than Comp. group                        | Approached but did not reach significance in the predicted direction (.25)                          |
| A X B X C        | I -Incomp. group more positive than others over time                          | Approached but did not reach significance (.10), I -Incomp. lower values than other groups on day 5 |

- a. Abbreviation for Isolation  
 b. Abbreviation for Control  
 c. Abbreviation for Incompatible  
 d. Abbreviation for Compatible  
 \*  $p < .05$ , or  $p < .01$

is presented in Table 16.

-----  
 Insert Table 16 about here  
 -----

There were only two significant effects, a between subjects main effect of condition ( $p < .05$ ) and a within subjects main effect of time in the experimental situation ( $p < .05$ ). The condition hypothesis that the isolation group ( $\bar{X} = 1.094$ ) would generate significantly higher scores due to the increased stress of the isolation circumstances as compared to the control group ( $\bar{X} = 1.018$ ), was upheld. The isolation group was significantly higher than the control group on day 1 and this difference increased dramatically by day 5. However the two groups were essentially at the same level by day 9. The condition by time interaction approached but did not reach statistical significance ( $p < .10$ ) and was in the predicted direction, (see Figure 10).

-----  
 Insert Figure 10 about here  
 -----

The main effect of time was significant at  $p < .05$ : day 1 ( $\bar{X} = 1.077$ ), day 5 ( $\bar{X} = .984$ ), and day 9 ( $\bar{X} = 1.107$ ). The hypothesis of a significant composition effect was not confirmed, nor were the predicted interaction effects between condition and composition, and composition and time confirmed. See Table 17 for a summary of the predicted hypotheses relative to the observed data concerning the polarity factor.

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 Insert Table 17 about here  
 -----

Hypothesis 5 posited differential loadings on the Semantic Differential need affiliation factor with differential stress. The analysis of this factor is presented in Table 18.

TABLE 16  
 Analysis of Variance: Polarity Factor

| Source          | df | MS   | F    | p     |
|-----------------|----|------|------|-------|
| Condition (A)   | 1  | .162 | 4.50 | .05   |
| Composition (B) | 1  | .024 |      |       |
| Time (C)        | 2  | .170 | 4.47 | .05   |
| A X B           | 1  | .011 |      |       |
| A X C           | 2  | .112 | 2.95 | (.10) |
| B X C           | 2  | .050 |      |       |
| A X B X C       | 2  | .052 |      |       |

## FIGURE 10

Effects of Time in Experiment and Isolation and Control Conditions  
on Polarity Factor Scores

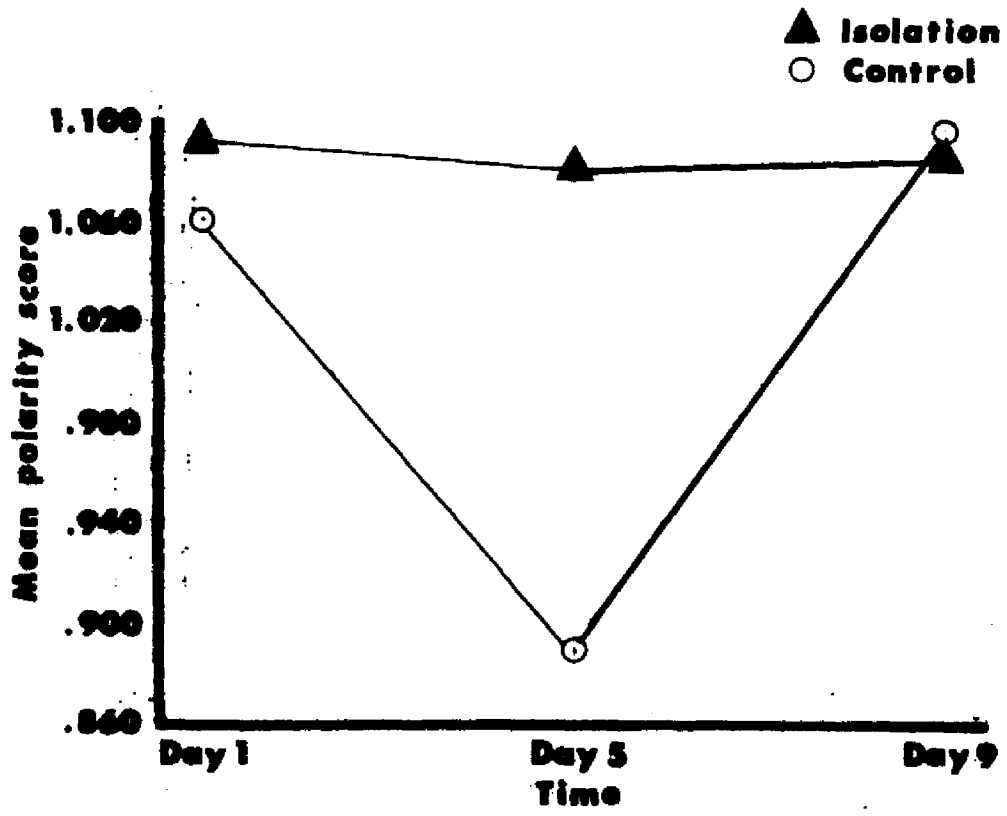


TABLE 17

Polarity Factor: Hypotheses Relative to Observed Data

|                 | Predicted  | Observed  |
|-----------------|--|---|
| Condition (A)*  | I <sup>a</sup> group higher mean values than C <sup>b</sup> group      | As predicted                                      |
| Composition (B) | Incomp. <sup>c</sup> group higher values than Comp. <sup>d</sup> group | Not significant                                   |
| Time (C)*       | Lower values on day 1 than on days 5 and 9                             | Lower values on day 5 than on day 1 or day 9      |
| A X B           | Incomp. group higher values over I and C conditions                    | Not significant                                   |
| A X C           | I group higher over time than C group                                  | Approached significance predicted direction (.10) |
| B X C           | Incomp. group higher values over time than Comp. group                 | Not significant                                   |
| A X B X C       | No hypothesis  | Not significant                                   |

- a Abbreviation for Isolation  
 b Abbreviation for Control  
 c Abbreviation for Incompatible  
 d Abbreviation for Compatible  
 \*  $p < .05$ , or  $p < .01$ .

-----  
 Insert Table 18 about here  
 -----

There were no between subject significant effects but there were three within subject effects: a main effect of time in the experimental situation ( $p < .01$ ), a 2-way interaction between composition and time ( $p < .01$ ), a 3-way interaction between condition, composition, and time ( $p < .05$ ). Contrary to the condition hypothesis the isolation group did not have significantly higher need affiliation scores than the control group. The significant time effect as predicted showed higher need affiliation scores with increasing time. The difference was primarily between day 1 and day 5 (means for day 1, 5, and 9 = .053, .096, and .098 respectively). Figure 11 shows the significant interaction between composition and time which was predicted.

-----  
 Insert Figure 11 about here  
 -----

Compatible groups increased in need affiliation scores greatly between days 1 and 5 and decreased somewhat on day 9. The incompatible groups showed only a small increase on day 5 and a big increase on day 9. This figure suggests the predicted main effect of group composition (compatible mean = .098 and incompatible mean = .080) which did not quite reach statistical significance ( $p < .10$ ) but was in the predicted direction of compatible higher than incompatible groups. There also was a 3-way interaction among condition, composition, and time ( $p < .05$ ), shown in Figure 12.

-----  
 Insert Figure 12 about here  
 -----

Again it is day 5 which is the greatest source of divergent scores. Com-

TABLE 18

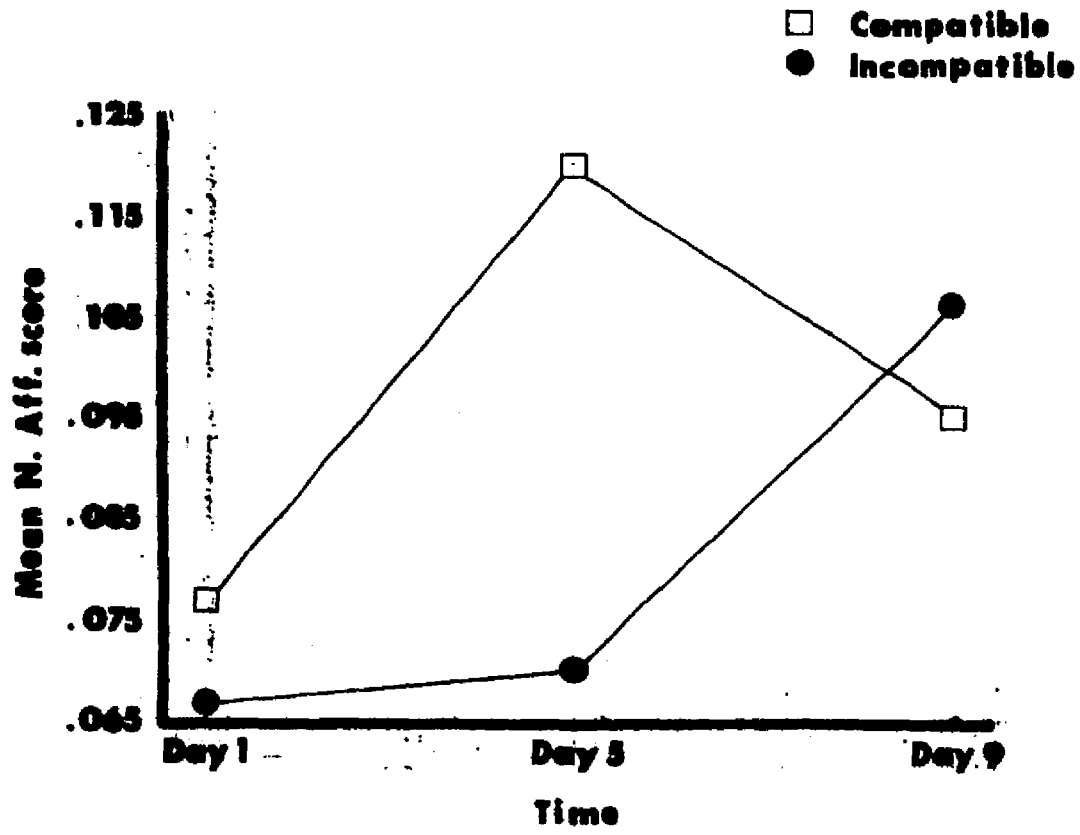
## Analysis of Variance: Need Affiliation Factor

| Source          | df | MS   | F     | p     |
|-----------------|----|------|-------|-------|
| Condition (A)   | 1  | .000 |       |       |
| Composition (B) | 1  | .008 | 2.67  | (.10) |
| Time (C)        | 2  | .065 | 32.50 | .01   |
| A X B           | 1  | .001 |       |       |
| A X C           | 2  | .003 |       |       |
| B X C           | 2  | .075 | 37.50 | .01   |
| A X B X C       | 2  | .008 | 4.00  | .05   |



## FIGURE 11

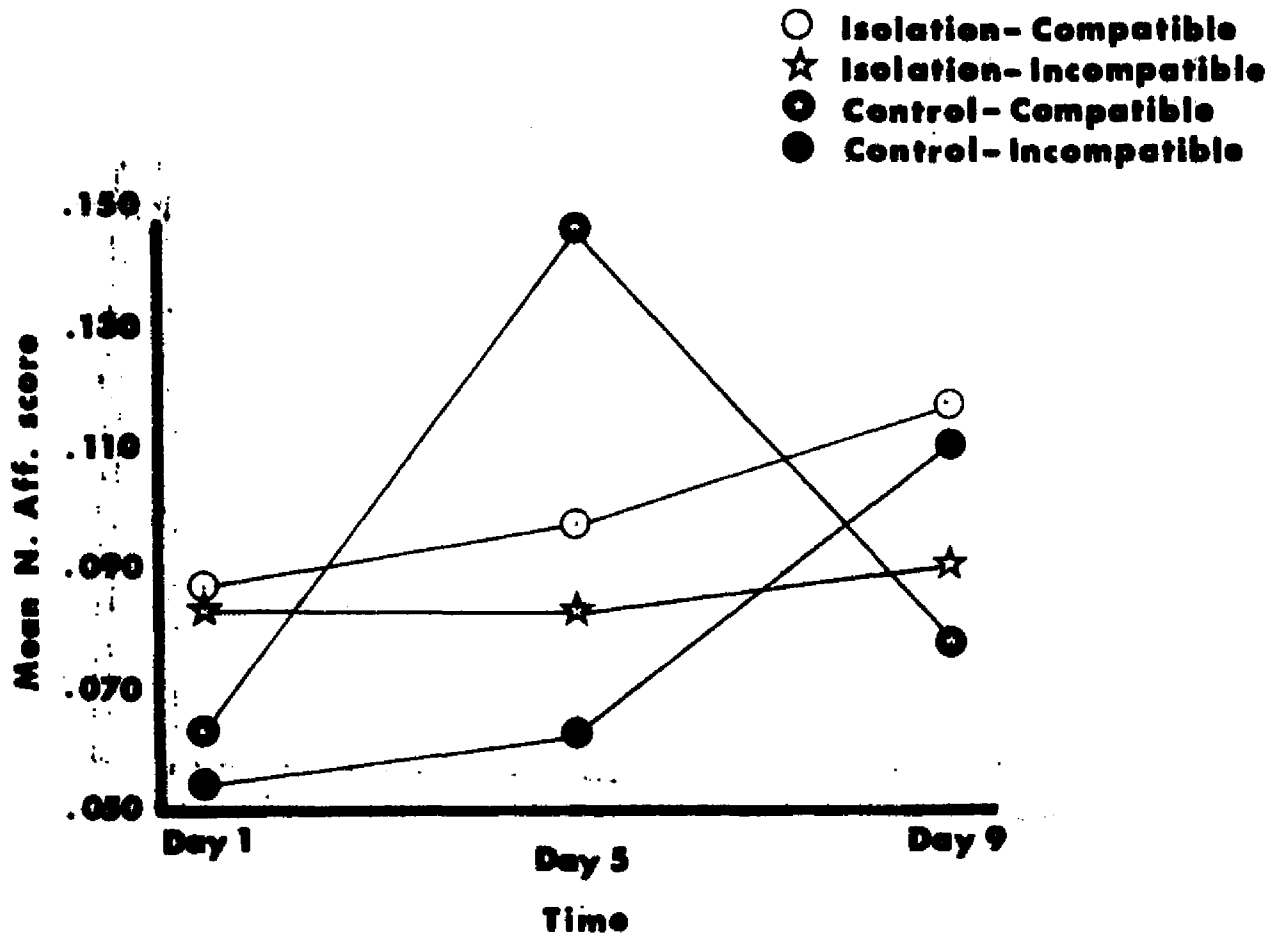
Effects of Time in Experiment and Compatibility on Need Affiliation  
(N.Aff.) Factor Scores



7-12

## FIGURE 12

Effects of Time in Experiment, Compatibility, and Isolation and Control Conditions on Need Affiliation (N.Aff.) Factor Scores



patible and incompatible groups begin as slightly divergent on day 1, this difference increases significantly on day 5, but by day 9 the groups are only slightly divergent again. The 3-way interaction is quite interesting in that both the isolation groups occupy an in-between position relative to the two control groups. The control-compatible group peaked on day 5 high above the others in need affiliation value, and the control-incompatible remained low. By day 9 however the control-compatible group was lowest in need affiliation values and the other groups were increasing in need affiliation scores. The 3-way interaction shows that the pattern observed in Figure 11 regarding the 2-way time by composition interaction was due to the results in the control groups not in the corresponding isolation groups. See Table 19 for a summary of the predicted hypotheses relative to the observed data concerning the need affiliation factor.

- - - - -  
 Insert Table 19 about here  
 - - - - -

Hypothesis 6 posited differential loadings on the Semantic Differential need achievement factor with differential stress. Table 20 shows the analysis of the need achievement factor.

- - - - -  
 Insert Table 20 about here  
 - - - - -

Contrary to the composition hypothesis, the incompatible groups did not have significantly higher need achievement scores than compatible groups. There were, however, two significant within subject effects, one main effect of time in the experimental situation ( $p < .01$ ) and a 3-way interaction between condition, composition, and time ( $p < .01$ ). The main time effect was as predicted but in this case it was day 9 which produced the

TABLE 19

## Need Affiliation Factor: Hypotheses Relative to Observed Data

|                 | Predicted  | Observed   |
|-----------------|--|--|
| Condition (A)   | I <sup>a</sup> group higher mean values than C <sup>b</sup> group      | Not significant                                      |
| Composition (B) | Comp. <sup>c</sup> group higher values than Incomp. <sup>d</sup> group | Approached significance (.10) in predicted direction |
| Time (C)*       | Higher values on days 5 and 9 than on day 1                            | As predicted   |
| A X B           | No hypothesis  | Not significant                                      |
| A X C           | I group higher over time than C group                                  | Not significant                                      |
| B X C*          | Comp. group higher over time than Incomp. group                        | As predicted   |
| A X B X C*      | No hypothesis  | C -Comp. most deviant, highest on day 5              |

a Abbreviation for Isolation

b Abbreviation for Control

c Abbreviation for Compatible

d Abbreviation for Incompatible

\*  $p < .05$ , or  $p < .01$

TABLE 20

Analysis of Variance: Need Achievement Factor

| Source          | df | MS   | F     | p   |
|-----------------|----|------|-------|-----|
| Condition (A)   | 1  | .001 |       |     |
| Composition (B) | 1  | .001 |       |     |
| Time (C)        | 2  | .005 | 16.67 | .01 |
| A X B           | 1  | .000 |       |     |
| A X C           | 2  | .000 |       |     |
| B X C           | 2  | .000 |       |     |
| A X B X C       | 2  | .005 | 16.67 | .01 |

divergence in scores. (Means were .034, .032, .053 for days 1, 5, and 9 respectively), Figure 13 illustrating the 3-way interaction shows that all the groups began at approximately the same need achievement level, but by day 5 the isolation group had increased slightly and the control groups had decreased considerably.

-----  
 Insert Figure 13 about here  
 -----

On day 9 all groups increased greatly, so that all groups had approximately the same need achievement values by day 9, this being higher than the initial level. The predicted condition by time effect and the composition by time effect were not significant. See Table 21 for a summary of the predicted hypotheses concerning the need achievement factor relative to the observed data.

-----  
 Insert Table 21 about here  
 -----

Table 22 is a summary of all significant and near significant ANOVA results of the present experiment.

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 Insert Table 22 about here  
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## FIGURE 13

Effects of Time in Experiment, Compatibility, and Isolation and Control Conditions on Need Achievement (N.Ach.) Factor Scores

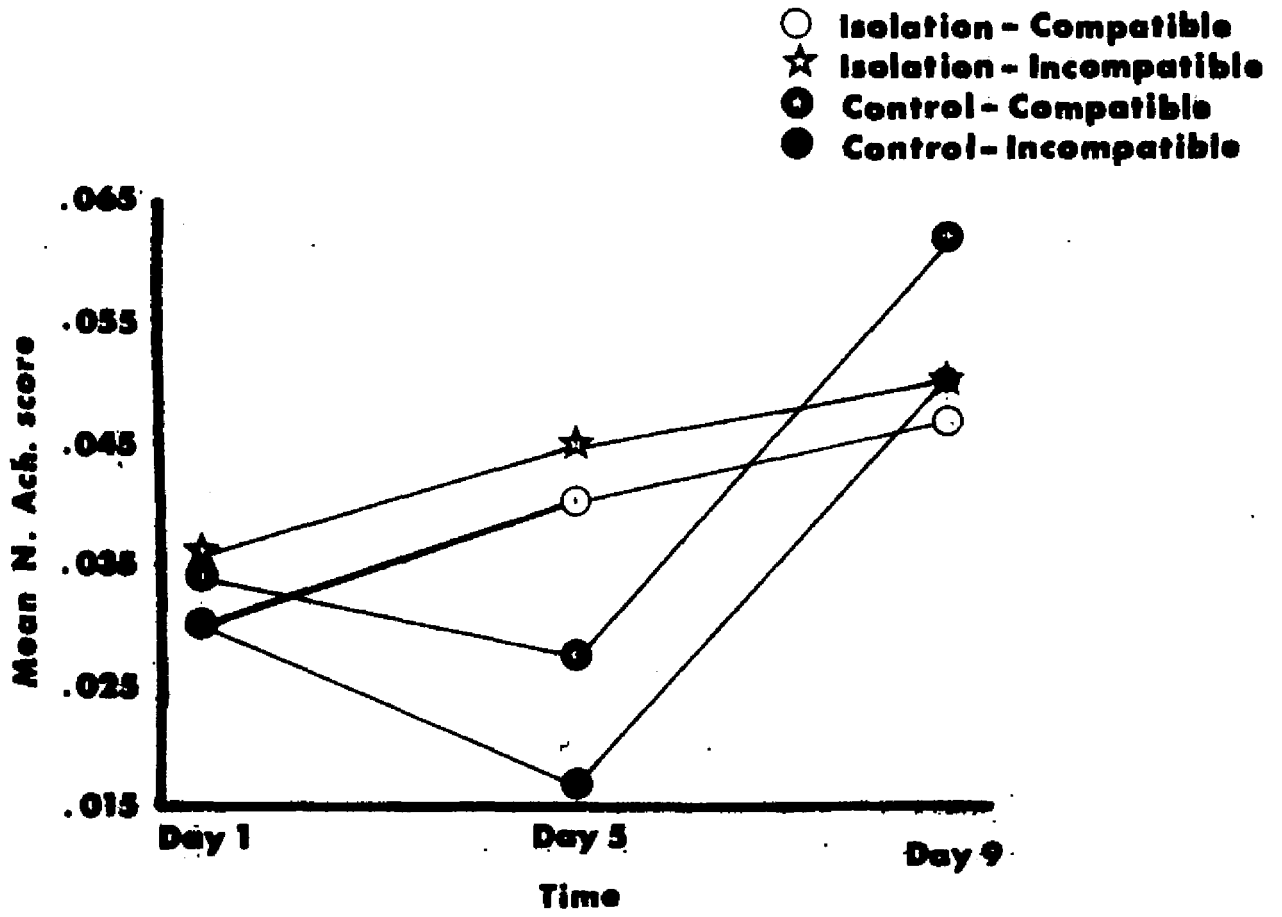


TABLE 21

## Need Achievement Factor? Hypotheses Relative to Observed Data

|                 | Predicted   | Observed        |
|-----------------|---|-----------------|
| Condition (A)   | No hypothesis   | Not significant |
| Composition (B) | Incomp. <sup>a</sup> group higher than Comp. <sup>b</sup> group | Not significant |
| Time (C)*       | Higher mean values on days 5 and 9 than on day 1                | As predicted    |
| A X B           | No hypothesis   | Not significant |
| A X C           | I. c group higher values over time than C <sup>d</sup> group    | Not significant |
| B X C           | Incomp. group higher mean values over time than Comp. group     | Not significant |
| A X B X C*      | I -Incomp. group higher mean values than other three groups     | As predicted    |

a Abbreviation for Incompatible

b Abbreviation for Compatible

c Abbreviation for Isolation

d Abbreviation for Control

\*  $p < .05$ , or  $p < .01$

TABLE 22  
 Summary of Analyses of Variance Results by Semantic Differential Factor: p values

|                 | Semantic Differential Factor |          |                    |          |                     |                     |
|-----------------|------------------------------|----------|--------------------|----------|---------------------|---------------------|
|                 | Evaluation                   | Activity | Potency            | Polarity | Need<br>Affiliation | Need<br>Achievement |
| Condition (A)   | .05 r                        | (.10)*   | .05*               | .05*     |                     |                     |
| Composition (B) |                              | .01*     | .05 r              |          | (.10)*              |                     |
| Time (C)        |                              | .05 d    | .05 d              | .05 d    | .01*                | .01 *               |
| A X B           |                              | .05*     | .05 r              |          |                     |                     |
| A X C           |                              | .01*     | .05*               | (.10)    |                     |                     |
| B X C           | .05*                         | .05*     |                    |          | .01*                |                     |
| A X B X C       |                              |          | (.10) <sup>d</sup> |          | .05 <sup>nh</sup>   | .01*                |

r Finding the reverse of the hypothesis  
 \* Finding in the predicted direction  
 d Finding in different direction from that of the hypothesis  
 nh No hypothesis made

Discussion  
FINDINGS DISCUSSED BY TIME, CONDITION AND COMPOSITION VARIABLES

Whether under the sea or in outer space the amount of time people have to spend in a given "restricted" situation makes a critical difference in their perception of it and the adjustments they are willing and/or able to make. While ten days in no way approximates the duration of the future missions this experiment was meant to simulate, it was hoped that it would afford a suggestion of the types of interactions which would occur in lengthier circumstances. At this point without the longer situation for comparison, there is no way of absolutely ascertaining this. However, it is quite safe to say that the ten day period definitely did exceed the "honeymoon" stage in interpersonal relationships. There was an acceleration of certain types of interpersonal exchange (Altman and Haythorn, 1965) in both circumstances, so in some ways the ten days represents a longer time than ten days in an ordinary relationship. For these reasons time in the experimental situation will be the first variable considered in this discussion. A discussion of the condition variable will follow with comments about the data results on the composition variable being largely subsumed within the discussions of the time and condition variables.

Though not all trends were equal in magnitude there is a general pattern on the main time variable which is similar across the activity potency and polarity factors and is also evident in some of the significant findings in the other main and interaction variables. The control group data reflect a kind of common sense withdrawal on day 5. This is especially pronounced in the control-incompatible group, in the above factors even though the factors themselves are not highly correlated. The

other three groups remained relatively level in affect across time in the experimental situation. Except for the evaluation factor, all the conventional Semantic Differential factors, showed a significant time effect. The evaluation factor did not show a main time effect of increasing negative affect as was predicted largely because by day 9 the compatible groups were showing a pronounced decrease in positive affect while the incompatible groups were simultaneously increasing in positive affect. This made for almost no difference in evaluation factor values across time in the experimental situation. However, there was a significant time by composition interaction effect which was largely in the predicted direction of the incompatible groups being more negative than the compatible groups, though as noted above this situation reversed itself on day 9. The reversal on day 9 also cancelled out the predicted main composition effect of the incompatible groups being more negative than the compatible groups on the evaluation factor. It would be most interesting to run a longer study incorporating similar variables to see if the evaluation factor values would level off by days 12 or 15 for example.

The pattern shown by the other three Semantic Differential factors is essentially identical, though not in the hypothesized directions. The control-incompatible group began on day 1 at essentially the same level as the other groups, showed a large increase in negative affect on day 5 and returned to the level of the other groups by day 9. In the activity factor, the predicted substitution phenomena of linearly increased talking about doing things which were physically restricted did not occur over time. While the main time effect was significant for the activity factor it was the lower values on day 5 for the control-incompatible group

not the linear increase from day 1 through day 9 which accounted for the significance. Also the two predicted time interactions for the activity factor were significant, time by condition and time by composition. The isolation group did show higher activity factor values than the control group over time: the isolation group remained quite level in activity values across days 1, 5 and 9 while the control group starting at about the same level, decreased in activity values on day 5 and increased on day 9. The predicted time by composition interaction showed the same pattern with the compatible group being more positive in activity factor values than the incompatible group but not in exactly the linear pattern hypothesized.

The main time hypothesis for the potency factor like that for the activity factor, was also one of linearly increasing values from day 1 through 9; this pattern was not evident, though the time variable showed a significant effect. Again it was the pronounced negative deviation of the control-incompatible group on day 5 which accounted for the significance. Here too, with the potency factor as predicted with the activity factor the condition by time interaction was significant: the isolation group was generally more positive though this too is primarily a result of day 5 values. The hypothesized time by composition interaction for the potency factor was not significant. The  $<.25$  p value which it did reach was a result of directly the opposite data trends from the hypothesis. The incompatible group was less positive on days 5 and 9 than the compatible group. The three-way interaction predicted for the potency factor was significant, but it was not the isolation-incompatible group which was deviant. It was the control-incompatible group which accounted for the variance, and this again was primarily on day 5.

Even though there was a significant polarity factor time effect the hypothesis of a linear increase over time was not substantiated. There still is the day 5 control-incompatible negative deviation from the other groups which accounts for a large part of the variance but in this case the control-compatible group is more similar in configuration to the control-incompatible group. This is responsible for the polarity factor condition by time interaction effect approaching significance in the predicted direction of the isolation group having higher polarity values over time than the control group. In that polarity values are theoretically an index of intensity and that the isolation and control groups are virtually the same on day 9 after being widely divergent, it is interesting to wonder what the pattern would have been in several more days let alone a couple weeks more! The composition by time interaction which was predicted on the polarity factor was not significant. The incompatible group was not higher over time in the experimental situation than the compatible group.

The polarity values of the control group may be reflecting the rather odd situation they occupied on the naval base. The control group really did not have access to an established "normal" environment outside the experimental chambers. Unlike the isolates they could get out of the chambers but in some respects they too were isolates. They were strangers to the base and the area and had expectations of a very temporary stay. The naval base itself is a fair distance from the larger metropolitan area though reasonably adequate bus transportation is available. Whether these circumstances of being isolated in the larger community affected the polarity or other factor values of the control subjects is unknown but should be considered as a feasible possibility. Any replication should certainly



endeavor to eliminate this confounding.

Need affiliation and need achievement factors showed highly particularistic configurations over time. This is very reasonable in that their derivation and purpose is quite different from the conventional Semantic Differential factors. In the case of the need affiliation factor, there was as predicted an approximately linear increase in need affiliation values from day 1 through day 9. The critical time by condition interaction for the need affiliation factor however, did not even approach significance. It was the personality composition configuration which was the determining factor for need affiliation factor values; the time by composition interaction was highly significant. The compatible groups were much more positive in these values than the incompatible groups on days 1 and 5, though on day 9 they were similar. No hypothesis was made relative to a possible three-way interaction for the need affiliation factor. The condition and composition variables as theoretically posited seemed to cancel each other out. However the large positive deviation of the control-compatible group on day 5 and its steep decrease on day 9, as well as a fair divergence and gradual increase of the other groups produced sufficient variance for a significant three-way interaction on the need affiliation factor.

There is a possibility that the need affiliation findings are effected by a disinclination of the incompatible groups to talk about affiliative needs. What may be being measured at least partially is the more conducive circumstances of the compatible group for expression of affiliative thoughts. It is unknown how important this distinction is for the purposes of this experiment. Probably it is safe to assume that for the short duration involved, expressed affiliative feelings within compatible groups is rea-

sonably cathartic and not yet at the potential level of learning "too much" about the other member of the dyad such that it interferes with compatible dyad functioning. However, how possible suppression of felt needs to express affiliative thoughts functions is entirely different and quite likely is disruptive to effective dyad functioning. Day 9 need affiliation values are an index that the relative positions of the two composition groups are reversing. The compatible groups are scoring lower and the incompatible groups are showing a marked increase in need affiliation scores. How these scores would plot given more time in the experimental situation is most important in that need affiliation is posited to be of increasing significance to longer mission durations.

The need achievement factor showed a significant time effect in yet another unique pattern. The values were not higher on day 5 as hypothesized but were definitely higher on day 9 than days 1 and 5. The condition of isolation or control was much more significant in determining need achievement values than composition variables. However, the predicted time by condition interaction for the need achievement factor was not significant. Day 5 was the only day that the isolation groups showed higher need achievement values. By day 9 the control groups were showing a rather dramatic increase in need achievement values, being either equal to or above the isolation groups, while the isolation groups maintained their steady linear increase. This pattern of need achievement scores may be showing the effects of relative community isolation of the control subjects as was mentioned briefly earlier. In that the control subjects were under less immediate strain, they may have felt more inclined to talk about "not getting things done" or "the general purpose and value of the experiment". As was obvious from the lack of the predicted time by composition inter-

action for the achievement factor interpersonal compatibility did not effect need achievement values nearly as much as either time or condition variables. However the significant 3-way interaction does indicate a complex meshing of these factors. The 3-way interaction was as predicted, with the isolation-incompatible group being higher than the other groups over time except for day 9. It would be very interesting to see whether this trend of increasing need achievement values would continue in an experimental mission simulation of longer duration. Another extremely important dimension is how this need achievement factor would pattern with older, more intellectually oriented, more highly educated subjects. It is only speculation at this point, but it should be known whether a discussion about getting ahead to a private first class rating or a special technicians rating has the same need achievement rating as a high level discussion of scientific advancement.

The condition of isolation was of primary significance in this experiment not only as an interaction variable with time but as a main variable. In three of the four conventional factors the condition variable showed a significant effect and in the fourth it approached significance. In the evaluation factor the condition variable was significant but in the reverse direction of the predicted hypothesis: the isolation group was higher rather than lower in evaluation affect than the control group. This main evaluation condition effect is worth emphasis in that it was significant across the very apparent hostile difficulties of most of the isolation-incompatible groups. In this respect, the substitution of day 7 for day 9 data in two of the isolation incompatible groups may have significantly altered the mean scores, however the alternative which the experimenters faced of introducing false zeros into the data by equating

being AWOL from the chamber with not talking seemed considerably more at variance with what the true score would have been. Physical violence in an actual mission situation would probably resolve itself short of fatal injury at least in the first couple instances. In one dyad the subjects were actually fighting when the mission simulation was terminated by the monitor. On the other dyad, one of the subjects broke the door seal, the equivalent of going AWOL, and the other subject followed him out. In the latter instance particularly it seems valid for mission simulation purposes to use day 7 data. Another equally drastic aspect of physical violence under these circumstances is the very real possibility of serious technological consequences. Thrashing around in confining quarters has a high probability of breaking life support equipment. If this was either more apparent or actually occurred without fatality, there probably would be less personal license exercised in the expression of felt hostility. Again the substitution of day 7 data seems feasible.

Another aspect of the opposite from predicted findings on the evaluation factor with regard to the condition variable is that it lends defining evidence to what the evaluation factor is not measuring. It obviously is not serving as a literal barometer to positive or negative affect in a limited hostile, non-hostile dimension. This is evident from the lack of the predicted significant interaction between condition and composition and from the lack of a significant main composition effect. In both instances in the evaluation factor the incompatible group was hypothesized to be more negative but they were not significantly so. This general finding lends import to an idea which is being tried in a future study now in progress; that of trying to create a Semantic Differential scale

of hostility. In the study now in progress, an index of hostility is being derived from ratings similar to those used for the need affiliation and need achievement factors in the Heise dictionary. Validation is of course necessary. If it proves functional, the hostility index may also help to remove the possible confounding between the potency and polarity factors on the intensity dimension.

The activity factor was the one in which the main condition effect only approached significance in the predicted direction. The isolation group was predicted to be more positive in activity values than the control group but this was true only on day 5. On days 1 and 9 the groups were essentially the same. The previously mentioned relative community isolation of the control group may be contributing to the rise of the control groups' activity values though this effect came almost exclusively from the scores of the control-incompatible group. The predicted condition by composition interaction on the activity factor was significant, with the compatible group being more positive in activity values. There also was a significant main composition effect in the activity factor in that the compatible groups as predicted were more positive than the incompatible group.

The potency factor showed the same pattern relative to the condition variable as the activity factor, except the main condition effect was significant in the predicted direction. The isolation group was only a little more positive on day 1: because of the pronounced withdrawal and increasing negative affect of the control-incompatible group, the control group as a whole showed a definite decrease in mean potency values on day 5, they were at approximately the same value again by day 9. The pre-

dicted condition by composition interaction for the potency factor was significant; however it was the reverse of the hypothesis. The compatible and incompatible groups had approximately the same values in the isolation condition, however they were widely divergent in the control conditions, with the incompatible group being much lower in mean potency value. This interaction on the potency factor also derived from the significant main composition effect which was predicted but again was the reverse of the hypothesis. The compatible groups as a whole were much more positive than the incompatible groups on the polarity factor. The unexpected day 5 divergence of the control-incompatible group is a fine example of how a reasonably tight experimental design allows numerous deductions. The isolation-incompatible group was of focal interest, yet in terms of most of the Semantic Differential factors the mean values of this group were not significantly different from the isolation-compatible group. If only these two had been compared there would be no index as to what can only be termed an artificial elevation of affect for the isolation-incompatible group. The Semantic Differential factor values of the control-incompatible group allow one to conclude that given even minimum outside facilities they will withdraw. This posits a more challenging problem though; in that it is the control-incompatible group which in most instances is deviant it is imperative to rerun comparable experiments, with more realistic subject dimensions (eg. older, more professional training, etc.), for much longer time periods. With these present Semantic Differential factors, the isolation-incompatible groups are not by themselves indicating stress, it is the comparable comparison group which is the index. And allowing for numerous less than optimal simulation factors this type of

mission seems to be performing this function of comparison quite well.

Potency and polarity are in some ways difficult to separate because the strength dimension of potency sometimes seems in translation to be synonymous with intensity represented by polarity even though the factors are not correlated. Though the polarity factor showed a pattern similar to those of activity and potency it was not of as great a magnitude. The predicted main condition effect was significant, with the isolation group being higher in mean polarity values than the control group on days 1 and 5 but being equal on day 9. And while here too it was the control-incompatible group which produced the greatest amount of variance on day 5, there was considerably more divergence between the other groups. The hypothesized interaction between condition and composition on the polarity factor was not significant. It was expected that the incompatible group would have higher polarity values than the compatible group. This did not occur. On day 5, which was the only day the two groups showed any appreciable difference, the compatible group had higher polarity values. Also because of the above data patterning the predicted main composition effect was not significant.

The need affiliation factor showed a pattern that was most unlike the other factors. A condition effect was predicted but the hypothesized trend of greater need affiliation values in isolation was completely eliminated by a great increase in need affiliation values for the control-compatible group on day 5. In this case the control-incompatible group remained the most negative in need affiliation scores as it was with the other factors but the control-compatible group showed a unique increase on day 5 and precipitously declined by day 9. The main composition effect on need affiliation approached significance in the predicted

direction of the compatible group being higher in need affiliation scores than the incompatible groups; however in the significant composition by time interaction the compatible group had as predicted higher need affiliation scores only on days 1 and 5 not on day 9. In this case, with the need affiliation factor as well as others, the data patterning seems to indicate approaching changes in the relative positions of the groups. Replication using longer mission simulation time periods is critical. It is conceivable that what is being tapped here is a relatively accurate picture of dyad interaction along these specified Semantic Differential dimensions. It is also conceivable that it is only a prelude to more stable patterns which would emerge with time.

No condition hypothesis was made about the need achievement factor. Being a new Semantic Differential factor like the need affiliation factor, there was too little known about its parameters to try to predict how it would function on this important independent variable. For future experiments it should be noted that there was a slight  $p < .25$  condition effect, with the isolation group being higher on day 5 in mean need achievement values, but being approximately the same on days 1 and 9. A main composition was predicted, the incompatible group was expected to be higher in need achievement values than the compatible group; this was not substantiated. There just was too little pattern separation for any significant main effects except time in the experimental situation.

#### NECESSARY REPLICATION AND FUTURE RESEARCH

In summation, data of this type are exploratory, badly needing expansion and replication. What is obvious in this particular research is a great deal of promise. The potential applications are extremely diverse. Certainly it should be progressively refined to serve both as an initial



personnel screening measure as well as an ongoing monitor of group stability in future extended explorations of either the sea or outer space. It also could be employed as a sensitive means of measuring changes in emotional affect in social/personal situations from intra-group interaction such as psychotherapy, to inter-group interaction such as tapping similarities, differences and trends across cultural, racial, educational, sexual and/or national distinctions. In that it is not restricted to a given language or form of language, it could be applied to written as well as to spoken utterances in various media. Conceivably it could prove to be a very useful tool in pinpointing differences heretofore vaguely perceived before they become too unwieldy for easy resolution.

The Semantic Differential technique has demonstrated a tremendous validity and flexibility in use and application. Hopefully, this research will begin exploration into a whole new area of employing this diverse technique. Using Semantic Differential factor means shows promise of being applicable to numerous psychological problems heretofore considered rather difficult and unwieldy.

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APPENDIX I

Selective review of research related to the Semantic  
Differential technique

The Semantic Differential technique by this point in its history is a well known multifaceted research tool. What follows is a selective review of scientific literature, both related to and using the Semantic Differential technique, as it pertains to a particular research project investigating emotional effect in small isolated groups, hereafter referred to as focal research. The data employed as an index of emotional effect were Semantic Differential values summated over time. The Semantic Differential factor values used were from a 778 separate word dictionary (1,000 different meanings) reported in previous research done by David Heise in 1965. The focal research of this review was conducted at the Naval Medical Research Institute, Bethesda, Maryland, in the time period 1968-1970 by Bill Haythorn and Donna Rosen. October, 1969 is the termination date for this literature review.

In that to the author's knowledge, the focal research application of the Semantic Differential factor analyzed values is unique, there is no literature to review which is literally similar in form. However, there is a foundation to be laid for this particular use of the Semantic Differential values. With this in mind the primary intent of this review is to give the reader a "feel" for the Semantic Differential technique and the Semantic Differential factor analyzed values which were employed in the focal research.

The overall plan of the review will be to proceed from the broad issues to the specific ones. If, in some instances, the review seems far afield this derives from the author's intent to impart to the reader a

sense of the diverse and well established ways of employing the Semantic Differential technique. With this broad spectrum as background the unique application in the focal research will be more comprehensible. Following a brief introduction and description of the Semantic Differential technique, the review will cover the two broad research areas which have exerted a major influence on both the original development of the Semantic Differential technique and its subsequent validation and diverse applications. The first of these broad influences on the Semantic Differential is the emergence of the general field of psycholinguistics. The second major influence is the extensive research done on the mediation model of verbal learning. Essentially a Hullian concept, this research model represents a modification of the strict S-R behavioristic approach to language phenomena in that it posits an internal mediating structure within the S-R model.

After discussion of these two broad influences the review will move on to consideration of specific areas of research done with the Semantic Differential technique; research to delineate exactly what the Semantic Differential technique is tapping in terms of language phenomena; developmental work with the Semantic Differential technique exploring the area of meaning acquisition; various non-clinical and clinical applications of the Semantic Differential technique; and, some of the statistical work and computer simulation related to the Semantic Differential technique. In all of the above, the discussion will concern representative work and is in no instance to be taken as an exhaustive review of any of the areas. There is a very good text published recently which does a fine job of reviewing all aspects of Semantic Differential research. The title is

Semantic Differential Technique: a sourcebook (Snider and Osgood, 1969).

The focus of this text is very broad and comprehensive, including large categories such as Semantic Differential research in personality, social, esthetics and cross-cultural work, as well as background, methodology and validity. While the focus is much different from that of this review and there is little overlap in terms of the literature mentioned it must be noted as an excellent reference for anyone interested in the Semantic Differential technique. The reference section of the above Snider and Osgood text is also published separately (Bobren, Hill, Snider and Osgood 1968).



## General Description and Discussion of the Semantic Differential Technique

The Semantic Differential as most people encounter it is comprised of a set of scales using bipolar adjectives; for example good - - - - - bad, strong- - - - -weak, large- - - - -small, fast- - - - -slow. The adjectives used theoretically represent significant psychological dimensions. The purpose of the technique is to tap connotative not denotative word meanings. The words or concepts to be rated relative to these particular adjectives can be anything representable in two or three dimensional space. Usually they are single words. The subject is generally instructed to rate the specific word on a given set of bipolar adjectival scales, such as where does the word "Mother" lie with respect to the dimension good- - - - -bad? Is it midway incorporating equal connotations of both, or is it closer to the good or the bad aspects of the dimension? Most of the Semantic Differential scales employ seven graduations between the bipolar adjectives. Obviously there is a great deal of subjective judgment in this sort of scaling by any subject but, more than one might anticipate, there is also a great amount of commonality in the judgment across people, especially within a linguistic group or subgroup.

The Semantic Differential is not a fixed instrument, rather it is a general technique that theoretically can be employed in almost any situation where a measure of the connotative dimension of words might be of interest. It is only the operations which are specified and even these are most malleable. As of this time, the Semantic Differential has stimulated a substantial amount of research, 14 years worth dating from the 1957 initial publication date of its definitive introduction to the scien-

tific community in the book The Measurement of Meaning (Osgood, Suci and Tannenbaum, 1957). There does exist a set of what one might term "conventional" scales, however these are just that, conventional. There is no reason they have to be used, for that matter, there is no reason to believe that for a particular given purpose they would be the most effective.

To achieve any historical or scientific perspective, the whole technique that comprises the Semantic Differential must be viewed within a larger context of burgeoning psycholinguistic research. Not only is there an acknowledged requirement to devise practical tools for language analysis, there also is a larger theoretical level which involves attempts to explore such overriding issues as language acquisition, language evolution, sentence production, multilingualism and various others. One aspect that has made the Semantic Differential so widely used in psycholinguistic research is the tremendous flexibility of the instrument, including the ease with which the subsequent Semantic Differential data can be computer analyzed. The Semantic Differential has been employed in everything imaginable, for various ends, from a simplified scale used with young children, to use in a large nationwide survey research in advertising to determine differential desirability of either corporate image or product for specific groups. The Semantic Differential has a very real advantage in multilingual research in that it is easier to construct comparable scales than with other instruments. Even when translated into another language it functions well as a great deal of Semantic Differential research in languages and cultures other than English testifies. Although much has been written on and about the Semantic Differential and its many applications, the incisive 1959 review in "Lan-

guage" by John B. Carroll cannot be surpassed for a clear picture of just what the Semantic Differential technique is and how it is constructed.

### General Field of Psycholinguistics

"Underlying the endless and fascinating idiosyncracies of the world's languages there are uniformities of universal scope. Admidst infinite diversity, all languages are, as it were cut from the same pattern (Miller, 1963, pp. 417-418). This quote from a Conference on Language Universals conveys rather well the tone of much of the psycholinguistic research done in the last ten to fifteen years. In one manner or another, most of the ensuing research has dealt with one of the following three language un~~iversaals~~: 1. phonological universals i.e. all languages are spoken and are sequential patterns of phonemes, 2. grammatical universals, i.e. all languages are analyzable into sequential patterns of morphemes, and 3. semantic universals i.e. all languages encompass expression of basic logical operations and expression of personal dimensions such as "I", "you" and "him".

For purposes of historical clarity this section of the review will be divided into two general time/milieu areas, pre-1957 and post 1957. The year 1957 was chosen as a significant date because it is the copyright year for three of the classics of psycholinguistic literature; Verbal Behavior by Burris F. Skinner, Measurement of Meaning by Charles Osgood, George Suci, and Percy Tannenbaum, and Syntactic Structure by Norm Chomsky. These three publications represent both the cumulation of many developments in the area of psychology and also represent three different perspectives in the newly emerging science of psycholinguistics. Skinner's book stated the strict behavioristic view of language phenomena, Osgood et al's text represented the position of the mediational theory of language analysis and Chomsky's book represented the formal generative linguistic

approach to language phenomena.

In retrospect the period prior to 1957 was a beautiful example of numerous specific and general findings and influences, social, scientific and technological, gradually laying the base for the emergence of a whole new area of science, that of psycholinguistics. Two addresses to the American Psychological Association are singularly indicative of this pre-1957 period.

In 1954 O. Hobart Mowrer chose language phenomena as the topic of his APA address. His extensive, masterly analysis gives a good picture of the professional environs into which the definitive text on the Semantic Differential was introduced three years later. Mowrer's basic, synthesizing premise was that the sentence not the word was the primary unit in communication. Drawing on both behavioristic and mediational theory and research he proposed that "...the sentence is, preeminently a conditioning device; and that its chief effect is to produce new associations, new learning, just as any other paired presentation of stimuli may do" (Mowrer, 1954, p. 665). "...One person, by the use of appropriate words or other signs, can 'arouse' or 'call up' particular meanings in the mind of another person; but he does not transfer or implant them there." (Mowrer, 1954, p. 663). Mowrer concurred with Osgood's early writings that individual words acquired meanings in a rather straightforward conditioning sense. He discusses mediational theory in detail and his analysis of where this theory lies in relation to his conceptions of communication is quite clear and concise.

The second APA address was more theoretical in nature but also was indicative of the pre-1957 milieu. Robert Oppenheimer in 1956 bluntly

told psychologists that they would be making a mistake if they continued to exclusively model psychological concepts and theories over an already outmoded absolutist physics. He argued very convincingly for an appreciation of common sense in psychology and advocated encompassing multiple approaches and models within any given discipline, but especially within psychology. This sort of advice meshed well with the then young mediational theories of meaning. Common sense said "meaning" was a real phenomena, and just enough research had been performed to make the model seem feasible.

Concurrent with the proposals of Mowrer and the advice of Oppenheimer there was a general trend that Carl Rogers described later as a new cognitive-existential, phenomenological current which was opening new realistic avenues, not supplanting behaviorism but expanding psychology.

There is no special virtue attached to the policy of limiting our theories to observable behaviorism. Neither, I would add, is there any inherent virtue in basing our theorizing on phenomenological variables. The fundamental question will be settled by the future....A theory that postulates relationships between inner subjective phenomena not directly measurable may, like theories of non-Euclidian space, prove to be more valuable in advancing our knowledge than theories regarding observable behavior (Rogers, 1964, p. 129).

Rogers from a different perspective also advocated a compromise, mixed model science of psychology, one not zealously committed to any one model or theory.

Given the above scientific milieu, it is quite unstandable that new theories of meaning such as the three 1957 publications mentioned earlier, were eagerly received, researched and debated.

Discussion of the post-1957 period in psycholinguistic research will be generally divided into three areas, formal linguistic analysis, biological analysis, and psychological analysis. Norm Chomsky's book on syntactical structure set forth a formal linguistic analysis of language phenomena which emphasized the "grammatical rules" of language. He assumed that speech was generated through application of grammatical rules which specify...(a) the structure of basic phrases or 'kernels' (phrase-structure grammar), (b) the ways in which these kernels may be transformed to form new structures (transformational rules), and (c) the manner in which the resulting linguistic material is actualized in the spoken word (phonological rules). (Carroll, 1964, p. 119) Chomsky's orientation takes into account a vital fact of language phenomena earlier noted by Nowrer, that the critical unit in understanding and/or communicating is the sentence. As George Miller wrote in discussing the new science of psycholinguistics

.....the fundamental puzzle is not our ability to associate vocal noises with perceptual objects, but rather our combinatorial productivity .....our ability to understand an unlimited diversity of never heard before utterances and to produce an equal variety of utterances similarly intelligible to other members of our speech community.....What we have learned are not particular strings of words, but rules for generating admissible strings of words (Miller, 1964, p. 33).

Other formal linguistic analysis has been done by Katz and Fodor, 1963, and Chomsky and Miller, 1963.

The syntactics/linguistic approach to language phenomena discussed above fits quite well with recent theory and research on the evolutionary

aspects of language phenomena. In 1967 Eric Lenneberg published a fascinating book entitled Biological Foundations of Language. In this he presents a great deal of impressive evidence to support his contention that speech is a specie specific behavior. As Carroll summarized "Lenneberg's initial thesis is that when behavior is as complicated and varied as that associated with language, it is profitable to consider the biological nature of the organism and the potentialities and constraints that are thereby implied for the development of behavior " (Carroll, 1968, p. 117). Carroll continues that it is ".....clear that language development shows all the characteristics of a maturationally-dependent behavior. (Lenneberg postulates) -----a critical period for language development that starts around two years of age, when adequate physical maturity is attained and ends around twelve, when a loss of flexibility for cerebral organization sets in." (Carroll, 1968, p. 118). Lenneberg cites research from various sources anthropological and genetic as well as biological and psychological. A particularly interesting report on language disability concerns evidence for a genetic basis of a language disturbance in a given family. (Brewer, 1963). Lenneberg's hypothesis also extends one of the findings of A.R. Luria's earlier work on the regulatory roll of speech, ".....that the acquisition of speech comprehension and production is intimately linked to the development of voluntary action " (Carroll, 1964, p. 123).

Psychological approaches to the analysis of language reflect different branches of thought within psychology itself. This review will only be concerned with theorists within the general behavioristic tradition. The 1957 publication of Verbal Behavior by B. F. Skinner remains as the



analysis of the strict formal behaviorist tradition. Skinner's emphasis is on the external nature of reinforcing and discriminative stimuli in the area of verbal behavior as it is also in other areas of behavior. This is a most interesting book for a number of reasons, one, it is well written and, two, it extrapolates behavioristic principles of conditioning to human verbal behavior without citing any appreciable amount of research evidence. The analysis is detailed and far reaching and has a great deal of face validity but even now more than ten years later the specific mechanisms Skinner proposes are largely undocumented.

Another psychological approach to the analysis of language is the mediational theory of meaning. Its initial advocates were Osgood and Suci and Tannenbaum in the 1957 publication The Measurement of Meaning. In that the theory and model presented in this text constitute the background for the Semantic Differential technique it will be discussed in detail in the review section on the mediational-model of verbal learning. It suffices to note at this point that in contrast to Skinner's emphasis on the external properties of speech Osgood et al stress the "internalness" of implicit verbal responses. As F. Hartman notes in his selective review of learning theory as it relates to communication, "meaning through response context remains the dominant theory at the present time" (Hartman, 1963, p. 160). Even though these theorists (Skinner and Osgood) seem to treat the same phenomena differently, they are definitely behaviorists and their theories reflect largely difference in emphasis as opposed to reflecting different scientific premises.

Another behavioral scientist, Arthur Staats, has tried to integrate and extend many of the classical and operant behavioristic principles dis-

cussed espoused by Skinner and Osgood. Staats' goal is to produce a functional theory of learning and behavior which would also incorporate complex behavior such as verbal behavior. (Staats and Staats, 1963; Staats, 1964; Staats, 1967; Staats, 1968). He has done a lot of his research on and with the Semantic Differential technique, however his emphasis is more on meaning acquisition and less on meaning per se and instrument validity as is Osgood's emphasis. Staats' research will also be covered in the review section on the mediational model of verbal learning.

In terms of the above theories and theorists a practical aspect of the Semantic Differential technique must be noted: Hartman summarizes it well "the approach (to verbal behavior/communication measurement) of Osgood and his associates is not the only one possible, but so far it is the only one of demonstrated practical usefulness " (Hartman, 1963, p. 178). In that the mediational theory of meaning has been tied to a functionally operable instrument from its inception, its present form reflects the advantages and validity of refinement from real not speculative application in many diverse subject areas.

Because it is such a new science it is difficult to pinpoint when the subject area "psycholinguistics" became a separate entity. As Osgood wrote in 1959 "psycholinguistics is a relatively new discipline developing along the border between linguistics and psychology " (Osgood, 1959, p. 192). However by 1969 it has become a definite, if still ill defined area, and the Semantic Differential technique is acknowledged as one of the accepted instruments of the field. There are three reviews which are noteworthy in a definitional sense for the interested reader; J. Laffal has written a paper on the differences between the psychology of language

and psycholinguistics (Laffal, 1964); S. Ervin-Tripp has coauthored with D. Slobin a review of the whole field which is highly technical and thorough, (Ervin-Tripp & Slobin, 1966); S. Ervin-Tripp has also authored a review of sociolinguistics which is an even newer area than psycholinguistics but logically consistent with it (Ervin-Tripp, 1970). In a number of ways this review helps define what psycholinguistics is not. For a newcomer to the area or to anyone who is interested in exactly where the Semantic Differential technique fits within the entire field the Ervin-Tripp & Slobin review is recommended.

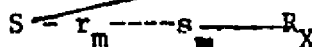
### Section on Review on Mediational Model

Almost all of the research on mediation theory and models, which is the scientific foundation of the Semantic Differential technique, was done within the above context of a newly emerging science of psycholinguistics and a trend away from a strict S-R behavioristic model of language phenomena. This section of the review will first consider the classic  $r_m$  mediational model as Osgood first extended it from its Hullian origins, including diagrams of the model, and the similarities and differences of this model to the strict behavioristic one. Following this, the next topic of consideration is the classic research in the area done by A. W. Staats and his associates. Staats' emphasis is more concerned with a learning conception of meaning and its behavioral ramifications than Osgood's but his research has done much to establish the validity of the Semantic Differential technique. Finally the review will mention some of the other interesting research done in the areas of the acquisition of meaning, the various conditions and variables which affect this, a report of verbal mediation at the level of problem solving and some related research on language phenomena in particular subgroups.

Osgood's own description of the mediational model of meaning is such that this author sees no reason to try to summarize:

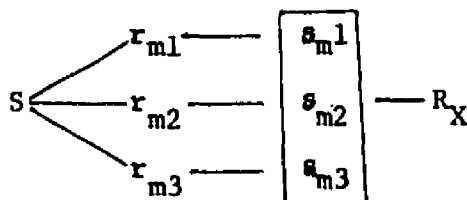
The two stage mediation model had its origin in Hull's notion of the 'pure stimulus act': an act whose function is to produce distinctive self stimulation rather than to be instrumental in itself.....Hull noted that such a mechanism could serve as the basis for symbolic process..... Along with many others I have proposed the mediation model as the characteristic, rather than the exceptional case in behavior, and I have tried

to use it as the basis for a psychological theory of meaning (Osgood, 1963a, p. 739). Osgood's diagrammatic representation and explanation of the two stage mediation model was as follows, S-----R<sub>T</sub>



Whenever some originally neutral stimulus (sign to be), S, is repeatedly contiguous with another stimulus (significate),  $\bar{S}$ , which regularly and reliably elicits a particular pattern of total behavior, R<sub>T</sub>, the neutral stimulus will become associated with some portion, r<sub>m</sub>, of this total behavior as a representational mediation process...All the conceptual machinery of single-stage S-R theory generalization, inhibition, and the like is assumed to apply to each of the stages of the mediation model (Osgood, 1963, p. 740).

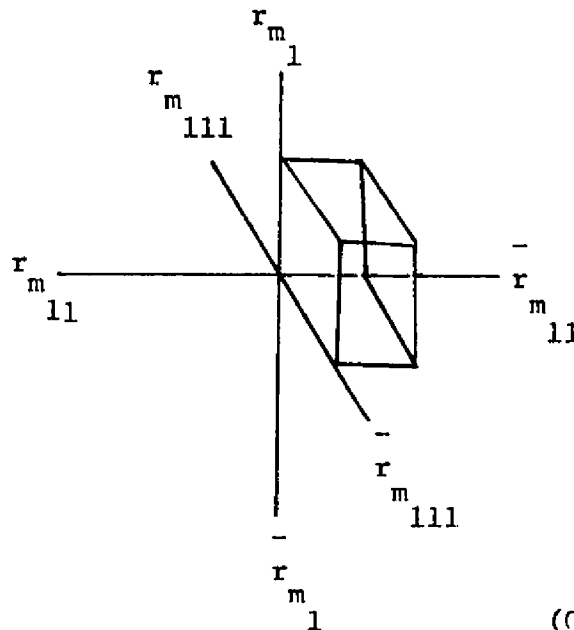
In an extension of this early work Osgood and associates went further to propose a three-stage mediation model which answered many criticisms as to the over simplicity of the two-stage model for complex symbolic processes. This was an endeavor to make "...the representational mediation process (r<sub>m</sub>)...just as complexly componential as the total behavior from which they derive" (Osgood, 1963, p. 746). This componential aspect applies to affective as well as perceptual and cognitive factors. The following is a two way representational diagram of the differentiation of the affective meaning of a concept:



from Osgood, 1963 a,p. 746

from Osgood, 1963 a,p. 746

A diagram of the differentiation of the affective meaning of a concept into three bipolar components (such as is found in the Semantic Differential) is as follows,



(Osgood, 1963a, p 746)

It is quite easy to see how for purposes of graphic explanation Osgood could draw an analogy between the last diagram of semantic space, premised on mediational theory, and color space; with special attention, to a 'meaningless' gray center, vectors defined by opposites going through 'neutral' center, and meaning defined by position on binary opposites (Osgood, 1963b). The bipolar semantic vectors which are the basis of the Semantic Differential technique are factor analytic products. This review will not attempt to explain the procedure, it will be adequate to note that many individual scores of many concepts on numerous bipolar scales were analyzed and the final product was a largely three dimensional semantic space. This was true over many different groups, concepts and scales. The three primary factor analytic vectors were characterized respectively as evaluation, potency, and activity. Practically, this means that any item or word to be rated by the Semantic

Differential technique receives a score on each of these three factors and can be plotted relative to other items and/or concepts in three dimensional semantic space, just as a given color might be plotted. The EPA (evaluation, potency, activity) semantic factors and their behavioral ramifications will be discussed further in the next review section.

After reading many reports, criticisms etc. regarding the Skinnerian S-R model and Osgood's mediation model the cumulative impression is of a singular difference in emphasis not of a difference in model. Gradually as the initial controversy has waned, this viewpoint also seems to be becoming the published concensus. Osgood in 1958 noted this but it took until 1966 for another author to state the position specifically. In his 1958 review of Skinner's Verbal Behavior Osgood indicated the correspondence:

Skinner gives a highly objective functional account of language... Dependency relations between stimulus variables and verbal responses are formed and strengthened and weakened on the basis of 'differential social reinforcement'.....It must be emphasized however, that there is nothing necessarily incompatible between what Skinner has done here and an explication of representational(symbolic) mediation processes' to the contrary, the two approaches must merge and be integrated in anything that pretends to be a complete conception of human language behavior. And there is no reason that the analysis of mediation processes cannot be as rigorous and behavioristic as what Skinner has done.....(Osgood, 1958, pp 209-212).

Jakobovits in 1966 wrote an excellent discussion of the lack of difference between mediation theory and the 'single-stage' S-R model;

"In short, both Osgood's and Skinner's accounts involve the notion of two independent processes in meaning; classically conditioned representational responses to symbols, and instrumentally conditioned (operant) verbal responses.---What is asserted here is that the Skinnerian concepts of mediated self-stimulation has the same theoretical characteristics as Osgood's representational mediation process." (Jakobovits, 1966, pp. 379-380).

Concurrent with the general growth of psycholinguistics, A. W. Staats and his colleagues have published much significant research which has had relevance for the validation and refinement of the Semantic Differential technique. While Staats' ultimate goal is a comprehensive, theory of functional behavior, much of what he has done directly involves either the mediation model or the Semantic Differential technique specifically. His research will be divided into two sections: the first will discuss theoretical considerations, and how Staats perceives the theoretical structure of the Semantic Differential technique, the second will discuss some of his research of the mediation model and an extension of this into complex verbal response hierarchies.

Because Staats is concerned with functional behavior theory, he has expanded the interpretation of the Semantic Differential EPA (evaluation, potency, activity) vectors to encompass their possible behavioral ramifications. Carroll noted this aspect of the qualities of the respective vectors early in 1959 but did not do a detailed analysis:

The principle Semantic Differential dimensions represent fundamental dimensions in the adjustment of the individual to the objects in his environment.....evaluation.....the individual's tendency to make an approach to the stimulus or to avoid it, activity.....refers to the necessity or



non-necessity of making movements in adjusting to stimuli, and potency.... suggests a measurement of the amount of adjustment that is made or must be made to a stimulus, or perhaps the amount of effort which is put into the response to a stimulus (Carroll, 1959a, pp. 73-74).

For the above reasons Carroll suggested that the Semantic Differential be retermed an "experiential differential" (Carroll, 1959b, p. 11).

Essentially what Staats has done in his interpretation of the Semantic Differential factors is give a detailed analysis of this "experiential" aspect, incorporating both classical and operant/instrumental conditioning principles. He proposes that while ".....affective word meaning is acquired according to the principles of classical conditioning, its function appears to involve the principle of operant or instrumental conditioning" (Staats, 1967, p. 125). ".....A stimulus which had become a CS (conditioned stimulus) and would elicit some (conditioned stimulus) would.....also have acquired an operant reinforcing function" (Staats, 1964c, p. 206). Staats proposes calling this  $CS^F$  and an UCS (unconditioned stimulus) which has potential reinforcing properties  $UCS^F$ . The "...central point to remember is that as a stimulus becomes a CS (conditioned stimulus) it also becomes a conditioned reinforcer, when the UCS (unconditioned stimulus is a reinforcer" (Staats, 1967, p. 133).

In general it is hypothesized that semantic rating scales of evaluative meaning (such as used by Osgood and Suci, 1955) actually index the reinforcing properties of words, as well as the conditioned stimulus value of the words.....It also suggests that semantic differential rating scales can be used to measure the reinforcement value of stimuli: that is, the extent to which stimuli will strengthen and maintain human behavior (Staats, 1967, p.134).

An example of research done to test this interpretation is by Finley and Staats, 1967. Words having variable Semantic Differential evaluative score values were employed. High positive Semantic Differential evaluative meaning words strengthened a motor response, negative Semantic Differential evaluative meaning words decreased the response and intermediate Semantic Differential evaluative meaning produced an intermediate, neutral reinforcing effect (Finley & Staats, 1967).

In the area of specific findings relative to the mediational theory of meaning, there are several important publications by Staats and his colleagues. A very significant early article appeared in 1957 in the Journal of Experimental Psychology. In this C. K. Staats and A. W. Staats presented the results of three interrelated experiments (Staats & Staats, 1957). His excellent summary in a later publication of these experiments follows:

Three experiments were conducted to test the hypothesis that meaning responses elicited by a word can be conditioned to a contiguously presented neutral stimulus, a nonsense syllable. The study assumed that total word meaning is composed of response components which can be separately conditioned. A nonsense syllable was visually presented 18 times, each time paired with the auditory presentation of a different word. While these words were different, they all had an identical meaning component. (Identical as measured by the particular scale on the Semantic Differential). In Experiment I, one nonsense syllable was paired with positive evaluative meaning and another was paired with negative evaluative meaning; in Experiment II 'active' meaning and 'passive' meaning responses were conditioned; and in Experiment III 'strong' and 'weak' meaning responses

were conditioned. In each experiment there was significant evidence that meaning responses had been conditioned to the nonsense syllables (Staats, 1968, p. 31).

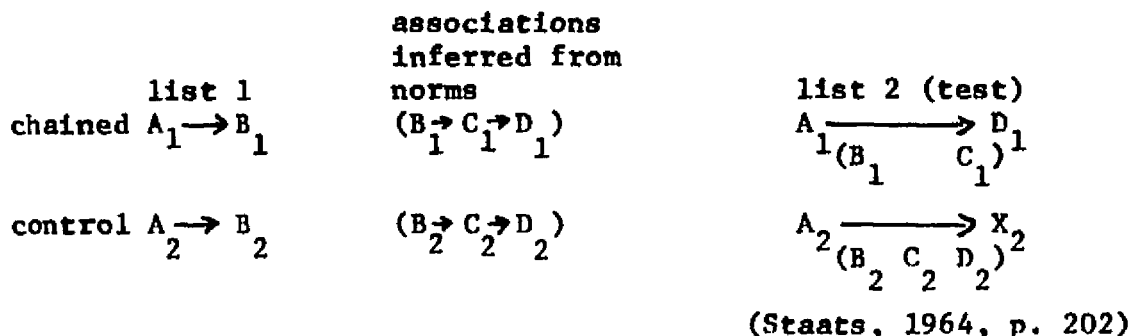
These critical results have been replicated numerous times. (Cohen, 1964; Divesta and Stover, 1962; Das & Nanda, 1963; Paivio, 1964; and Pollio, 1963). While these reports dealt with contiguously presented nonsense syllables in 1958 Staats, Staats and Briggs went further "...words of known meaning were used as CS and this meaning was changed by means of conditioning." (Staats, Staats, & Briggs, 1958, p. 431). The Semantic Differential in this case was used to measure change. Staats and associates continued in 1962 to test the mediation model and included a physiological measure of conditioning. (Staats, A. W., Staats, C. W. and Crawford, 1962). Again Staats summarizes well

.....when subjects had the experience in which a word was systematically paired with aversive environmental stimuli: the word gained a negative evaluative meaning as measured by the two indices.....That is the word came to elicit one of the easily measurable emotional responses elicited by the aversive stimuli, the galvanic skin response, and the subjects later on also rated the word as having an unpleasant affective meaning (Staats, 1968, p. 19).

A replication of this experiment was performed in 1965 by Maltzman, Raskin, Gould, and Johnson.

Another area of research related to the mediation model of meaning, is research on implicit verbal mediation and verbal habit-family hierarchies. An early (1955) example of implicit verbal mediation was per-

formed by Russell and Storms (Russell and Storms, 1955). In part this research tested the following assumption, that the effect of deviation occurred across multiple items. They had their subjects learn a number of chained and controlled pairs and demonstrated facilitation of learning of the chained pairs as contrasted with the learning of the control pairs.



An even earlier report (1952) showed evidence for verbal mediated associations without awareness. The experimental group learned lists as follows:

|                   |      |                   |                   |
|-------------------|------|-------------------|-------------------|
| $A \rightarrow B$ | Test | $A \rightarrow C$ | $A \rightarrow C$ |
| $B \rightarrow C$ |      |                   |                   |

The A → C learning in the experimental group represented a saving over the control paradigm of

|                   |      |                   |
|-------------------|------|-------------------|
| $A \rightarrow B$ | Test | $A \rightarrow D$ |
| $C \rightarrow D$ |      |                   |

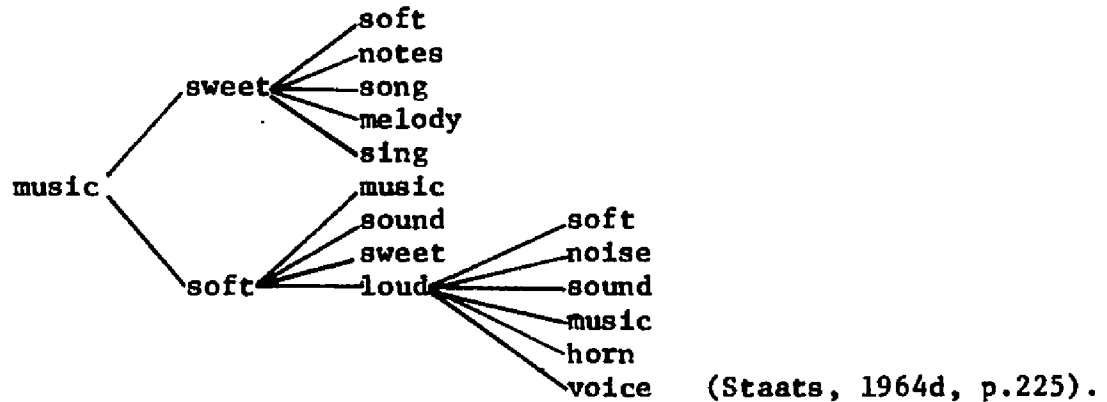
(Bugelski and Scharlock, 1952)

Unfortunately there was no control for response learning.

Mediation of verbal responses was also demonstrated in an experiment involving mediated instrumental problem solving behavior; experimental subjects learned a list of words involving rope-swing-pendulum in a sequence. Control subjects learned the same words without that specific sequence. In the next phase of the experiment the experimental subjects solved a Maier-two-string problem faster than the control subjects (Judson, Cofer, Gelfand, 1956).

Research on implicit verbal mediation forms part of the larger framework of verbal habit-family hierarchies. These hierarchies are seen to be a mechanism which help to realistically describe human concept

in which certain experiences, being prepotent, form the core of the concept and other experiences remain peripheral. The basis for this hierarchical organization lies in the amount of reinforcement accruing to each experience (Feierabend, 1966, p. 925). An example of the verbal habit-family hierarchies which might be formed to the word music follows



"On the basis of verbal habit-families and language conditioning and generalization, learning which is originally derived from experience with a relatively small class of objects, usually having identical elements, may be transferred to many new situations and tasks." (Staats, 1961, p. 198). Within this context it is easy to understand why reading is such a powerful form of human learning. It allows new verbal and motor response acquisitions without either "-----personal instruction or the opportunity of observing someone else " (Staats, 1964b, p. 195).

Another question frequently related to work with the Semantic Differential technique is "what is the effect of pleasant/unpleasant or congruent/non-congruent contexts or ratings on learning of word lists?" Markel, Hunt and Crapsi used Semantic Differential ratings of nonsense syllables to test whether connotative similarity facilitated learning".....results indicate that learning a nonsense syllable adjective paired-associate list is facilitated when the adjectives manifest the connotative mean-

ings of the nonsense syllable and that there is interference with learning when the adjectives manifest the polar opposite connotative meaning" (Markel, Hunt, & Crapsi, 1966, pp. 349-350). Solarz dealing with response latencies found a differential reaction time for "toward" and "away" arm movement to a compatible sign for stimuli rated evaluatively pleasant and unpleasant. The time difference was in the initiation not the execution of the arm movement (Solarz, 1960). In 1965 Pollio and Lore demonstrated that"..... associative reaction times were significantly faster to pleasant words than to unpleasant words and that over lengthy congruent contexts the magnitude of the difference increased" (Pollio and Lore, 1965). It was also found that if the context was unpleasant, word association had greater reaction times regardless if the word itself was pleasant or unpleasant (Pollio and Gerow, 1968).

## Research Related to "What" the Semantic Differential Technique Measures

The review will next consider research which has been done to specifically test some aspect of the "meaning" which the Semantic Differential technique purports to measure. First, some general notes on Semantic Differential factors, then other aspects to be considered will be concept-scale interaction and the Semantic Differential adjectival format, Semantic Differential factors and how they relate to word associations, how Semantic Differential scores are affected by the mode of presentation, some basic questions concerning the bipolarity of semantic space, a brief discussion of the cross cultural/phenomenological aspects of the Semantic Differential, and how motivation states affect Semantic Differential scores and finally how subgroup phenomena within a given linguistic community affect Semantic Differential scoring.

John Carroll's comments on the "experiential differential" warrant referring to again because his is an excellent functional analysis of Semantic Differential factors (Carroll, 1959a). He "-----attempted to coordinate the evaluative dimension with the reward (approach-avoidance) properties of a stimulus, the activity dimension with the arousal and movement properties evoked by a stimulus, and the potency dimension with the amount of effort required in responding to a stimulus" (Pollio & Gerow, 1968, p.122-123). Nunnally provides a more conventional analysis of Semantic Differential meaning, which is especially good in the statistical dimension and in its discussion of the "adjectival" format of the Semantic Differential technique. He writes with respect to this latter aspect:

"In spoken and written language, characteristics of ideas and real

things are communicated largely by adjectives....If it is reasonable to assume that much of 'meaning' can be, and usually is, communicated with adjectives, it is also reasonable to assume that adjectives can be used to measure various facets of meaning....The evaluative factor is prominent because nearly all adjectives imply negative and positive characteristics." (Nunnally, 1967, p. 536-537). Howe has also done some research on determinants of the intensity of evaluative meaning; he concludes concerning adjectives "...the particular determinants involved (magnitude, probability, frequency and delay) constitute inescapable attributes of all human developmental situations rewarding or punishing, from birth on. It will thus not be at all surprising if---quantifiers as a generic class turn out to be a critical agent in the verbal control and attenuation of affective behavior" (Howe, 1966, p. 154-155). In terms of a very general review of all types of literature on experimental research on "meaning" both American and Russian, Marjorie Creelman's book, The experimental investigation of meaning; a review of the literature, is to be recommended (Creelman, 1966).

An excellent review of many diverse methodological aspects of the Semantic Differential technique was written by Heise in 1968.

The fundamental question of concept/scale interaction is critical to any interpretation of Semantic Differential factor scores. On first appraisal it would seem that meaning would vary directly with context. Higham mentions Asch's work with impressions of personality from a list of adjectives as an example of contextual influence; "Calm in the list 'kind, wise, honest, calm, strong' was seen as synonymous with soothing, peaceful, gentle, tolerant and mild mannered. Calm in the list "cruel, shrewd, unscrupulous, calm and strong' was seen as synonymous with cold, frigid and



calculating" (Higham, 1957, p 7). However, in terms of the Semantic Differential, taking into consideration the compositional aspect of the formation of mediational  $r_m$ s, a relatively non-interactive position was adopted by Osgood et al. Ross in testing this hypothesis summarized: Osgood's position as stating ".....a concept provokes a response which is independent of context.----Osgood does admit certain limited context effects, but these are taken to be dennotative superimpositions on the fundamental connotative meaning response, which does not itself change" (Ross, 1965, p. 148). Ross' experiment provided support for this hypothesis. He varied contexts for the same concepts and found no scatter pattern or factor analytic differences. Generally the consensus is that concept scale interaction in the Semantic Differential is much less than would be expected. Presly has published a good, quite detailed investigation into concept-scale interaction generally and its ramifications for subsequent factor analysis (Presly, 1969). There is cross-cultural evidence for a limited type of concept-scale interaction. In 1962 Osgood published material on visual-verbal synesthesia to illustrate common cross-cultural factors. However, later work has found that the perceptual space of directly translatable figures is not exactly the same as linguistic space. Tanaka and Osgood in a 1965 study used 24 perceptual signs on 10 Semantic Differential scales in testing with three groups Americans, Finns and Japanese. In that they found other than "conventional" semantic factors they concluded ".....the structure of meaning space for perceptual signs differs somewhat from the structure of those for linguistic signs (Tanaka and Osgood, 1965, p. 143). This same study also reviewed an earlier study (Tanaka, Oyama, and Osgood, 1963) which presented similar evidence of a change in the

structure of affective semantic space as the very broad concept class under consideration changes; this case from colors to line forms to abstract words.

Wilcox replicated the Heise, 1965, Semantic Differential dictionary which was used in the focal research. Wilcox was specifically interested in whether the individual word defining sentences employed by Heise had produced different results from what the same procedure would have produced without contexts for the words. He found no statistically significant differences and concluded in part "...there are no such things as 'neutral contexts'. Since there may be as many Semantic Differential ratings as there are possible contexts, perhaps a more justifiable approach would be to continue to collect Semantic Differential ratings in the absence of context " (Wilcox, 1966, p. 874). A more complicated but also justifiable approach would be to continue to collect Semantic Differential ratings in a wide variety of contexts and somehow in a later synthesis, weight the different ratings relative to that particular context's frequency.

Some of the work in the area of word association has indirectly provided support for Osgood's hypothesis which ignores contextual meaning effects. Rosenweig and McNeill examined various definitions given for a word against its proportionate use in word associations. They derived a 'predominant meaning' figure for the word's use in 78% of the cases. Also, the greater the proportion of predominant meaning use the greater the probability that this will be the primary response use (Rosenweig and McNeill, 1962).

Nobel's "m" (meaning), which is a measure of word association

and is also derived from Hullian concepts, is correlated +.71 with the size of the Semantic Differential "D" (i.e, degree of Semantic Differential intensity) (Staats, A. W, and Staats, C.K., 1959). Pollio found a high positive correlation between Semantic rating and primary word association, and also found that this was higher for children than for adults (Pollio, 1964). Nunnally and Hodges (1965) argue that the Semantic Differential technique and the word association technique are measuring different but equal dimensions of meaning. The Semantic Differential is termed primarily descriptive and evaluative while word association is seen as largely syntactical, with the responses having the same form. They have proposed an interesting binary choice modification of the word association technique which allows sorting of individual differences in mode of categorization; the format is as follows, orange; \_\_\_\_\_ fruit \_\_\_\_\_ juice (Nunnally, Flaughter and Hodges, 1963).

Another question about the Semantic Differential technique is whether variations in the manner of presentations effect the scores. Livant found that noun and verb forms did not differ on the evaluation scale. However comparatively the verb forms were more active than noun form and the noun forms were more potent. An example of words used which could function as both verbs and nouns were "age", "attack", and "command" (Livant, 1963).

Test-retest reliabilities are of interest in any measuring technique, but especially with a relatively simple straightforward, paper and pencil test such as is the usual format for the Semantic Differential technique. In a test-retest study which involved a four week time lapse, Norman noted "-----experiments aimed at restructuring 'semantic space' are feasible if a large enough number of subjects are employed" (Norman, 1959, p. 584).

He considered correlational statistics inappropriate for this type of research and devised a proportionate number, actual unit discrepancy over maximum unit discrepancy; the potential unit/scale variance depended on the initial unit/scale position i.e. an initial scale score of 1 or 7 can change more units than an initial unit/scale score of 4. Norman found a mean shift of 1.07 between the test-retest trials. In an immediate retest Miron also found that subjects could remember how they had checked words on a 400 concept test. He went on to vary test directions to "proceed carefully" vs "proceed rapidly". He found no differences and concluded "it appears to be extremely difficult to proceed slowly through a 400 item task" (Miron, 1961, p. 891).

Given the above test-retest memory effects, the question arises concerning the feasibility of equivalent forms of Semantic Differential scales. To the date of this review not very much had been done in this area. Aiken published a technique for constructing alternate forms, but it is not known whether it will extend beyond its initial purpose of tapping short term changes in self description (Aiken, 1965). Coyne and Holzman employed a mean loading technique to construct three equivalent forms of the Semantic Differential to measure short attitudinal changes to a single concept. They made no pretense as to the generality of the particular scales used, but they did suggest that the technique could be validly used to construct equivalent scales from any set of factor analysis factor loadings. (Coyne and Holzman, 1966).

Another aspect of Semantic Differential format is scoring procedures. Both Heise and Smith devised machine reading procedures. Heise printed each concept with all scales on a separate IBM card (Heise, 1964). Smith

made complete machine reading possible by overprinting on top of a regular 1000 answer question sheet (IBM form #552) (Smith, 1968).

In an attempt to modify the Semantic Differential format to specifically measure anxiety not connotative meaning, Alexander and Husek constructed and validated a verbal response measure of situational anxiety, termed the "anxiety differential." Concentrating on "bodily harm anxiety" after a gruesome movie (for experimental subjects) they found enough pre and post difference between experimental and control groups to indicate promise for the technique. (Alexander and Husek, 1962).

A relatively simple but potentially important question of the Semantic Differential technique concerns whether the individual scale steps between the two bipolar adjectives should be labeled or whether they should be left blank leaving spatial interpretation of the continuum up to the subjects. Wells and Smith compared these two possible scale formats. Their results indicated that labeling is preferable especially if the data analysis is to be in other than just gross relative terms and if the raters are not particularly adept at abstractions (Wells and Smith, 1960).

Implicit in the mediation model as Osgood et al conceptualized it, was a bipolar semantic space. As was mentioned earlier there is a direct analogy possible between this semantic space and color space (Osgood, 1963b). Other investigators have further explored this area. In 1965 Green and Goldfried published a monograph the results of which seriously questioned the bipolarity of semantic space. They constructed an adjective version of the Semantic Differential. Subjects rated adjectives representative of two polar ends of the three main semantic factors. Analysis of the intercorrelations between the six scales resulted in

large positive correlations among scales and near zero correlations among polar opposites (Green and Goldfried, 1965). However this finding was refuted by Bentler in a 1969 replication and extension of the same experiment. Bentler duplicated Green and Goldfried's experiment, however he partialled out a factor of acquiescence in response style. Once this was done the correlations changed radically and supported an approximately bipolar description of semantic space (Bentler, 1969).

Dealing with the question of the "----independence of semantic space from the measuring instrument used to generate the space" (Anderson, 1968, p. 428), Anderson used a technique developed by Shepard and Kruskal. From similarity judgments between twelve adjectives Anderson generated spatial configurations. He concluded "----the analysis produced no evidence to suggest that the structural characteristics of semantic space result from constraints imposed by the Semantic Differential (technique)" (Anderson, 1968, p. 428).

There is a wealth of cross-cultural research which has been done using the Semantic Differential. Underlying much of this research is the assumption that men share universal developmental experiences and as a consequence across cultures generate a relatively common phenomenological background. If universal Semantic Differential dimensions are found which are not an artifact of translation, it will be a disconfirmation of the strict Whorfian hypothesis of linguistic reality which says that different languages lead to differences in thought. In 1958 Triandis and Osgood made this relatively cautious statement "----the present results imply that certain aspects of human cognition are relatively independent of the structure (language) used to communicate" (Triandis and Osgood,

1958, p. 195). Seven years later Tanaka and Osgood were able to state the results more confidently, "----(we) have been able to show that people in over 10 different language/culture communities use quite similar semantic factors. Again the three most salient factors identifiable are evaluation, potency, and activity, regardless of differences in both language and culture " (Tanaka and Osgood, 1965, p. 143).

Very early in the work with the mediation model and the Semantic Differential technique, Osgood noted the influence of motivational states; i.e., that the presence of a particular motivation in an individual acted theoretically as an internal stimulus to the use of associated language forms (Osgood, 1954). Twelve years later Heise demonstrated this influence on encoding in a research analysis involving the motivational states of Need Achievement (nAch) and Need Affiliation (nAff). He concluded "----the presence of a motivation increases the emission probability of words associated with that motivation" (Heise, 1966a, p. 522).

This encoding influence covers pervasive personality characteristics as well as acute situational states. Ford and Meisels found +.90 correlations between Osgood's evaluative ratings and Edwards social desirability ratings. They used two methods of pairing and not pairing bipolar adjectives, but it made no difference. Concepts of high evaluativeness and high desirability value were found to be "----highly compatible, if not identical" (Ford and Meisels, 1965, p. 471). Their conclusion was that the high positive correlation indicated "----that responses to questionnaires and other personality assessment devices may be assumed to tap the same kind of representational mediation process that is hypothesized---to underlie semantic differential judgments" (Ford and Meisels, 1965, p. 473).

Directly related to the area of motivational states is the question of how influential are various subgroup phenomena? The discussion of this will be divided into general group comments on subgroup phenomena and specific research related to individual or dyad influences. As early as 1943 Foley and Macmillan "----demonstrated differences in type of verbal responses in the 'free association' experiment as a function of differences in type and amount of professional training" (Foley and Macmillan, 1943, p. 309). This sort of straightforward common sense analysis has in the ensuing years become considerably more sophisticated and has usually been tied in one way or another to social class. Bernstein (1962) proposed two types of linguistic codes, restricted and elaborated, and further proposed that these were respectively representative of lower and middle class speech. The restrictive code (lower class) was particularistic with respect to both subject and model; is used within an ingroup and has a distinctly limited range of alternatives. The elaborated code (middle class) was universalistic in model and reference group. He concluded that the linguistic codes were tied to "----qualitatively different verbal planning orientations which control different modes of self-regulation and levels of cognitive behavior (Bernstein, 1962, p. 31).

With a slightly different emphasis, using Semantic Differential scores as indices, Heise has published an excellent analysis of the interconnections between social status, attitudes and word connotations. His analysis begins with a description of his basic unit "a word is a cognitive category which is linked through denotative meaning to a referent category (representing a class or perceptions), and each category typically is bound with affective associations or attitudes. Referent attitudes



are associations derived from experience" (Heise, 1966b, p. 227). Within an acknowledged balance theory context he goes on to explain that, within a given category, words tend to have the same connotations. And if idiosyncratic use is continued there usually is social pressure to modify that use; he gives a fine example using a hypothetical idiosyncratic negative connotation to "mother". The individual uttering the following "she's nothing but a mother" (Heise, 1966b, p. 228) would most likely produce conflict in his listeners!

Heise's hypothesis is that there is a "---differential use of synonyms in subgroups with only minor variation from group to group in the connotations of words" (Heise, 1966b, p. 231). Synonyms will be employed in subcultural conversation, and words used as communications between subgroups will have common similar connotations. In a simple society with little differentiation there will be largely homogeneous word connotations. In a highly differentiated society there will be a pool of similarly connotated words with subcultures employing synonyms with particularistic connotations. This avoids intrapersonal and interpersonal conflicts (dissonance). Heise sees subcultures as corresponding largely to social status position, i.e. "by using synonyms, persons in subgroups can maintain modal word connotations, and at the same time avoid dissonance, by using only those words which are congruent with their personal experience. In everyday circumstances and in interaction within the subgroup a positionally-relevant sublanguage is used; in cross-position interactions another sublanguage is used, one that affords expressions which produce minimum dissonance and punishment during interaction" (Heise, 1966b, p. 230). In the research which was performed to support these conclusions, Heise compared Navy

corpsmen's Semantic Differential ratings with college sophomores'.

"The evidence presented here and in these other studies supports the hypothesis that in this society the attitudinal association or connotation of a word and perhaps of other cultural units as well is generally uniform across groups" (Heise, 1966b, p. 238).

In a personal communication which formed part of the instigation for the focal research of this review, Haythorn noted that "the results of our analyses of verbal behavior indicate that disassociative verbal output and words drawn from a negatively evaluative semantic space are associated with reported subjective stress, and predictive of poor adaptation. It should be possible, therefore, to monitor the verbal behavior of an isolated group and from such verbal behavior be able to predict adaptation difficulties" (Haythorn, 1967).

With respect to individual/dyad phenomena in verbal behavior in subgroups it is worth noting Schultz's discussion on subjects in psychological research in general. His well documented contention is that there is a distinct lack of naivete, good intentions, trustfulness, representativeness, etc., in most subjects that participate in psychological experiments. He subsequently cautions researchers, especially researchers using some kind of verbal report, to be very cautious in data interpretation (Schultz, 1969). This caution applies especially to the investigation of verbal behavior phenomena. The classic example of an unfortunate literal interpretation of verbal report was discovered when Azrin, Holz, Ulrich and Goldiamond (1961) tried to replicate an important experiment in verbal conditioning by Verplank and found that his subjects had fabricated the data to comply with his expectations.

Given the above research considerations, there is some interesting research which has been done on interpersonal influence in dyads or larger groups. Crowne and Strickland found that "---subjects whose need for social approval is high, as compared with subjects less concerned with approval and nonreinforced control subjects, tend to increase the relative frequency of the reinforced response class of plural nouns under positive reinforcement and tend to inhibit plurals when they are followed by punishment" (Crowne and Strickland, 1961, p. 399).

Further evidence for the effect of a particular kind of interpersonal relationship between the subject and the experimenter on verbal conditioning was demonstrated by Sapolsky. His research results

"---support the hypothesis that the positive or negative qualities of the interpersonal relationship between subject and experimenter have related effects upon the subject's performance in a verbal conditioning situation.----These results extend and qualify the findings of Back (1951) that in more highly attracted groups, the members are more receptive to influence" (Sapolsky, 1960, p. 245).

Triandis has used Semantic Differential scales to measure semantic profile similarity between two individuals for a given concept. He found that they are better able to communicate effectively the more similar these semantic profiles are (Triandis, 1960a). He concludes from another report "---the effectiveness of the communication in a dyad is related to the cognitive similarity of its members" (Triandis, 1960b, p. 175).

### Developmental Work with the Semantic Differential

Developmental work with the Semantic Differential has augmented the expanding body of developmental research which has documented the very early emergence of many previously considered adult phenomena. This section will briefly consider some motivational aspects of language acquisition and then discuss some of the Semantic Differential research done with children.

The earlier sections of this review on psycholinguistics mentioned the biological basis of language development. However in conjunction with the basic innate ability to learn to speak there is a factor of motivation to learn. Probably the most widely held view is similar to Mowrer's, "Infantile helplessness very likely gave the human race one of its most powerful pushes toward both language and sociality---" (Mowrer, 1954, p. 678). From a clinical perspective Sarbin notes "--- a person's construction of what is real is guided to a great extent by the words available to him" (Sarbin, 1968, p. 411). He goes on to hypothesize in terms of general Gestalt closure tendencies that part of the "---motivation to invent concepts --- is to resolve uncertainty or ambiguity" (Sarbin, 1968, p. 413). The late Russian psychologist Vygotsky, also advocated this general position, "speech is ---social in its origins. It is learned from others and at first is used entirely for affective and social functions. Only with time does it come to have self-directive properties that eventually result in internalized verbal thought" (Ervin, 1962, p. 407). In Vygotsky's work he theorizes that "---language evolves as a device for mediating the adaptation of the organism, and should be viewed in terms of its functional context"

(Ervin, 1962, p. 406). Vygotsky, contrary to other developmental theorists such as Piaget and Luria considers speech and thought to be separate functions, however in terms of general developmental stages they are similar.

One of the surprising findings of Semantic Differential work with children is how early it can be successfully employed. In a large exploratory study on how to use the Semantic Differential in studying the development of cognitive meaning, DiVesta says, "----the child's conceptualization of his environment appears to be adopted from the adult speech community at a very early age, probably as soon as elementary language facility is learned" (DiVesta, 1966a, p. 222). "The mode of experiencing the environment and the way in which the experiences are encoded, with regard to the development of connotative meaning, appear to be securely fashioned by the time the child is in the second grade" (DiVesta, 1966, p. 257). In summarizing three of his studies he wrote, "The results of the three studies----clearly indicate the generality of the EPA (evaluative, potency, activity) system in children's use of language.---A practical implication of the present study is that the use of the Semantic Differential technique is applicable at the age at which children first learn to read...." (DiVesta, 1966, p. 258).

The second grade seems to be the youngest there is group data reported. In this approximately 7 year age group, Ervin and Foster used a set of pictures of faces; "----(in) over half of the youngest children (2nd gr.) treated good, pretty and happy as interchangeable synonyms. The proportion dropped markedly with age. The more easily identified traits, such as the referents big and clean, were least often confused

with other attributes" (Ervin, 1960, p. 275). Using a three way graphing technique DiVesta found that most concepts were clearly located in either friendly-big-moving or in unfriendly-big-moving (DiVesta, 1966b). Employing pictures, completion, and assignment of "bad" in an interesting variation of the Semantic Differential technique with 1st and 2nd graders Kagan, Hosken, and Watson (1961) found that the male role is perceived to be stronger, darker, bigger, dirtier, more angular and more dangerous than the female. There was a distinct tendency not to assign "bad" loadings to either parent; there was a striking homogeneity in terms of responses within a common culture, and by the 6th year the self-concept was quite similar to the same sex parent concept (Kagan, Hosken, and Watson, 1961).

A novel use of the Semantic Differential to measure connotations of various letters was reported by Knapp and Ehlinger (1968). They found that the extraneous meaning associations to letters which were learned in childhood are retained through high school. There was a declining gradient from friendly A, to unfriendly, Z. In her PhD thesis Ervin, paired objects differing only in one dimension, weight, strength or size. She found that young children tended to confuse bipolar terms, i.e., the heaviest of two objects were also considered to be the strongest and the biggest (Ervin, 1959).

There is some question as to the consistency or possible change in the concepts of young children. In a study covering grades 2, 4, 6, and college, Maltz found that "----the meaning of concepts is less consistent in the youngest children" (Maltz, 1963, p. 674).

Using a "mediational level scale" for discrimination of three genetic stages of cognition, Brandwin disputes the general Semantic

Differential finding that childrens' semantic structure is relatively stable over age. He had children choose from lists of words representing the three levels; (1) sensori-motor-affective, (2) perceptual, and (3) conceptual, as to which was most closely associated with the stimulus word. Relative to Semantic Differential research findings he interpreted his data as "----deriving from the inability of the Semantic Differential to discriminate among different cognitive functions leading to the same scale rating" (Brandwin, 1966, p. 597).

The Semantic Differential technique has also been used with children to test for such dimensions as sex differences and degree of socialization. Using 3rd, 6th, and 9th graders Small did not find much in the way of sex or age differences. Again however there was confirmation of the early formation of the EPA affective system: "The similarity of the factors attained in our children's groups suggests that the cultural use of the polar terms of the dominant semantic dimensions is adequately learned by the third grade level" (Small, 1959, p. 873). McNeil tested 6th graders from four distinct subcultures. Through a discriminant analysis of Semantic Differential ratings he was able to not only separate the subject grouping but also was able to predict the order of the grouping, i.e., the hypothesized degree of socialization (McNeil, 1968).

## Section on Non-clinical and Clinical Uses of the Semantic Differential Technique

The next section will discuss various clinical and non-clinical applications of the Semantic Differential technique. As a rule the Semantic Differential technique has been used as a tool to get at other phenomena of interest. Hartman (1963) discusses a few of the practical reasons why the Semantic Differential has received such wide use.

In addition to reducing qualitative meaning to a limited number of dimensions, the Semantic Differential possesses other virtues. It asks recognition, not recall, of the subject; thus it allows sensitive responses to be made by subjects with limited vocabularies. The operation of the Semantic Differential is efficient and simple.---The Semantic Differential is flexible in its ability to assign meaning to stimuli; economical and efficient to administer, to score, and to interpret; and the only available procedure that provides a rationale for reducing the variety of meaning to a few basic components (Hartman, 1963, p. 181-182).

Nowhere is this "functional/practical" aspect quite so apparent as the eager use of the Semantic Differential technique in marketing and advertising research. Survey agencies and marketing companies recognized the value of this technique early and by now it is part of their standard repertoire of measurement tools. In 1958, "Advertising Age" magazine published an article on how to construct "product semantic indices" (PSI) using Semantic Differential type scales. They used an eleven gradation scale to tap "---over-all brand or corporate image" (Mongul, Lewin, Williams and Saylor, 1958, p. 80). To facilitate comparison between different consumer groups they graphed their data on transparent



overlays. The advantage of the Semantic Differential technique which they listed were (1) it is cheap to employ, (2) it is fast, and (3) it can be used repeatedly (Mongul, Lewin, Williams and Saylor, 1958). Mindak in the "Journal of Marketing" discussed the efficiency of the Semantic Differential technique for marketing/advertising type problems and particularly how specialized Semantic Differential scales allow the researcher to explore multiple factors simultaneously. "---(It) avoids stereotyped responses and allows for individual frames of reference.--- It eliminates some of the problems of question phrasing, such as ambiguity and overlapping of statements" (Mindak, 1961, p. 29).

Reporting to a special session on the Semantic Differential of the American Association of Public Opinion Research (AAPOR) Deutschmann indicated that his research with the Semantic Differential technique had shown a definite media preference by educational level. He also reported that frequently Semantic Differential scales could be substituted for a more complex scale at a lower cost/time involvement (Deutschmann, 1959). In a PhD dissertation Lamone used Semantic Differential scales to study self-image and product-image. From this data he was able to quite accurately predict consumer choices on a wide range of retail items from toothpaste to cars (Lamone, 1968).

Another aspect of the non-clinical application of the Semantic Differential technique has been to access various aspects of communication. Carroll reported in 1960 a most interesting analysis of prose style. By combining in a large factor analysis subjective Semantic Differential scales and objective measures such as various counts of types of words, and numbers of phrases, etc., he found six factors or vectors in prose

style, general stylistic evaluation, personal affect, ornamentation, abstractness, seriousness and characterization (Carroll, 1960).

Few researchers have attempted communication analysis of this scope however, more frequently the Semantic Differential technique has been used in a simpler way. For example, Clare found a difference between the Semantic Differential ratings of the same concept in Filipino subjects when he used Tagalog, the official Filipino language, and English, the Filipino school language. (Clare, 1968). Sines used Semantic Differential ratings to pinpoint those words which have fewer dictionary meanings. He concluded that those "---words which have a small number of dictionary meanings similarly have a lower total deviation score obtained from a Semantic Differential" (Sines, 1962, p. 115). In a rather abstract analysis, Heise used Semantic Differential scales to rate phonemes in English. He found low but significant correlations between these phonemes and respective words containing those phonemes; "words containing certain phonemes were found to have, on the average, characteristic attitudinal meaning" (Heise, 1966c, p.24).

The evaluative dimension of the Semantic Differential technique proved to be quite useful in an attempt to assess the degree of communication between a writer and a reader. Manis had a writer judge his own short written opinion on Semantic Differential scales, then had the reader perform the same judging. The evaluative dimension was very sensitive to similar language usage and resultant degree of communication (Manis, 1959).

In personality and social psychology the Semantic Differential technique has frequently been employed to demonstrate differences between various groupings. Using Rokeach's "open--closed" personality continuum, Wozniak found differences in the range of use of scale

positions plus finding semantic structure differences between extremes (either open or closed) and middle range personalities (Wozniak, 1964). This is support for Osgood's general contention that differences in personality are reflected in differences in connotative meaning. Semantic Differential "D" (difference) scores were used successfully to measure a child's personal/emotional distance from his parents (Shell, O'Mally and Johnsgard, 1964). Morris, Osgood and Ware used Semantic Differential type scales to explore American college student's perception of "ways to live". In their factor analysis they found factors of "successfulness", "sociability", and "stability" (Morris, Osgood and Ware, 1960). In a very interesting report which tested the contention that "---meaning is one of the pivotal variables in human behavior and interaction" (Katz, 1965, p. 72), Katz demonstrated Semantic Differential measured differences on connotative meanings between troubled and untroubled married couples. This difference was not general however, it held only for those concepts which directly related to marriage such as "love", "understanding", and "sex relations" (Katz, 1965).

As would also be expected Semantic Differential scales have been extensively used in laboratory studies to rate various things. In a test of non-prescription stimulants Barclay and Thumin had subjects use Semantic Differential scales to rate the personality dimensions of individuals shown on slides. The experimental subjects taking No-Doz gave significantly more negative responses and their whole profile differed from subjects taking caffeine in either coffee or tea (Barclay and Thumin, 1963). Williams used Semantic Differential scales to demonstrate that connotations of color names are highly related to the connotations of

color-coding in racial concepts and that there were different profiles for same color ratings between Caucasian and Negro subjects (Williams, 1966).

In another study concerning social roles Friedman and Gladden used ten unit Semantic Differential scales to demonstrate a large amount of consensual agreement about role characteristics. By using an "actual" versus "ideal" division they provided support for the role theory distinction of "role" and "position" (Friedman and Gladden, 1964).

School psychology has also utilized Semantic Differential scale ratings as indices of personal and social factors. Haygood used Semantic Differential evaluative and potency scores in a learning task. He found that his subjects learned a list of words more rapidly if the words were within a certain rating range and if his subjects were instructed to categorize on the basis of a given similar concept. He saw this as evidence that the Semantic Differential technique is amenable to study of conceptual behavior and also saw these results as "strong support---that Semantic Differential factors represent real dimensions of meaning to most individuals" (Haygood, 1966, p. 306). By using Semantic Differential ratings of "myself as a student" and "ideal student" Cook reported a 15-20% improvement in the prediction of ACE total scores (Cook, 1959). Also in terms of achievement, Helper and Garfield found that in a situation where two cultures impinge on a single individual, American Indian adolescents, they could differentiate high achievers from low achievers because the high achiever Semantic Differential profiles were displaced toward the white norms (Helper and Garfield, 1965).

There are numerous parallels between clinical and non-clinical

applications of Semantic Differential scales. For this reason as well as the fact that the focal research of this review is not concerned with clinical psychological pathology mention of the Semantic Differential technique in clinical areas will be attenuated. This should not be taken however as any indication that the diverse material in clinical psychology employing the Semantic Differential technique is less interesting than other areas. One of the most famous and fascinating of all reports about Semantic Differential use is from this area, it has to do with the renowned case of multiple personality popularized as 'The Three Faces of Eve'. "---Osgood and Luria predicted, on the basis of the differentials given to the three aspects of this personality that the emergent personality, Jane, was not a genuine personality.--- The original cue was that the semantic structures---were collapsed or oversimplified.---Evidence indicated that when people role play there is a detectable simplification of the semantic structure" (Moss, 1960, p. 51). Gwaltney using Semantic Differential ratings of concepts of identification with the community and the hospital was able to differentiate between acute and chronic patients (Gwaltney, 1959). Allison found significant differences in Semantic Differential ratings between "normal" and "pathological" groups and also within the latter group reported differences with increasing severity of pathology (Allison, 1963). A more detailed review of clinical and personality use of the Semantic Differential is available in Snider and Osgood, 1969.

Statistical Work/Comments and Computer Simulation Related to the Semantic  
Differential Technique

Without a doubt one of the very important factors in the success of the Semantic Differential technique has been its empirical development and the amenability of its data to machine/computer processing and analysis. However, before reviewing specific statistical aspects of the Semantic Differential technique, relevant general experimental design considerations will be discussed. With the increased analytical power afforded by readily available computer facilities, the possibilities arise for inclusion of more dependent variables. Altman, in an excellent discussion of this problem in present day research labels it the "---fallacy of too few dependent variable linkages" (Altman, 1966a, p. 107). For research design in general but especially in small group research he urges the inclusion of more than final output measures but also contributory and intervening measures (Altman, 1966a).

An adjacent problem which again is especially relevant to small group research, is that of classificatory systems. Altman lists three particularly promising systems, content analysis, behavior observation systems and factor analysis (Altman, 1966b). Two of these have been specifically employed to deal with verbal phenomena, content analysis and factor analysis. Stone has published a very interesting and impressive program for computer content analysis called the General Inquirer: a computer approach to content analysis (Stone, 1968). Later he improved the content analysis categories with the addition of disambiguation rules for high frequency English words (Stone, 1969).

While content analysis synthesizes information within a given body of data, factor analysis "---identifies behavioral uniformities in

already unitized events" (Altman, 1966b, p. 4). Because it is a rather complicated technique, a number of researchers have concluded that factor analysis is a panacea for all experimental design and analysis problems. This is not so. Harmon, author of the excellent reference text Modern Factor Analysis quoted Kelley concerning the essential purpose of factor analysis, "There is no search for timeless, spaceless, populationless, truth in factor analysis; rather it represents a simple, straightforward problem of description in several dimensions of a definite group functioning in definite manners, and he who assumes to read more remote verities into the factorial outcome is certainly doomed to disappointment" (Harmon, 1960, p. 5-6).

The empirical development of the Semantic Differential technique fits very well within the above context of greater psychological sophistication both technological and statistical. There have been however some very good suggestions as to possible improvements which might be instituted concerning the technique. Carroll in a 1959 American Psychological Association address had two specific suggestions which unfortunately still have not been acted upon; 1) he suggested a series of 'referent concepts' which should be established to be included in all Semantic Differential factor analyses in order to define the sample space by representing different locations in it; and 2) since the use of a large  $N$  in Semantic Differential research might entail too great a job for any one observer if he has to rate each concept on all scales, 'equivalent' groups of observers should be used to rate different (possibly overlapping) groups of points in sample space, and averaged data from these equivalent groups can be used in constructing the single composite correlation matrix to

be analyzed (Carroll, 1959b).

Caution about small N's was also made by Gulliksen, in addition he noted that there should be some caution about interpretation of low nonsignificant differences when an increase in N would make the results significant. At that time Gulliksen suggested an expansion of the seven unit scale which was integrated early in advertising research but still has not been widely adopted by the academic research community. (Gulliksen, 1958).

The use of various unit scales, etc., has to do directly with some basic metric assumptions of the Semantic Differential technique. Messick did some research to explore these metric rating assumptions which are "1) the property of equal intervals within the scale, 2) the property of equal intervals between scales, and 3) (with regard to factor analysis) the assumption that the zero point falls at the same place on each scale" (Messick, 1957, p. 200). If any of these assumptions are invalid then the subsequent meaning map is distorted. Messick's results generally supported the conclusion that there was little distortion if an investigator assumed the stated metric properties and concluded"---the scaling properties implied by the Semantic Differential procedures have some basis other than mere assumption" (Messick, 1957, p. 205).

Another newer aspect of the psychological methodology which is applicable to the Semantic Differential technique has to do with statistical techniques for the computer, some specifically designed to handle multi-dimensional data. Tucker has published a program for "---a factor-analytic model to deal with observations classifiable in three or more ways.---For example, each of a number of individuals may rate each of a group of objects as to each of a number of attributes" (Tucker, 1963, p. 122). Although



this 3-way matrix analysis was not designed for the Semantic Differential technique, it obviously is most appropriate.

The focal research of this review attempts to take factor analytic Semantic Differential word scores, further computer analyzes these as they occur in free interaction conversation, with a goal of subsequently producing an index to the emotional affect of small group interaction over time. Even fifteen years ago this would have seemed an extremely tenuous analysis. That it appears feasible today is an index to the advances in psychological theory and technology. It seems appropriate to close this review of the Semantic Differential technique with a quote from the exciting book on computer simulation and artificial intelligence, Semantic Information Processing. The editor, Minsky (1968a) is speaking of the effort toward making intelligent machines and the incorporation of useful psychological concepts. In his terminology mentalistic and idealistic refer to all psychological concepts other than strict observable S-R theory and definitely include mediation theory and the "meaning" of the Semantic Differential technique.

Some readers may be disturbed by my deliberate use of psychological terms, such as meaning, not usually employed so freely in describing the behavior of machines. But it is my opinion that these mentalist terms are not all superficial analogies. Indeed, the computer programs described here themselves confirm the validity and fertility of the intellectual revolution that come with the discovery that at least some mentalist descriptions of thought processes can be turned into specifications for the design of machines or, what is the same, the design of programs...

It is ironic that these ideas (advances in cybernetics and artificial intelligence) descend more from the 'idealistic' rather than from the 'mechanistic' lines in metaphysical and psychological thought; For the mechanistic tradition was fatally dominated by the tightly limited stock of kinematic images that were available, and did not lead to models capable of adequate information processing. The idealists were better equipped (and more boldly prepared) to consider more sophisticated abstract structures and interactions, though they had no mechanical floor upon which to set them" (Minsky, 1968b, p. 2).

Given the wide application and continued development of Semantic Differential technology, it is easy to foresee an even greater incorporation of either the Semantic Differential technique or a similar type technique into many areas of future psychological analyses.

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APPENDIX II

Modified Heise dictionary including all  
word forms and their respective Semantic  
Differential factor values.

|            | <u>Evaluation</u><br>-1.75 | <u>Activity</u><br>.31 | <u>Potency</u><br>- .16 | <u>Polarity</u><br>1.78 | <u>N. Aff.</u><br>0.00 | <u>N. Ach.</u><br>0.00 |
|------------|----------------------------|------------------------|-------------------------|-------------------------|------------------------|------------------------|
| , about    |                            |                        |                         |                         |                        |                        |
| above      | .05                        | - .68                  | .05                     | .68                     | 0.00                   | 0.00                   |
| accept     | .79                        | .37                    | - .24                   | .90                     | 0.00                   | 0.00                   |
| accepted   |                            |                        |                         |                         |                        |                        |
| accepts    |                            |                        |                         |                         |                        |                        |
| accepting  |                            |                        |                         |                         |                        |                        |
| across     | - .36                      | - .40                  | .18                     | .57                     | 0.00                   | 0.00                   |
| action     | - .37                      | 1.43                   | .23                     | 1.50                    | 0.00                   | 0.00                   |
| actions    |                            |                        |                         |                         |                        |                        |
| actual     | - .14                      | - .30                  | .13                     | .36                     | 0.00                   | 0.00                   |
| admiral    | .58                        | .72                    | 1.49                    | 1.75                    | 0.00                   | 1.03                   |
| admirals   |                            |                        |                         |                         |                        |                        |
| admit      | - .25                      | - .16                  | .21                     | .36                     | 0.00                   | 0.00                   |
| admits     |                            |                        |                         |                         |                        |                        |
| admitted   |                            |                        |                         |                         |                        |                        |
| admitting  |                            |                        |                         |                         |                        |                        |
| adopt      | .54                        | - .31                  | - .80                   | 1.01                    | 0.00                   | 0.00                   |
| adopts     |                            |                        |                         |                         |                        |                        |
| adopted    |                            |                        |                         |                         |                        |                        |
| adopting   |                            |                        |                         |                         |                        |                        |
| advantage  | .71                        | .62                    | 1.14                    | 1.48                    | 0.00                   | .85                    |
| advantages |                            |                        |                         |                         |                        |                        |
| affect     | - .68                      | - .66                  | - .85                   | 1.27                    | 0.00                   | 0.00                   |
| affects    |                            |                        |                         |                         |                        |                        |
| affected   |                            |                        |                         |                         |                        |                        |
| affecting  |                            |                        |                         |                         |                        |                        |

|           | Evaluation | Activity | Potency | Polarity | N. Aff. | N. Ach. |
|-----------|------------|----------|---------|----------|---------|---------|
| again     | - .15      | - .03    | - .70   | .72      | .26     | 0.00    |
| ago       | - .65      | -1.09    | - .17   | 1.28     | 0.00    | 0.00    |
| agree     | .26        | - .90    | - .28   | .98      | 0.00    | 0.00    |
| agrees    |            |          |         |          |         |         |
| agreed    |            |          |         |          |         |         |
| agreeing  |            |          |         |          |         |         |
| all       | .11        | .93      | - .26   | .97      | 0.00    | 0.00    |
| allow     | .05        | - .70    | - .35   | .78      | 0.00    | 0.00    |
| allows    |            |          |         |          |         |         |
| allowed   |            |          |         |          |         |         |
| allowing  |            |          |         |          |         |         |
| almost    | - .11      | .31      | .21     | .39      | 0.00    | 0.00    |
| alone     | -1.96      | -1.88    | -1.26   | 2.99     | 0.00    | 0.00    |
| along     | - .72      | - .88    | - .12   | 1.14     | 0.00    | 0.00    |
| already   | - .60      | - .26    | - .34   | .74      | 0.00    | 0.00    |
| also      | - .59      | - .65    | - .38   | .96      | 0.00    | 0.00    |
| always    | .11        | .41      | - .93   | 1.02     | 0.00    | 0.00    |
| amount    | .33        | - .82    | .75     | 1.16     | 0.00    | 0.00    |
| another   | - .33      | - .86    | - .38   | 1.00     | 0.00    | 0.00    |
| answer    | .60        | .40      | .48     | .87      | 0.00    | .29     |
| answers   |            |          |         |          |         |         |
| answered  |            |          |         |          |         |         |
| answering |            |          |         |          |         |         |

|             | Evaluation | Activity | Potency | Polarity | N. Aff. | N. Ach. |
|-------------|------------|----------|---------|----------|---------|---------|
| anything    | - .67      | .36      | - .34   | .83      | 0.00    | 0.00    |
| appear      | - .06      | - .23    | .59     | .64      | 0.00    | 0.00    |
| appears     |            |          |         |          |         |         |
| appeared    |            |          |         |          |         |         |
| appearing   |            |          |         |          |         |         |
| appoint     | 1.15       | 1.08     | .58     | 1.68     | 0.00    | 1.01    |
| appoints    |            |          |         |          |         |         |
| appointed   |            |          |         |          |         |         |
| appointing  |            |          |         |          |         |         |
| apprentice  | .50        | - .23    | - .03   | .55      | 0.00    | 0.00    |
| apprentices |            |          |         |          |         |         |
| argue       | -2.85      | 1.32     | - .50   | 3.18     | 0.00    | 0.00    |
| argues      |            |          |         |          |         |         |
| argues      |            |          |         |          |         |         |
| arguing     |            |          |         |          |         |         |
| argument    | -2.47      | 1.38     | .23     | 2.84     | 0.00    | 0.00    |
| arguments   |            |          |         |          |         |         |
| arise       | .63        | .88      | - .44   | 1.17     | 0.00    | 0.00    |
| arose       |            |          |         |          |         |         |
| arisen      |            |          |         |          |         |         |
| arises      |            |          |         |          |         |         |
| arising     |            |          |         |          |         |         |
| arm         | .05        | .92      | .84     | 1.25     | 0.00    | .64     |
| arms        |            |          |         |          |         |         |
| army        | - .60      | .93      | 1.77    | 2.09     | 0.00    | .65     |
| armies      |            |          |         |          |         |         |

|            | Evaluation | Activity | Potency | Polarity | N. Aff. | N. Ach. |
|------------|------------|----------|---------|----------|---------|---------|
| around     | - .93      | .99      | .17     | 1.37     | 0.00    | 0.00    |
| arrive     | .71        | 1.20     | -.83    | 1.62     | .71     | 0.00    |
| arrives    |            |          |         |          |         |         |
| arrived    |            |          |         |          |         |         |
| arriving   |            |          |         |          |         |         |
| article    | .43        | -.37     | -.38    | .68      | 0.00    | 0.00    |
| articles   |            |          |         |          |         |         |
| artist     | .66        | .48      | -1.37   | 1.60     | 1.03    | 0.00    |
| artists    |            |          |         |          |         |         |
| ask        | -.18       | -.14     | .05     | .23      | 0.00    | 0.00    |
| asks       |            |          |         |          |         |         |
| asked      |            |          |         |          |         |         |
| asking     |            |          |         |          |         |         |
| attack     | -2.27      | 2.36     | .94     | 3.41     | 0.00    | 0.00    |
| attacks    |            |          |         |          |         |         |
| attempt    | -.15       | 1.03     | 1.34    | 1.70     | 0.00    | 0.80    |
| attempts   |            |          |         |          |         |         |
| attempted  |            |          |         |          |         |         |
| attempting |            |          |         |          |         |         |
| attention  | -.19       | .17      | 1.09    | 1.12     | 0.00    | 0.00    |
| away       | -1.43      | -.47     | -1.44   | 2.08     | 0.00    | 0.00    |
| baby       | 1.39       | 1.42     | -3.20   | 3.77     | 2.66    | 0.00    |
| babies     |            |          |         |          |         |         |
| back       | .48        | -.34     | -.39    | .71      | 0.00    | 0.00    |



|  | Evaluation | Activity | Potency | Polarity | N. Aff. | N. Ach. |
|--|------------|----------|---------|----------|---------|---------|
| bad  | -3.35      | - .79    | .50     | 3.48     | 0.00    | 0.00    |
| ball<br>balls                                | .43        | 1.40     | 1.06    | 1.81     | 0.00    | 1.26    |
| bank<br>banks                                | 1.24       | - .06    | 1.59    | 2.02     | 0.00    | 0.00    |
| battle<br>battles                            | -2.93      | 1.82     | .53     | 3.49     | 0.00    | 0.00    |
| beautiful                                    | .81        | - .34    | -2.83   | 2.96     | 1.62    | 0.00    |
| beauty                                       | 2.21       | -1.23    | -2.40   | 3.49     | 1.65    | 0.00    |
| become<br>became<br>becoming                 | - .59      | .62      | - .19   | .88      | 0.00    | 0.00    |
| bed<br>beds                                  | 1.37       | -1.40    | - .63   | 2.06     | 0.00    | 0.00    |
| before                                       | - .45      | - .52    | - .02   | .69      | 0.00    | 0.00    |
| begin<br>began<br>begun                      | .25        | 1.26     | - .42   | 1.35     | 0.00    | 0.00    |
| beginning                                    | .70        | - .33    | - .13   | .78      | 0.00    | 0.00    |
| behind                                       | -1.03      | - .71    | - .29   | 1.28     | 0.00    | 0.00    |
| believe<br>believes<br>believed<br>believing | .39        | - .42    | - .79   | .98      | 0.00    | 0.00    |

|           | Evaluation | Activity | Potency | Polarity | N. Aff. | N. Ach. |
|-----------|------------|----------|---------|----------|---------|---------|
| belong    | .22        | - .88    | .03     | .91      | 0.00    | 0.00    |
| belongs   |            |          |         |          |         |         |
| belonged  |            |          |         |          |         |         |
| belonging |            |          |         |          |         |         |
| best      | 1.31       | 1.01     | .71     | 1.80     | 0.00    | 1.07    |
| better    | .54        | - .51    | - .52   | .91      | 0.00    | 0.00    |
| big       | - .94      | .77      | .67     | 1.39     | 0.00    | 0.00    |
| bird      | 1.07       | 2.05     | -2.17   | 3.17     | 1.74    | 0.00    |
| birds     |            |          |         |          |         |         |
| black     | -1.80      | -2.07    | 1.24    | 3.01     | 0.00    | 0.00    |
| blood     | -1.11      | 1.33     | - .49   | 1.80     | 0.00    | 0.00    |
| blow      | -1.09      | 1.21     | 0.00    | 1.63     | 0.00    | 0.00    |
| blew      |            |          |         |          |         |         |
| blown     |            |          |         |          |         |         |
| blowing   |            |          |         |          |         |         |
| blue      | .84        | - .91    | - .37   | 1.29     | 0.00    | 0.00    |
| boat      | 1.08       | .67      | .84     | 1.52     | 0.00    | .84     |
| boats     |            |          |         |          |         |         |
| body      | .83        | .31      | - .08   | .89      | 0.00    | 0.00    |
| bodies    |            |          |         |          |         |         |
| book      | 1.07       | - .56    | .22     | 1.23     | 0.00    | 0.00    |
| books     |            |          |         |          |         |         |
| born      | 1.01       | - .82    | -1.71   | 2.15     | .99     | 0.00    |

|  | Evaluation | Activity | Potency | Polarity | N. Aff. | N. Ach. |
|--|------------|----------|---------|----------|---------|---------|
| both   | - .17      | - .49    | - .15   | .54      | 0.00    | 0.00    |
| box<br>boxes                                   | .07        | -1.38    | .62     | 1.51     | 0.00    | 0.00    |
| boy<br>boys                                    | .72        | 1.16     | - .57   | 1.48     | .52     | 0.00    |
| bread<br>breads                                | 1.14       | -1.75    | - .20   | 2.10     | 0.00    | 0.00    |
| break<br>breaks<br>broke<br>broken<br>breaking | -2.44      | .73      | - .97   | 2.72     | 0.00    | 0.00    |
| bright   | - .11      | .50      | - .08   | .52      | 0.00    | 0.00    |
| bring<br>brings<br>brought<br>bringing         | .50        | - .31    | - .59   | .83      | 0.00    | 0.00    |
| brother<br>brothers                            | 1.41       | 1.13     | - .14   | 1.81     | .51     | .56     |
| build<br>builds<br>built                       | 1.03       | 1.54     | 1.45    | 2.35     | 0.00    | 1.84    |
| building<br>buildings                          | .89        | -1.42    | 2.40    | 2.93     | 0.00    | 0.00    |

|          | Evaluation | Activity | Potency | Polarity | N. Aff. | N. Ach. |
|----------|------------|----------|---------|----------|---------|---------|
| burn     | -2.47      | .74      | -.52    | 2.63     | 0.00    | 0.00    |
| burns    |            |          |         |          |         |         |
| burned   |            |          |         |          |         |         |
| burning  |            |          |         |          |         |         |
| buy      | .69        | .20      | .68     | .99      | 0.00    | 0.00    |
| buys     |            |          |         |          |         |         |
| bought   |            |          |         |          |         |         |
| buying   |            |          |         |          |         |         |
| call     | -.25       | .63      | -.84    | 1.08     | 0.00    | 0.00    |
| calls    |            |          |         |          |         |         |
| called   |            |          |         |          |         |         |
| calling  |            |          |         |          |         |         |
| can      | .40        | .35      | .80     | .96      | 0.00    | 0.00    |
| car      | .24        | .49      | 1.04    | 1.17     | 0.00    | .51     |
| cars     |            |          |         |          |         |         |
| carry    | -.27       | .62      | .10     | .68      | 0.00    | 0.00    |
| carries  |            |          |         |          |         |         |
| carried  |            |          |         |          |         |         |
| carrying |            |          |         |          |         |         |
| catch    | -.80       | .51      | .86     | 1.28     | 0.00    | 0.00    |
| catches  |            |          |         |          |         |         |
| caught   |            |          |         |          |         |         |
| catching |            |          |         |          |         |         |
| cause    | -2.06      | .16      | .58     | 2.15     | 0.00    | 0.00    |
| causes   |            |          |         |          |         |         |
| caused   |            |          |         |          |         |         |
| causing  |            |          |         |          |         |         |

|           | Evaluation | Activity | Potency | Polarity | N. Aff. | N. Ach. |
|-----------|------------|----------|---------|----------|---------|---------|
| center    | - .08      | -1.39    | .03     | 1.39     | 0.00    | 0.00    |
| centers   |            |          |         |          |         |         |
| certain   | - .02      | - .83    | - .33   | .89      | 0.00    | 0.00    |
| certainly | - .28      | .37      | - .28   | .54      | 0.00    | 0.00    |
| chance    | - .02      | .21      | - .49   | .53      | 0.00    | 0.00    |
| chances   |            |          |         |          |         |         |
| change    | .04        | .14      | .59     | .61      | 0.00    | 0.00    |
| changes   |            |          |         |          |         |         |
| chief     | - .62      | 1.31     | 1.21    | 1.89     | 0.00    | .67     |
| chiefs    |            |          |         |          |         |         |
| child     | 1.32       | 1.55     | -2.69   | 3.37     | 2.21    | 0.00    |
| children  |            |          |         |          |         |         |
| choose    | .09        | .68      | - .11   | .70      | 0.00    | 0.00    |
| chose     |            |          |         |          |         |         |
| chosen    |            |          |         |          |         |         |
| chooses   |            |          |         |          |         |         |
| choosing  |            |          |         |          |         |         |
| church    | 2.40       | - .48    | - .77   | 2.56     | 1.05    | 0.00    |
| churches  |            |          |         |          |         |         |
| city      | - .75      | 1.08     | .52     | 1.41     | 0.00    | 0.00    |
| cities    |            |          |         |          |         |         |
| class     | .09        | .06      | .65     | .66      | 0.00    | 0.00    |
| classes   |            |          |         |          |         |         |

|            | Evaluation | Activity | Potency | Polarity | N. Aff. | N. Ach. |
|------------|------------|----------|---------|----------|---------|---------|
| classroom  | .29        | -1.04    | .92     | 1.42     | 0.00    | 0.00    |
| classrooms |            |          |         |          |         |         |
| clear      | .76        | -.23     | .80     | 1.13     | 0.00    | 0.00    |
| close      | -.91       | -.31     | -.54    | 1.10     | 0.00    | 0.00    |
| closed     |            |          |         |          |         |         |
| closing    |            |          |         |          |         |         |
| closes     |            |          |         |          |         |         |
| cloud      | .19        | -.41     | -.68    | .82      | 0.00    | 0.00    |
| clouds     |            |          |         |          |         |         |
| cold       | -2.41      | .05      | 1.39    | 2.78     | 0.00    | 0.00    |
| college    | 1.07       | 1.29     | 1.98    | 2.59     | 0.00    | 1.88    |
| colleges   |            |          |         |          |         |         |
| color      | 1.09       | -.35     | -.36    | 1.20     | 0.00    | 0.00    |
| colors     |            |          |         |          |         |         |
| come       | .10        | -.22     | -.20    | .31      | 0.00    | 0.00    |
| came       |            |          |         |          |         |         |
| coming     |            |          |         |          |         |         |
| comes      |            |          |         |          |         |         |
| committee  | -.35       | .38      | .27     | .58      | 0.00    | 0.00    |
| committees |            |          |         |          |         |         |
| company    | .66        | .83      | .96     | 1.43     | 0.00    | .90     |
| companies  |            |          |         |          |         |         |
| complete   | .29        | -.17     | .10     | .35      | 0.00    | 0.00    |
| completes  |            |          |         |          |         |         |
| completed  |            |          |         |          |         |         |
| completing |            |          |         |          |         |         |

|             | Evaluation | Activity | Potency | Polarity | N. Aff. | N. Ach. |
|-------------|------------|----------|---------|----------|---------|---------|
| concern     | - .79      | 0.00     | - .94   | 1.23     | 0.00    | 0.00    |
| concerns    |            |          |         |          |         |         |
| concerned   |            |          |         |          |         |         |
| condition   | - .79      | - .80    | .51     | 1.23     | 0.00    | 0.00    |
| conditions  | - .16      | - .89    | .68     | 1.13     | 0.00    | 0.00    |
| connection  | - .11      | - .79    | .56     | .97      | 0.00    | 0.00    |
| consider    | .49        | .14      | - .01   | .51      | 0.00    | 0.00    |
| considers   |            |          |         |          |         |         |
| considering |            |          |         |          |         |         |
| considered  |            |          |         |          |         |         |
| contain     | .20        | -1.48    | .54     | 1.59     | 0.00    | 0.00    |
| contains    |            |          |         |          |         |         |
| contained   |            |          |         |          |         |         |
| containing  |            |          |         |          |         |         |
| content     | 1.28       | -1.02    | -1.40   | 2.15     | .84     | 0.00    |
| contented   |            |          |         |          |         |         |
| continue    | - .85      | -1.11    | - .20   | 1.41     | 0.00    | 0.00    |
| continues   |            |          |         |          |         |         |
| continued   |            |          |         |          |         |         |
| continuing  |            |          |         |          |         |         |
| control     | .89        | .75      | 1.69    | 2.05     | 0.00    | 1.25    |
| cost        | -1.00      | - .40    | .62     | 1.24     | 0.00    | 0.00    |
| country     | 1.24       | .72      | - .26   | 1.46     | .38     | .48     |

|           | Evaluation | Activity | Potency | Polarity | N. Aff. | N. Ach. |
|-----------|------------|----------|---------|----------|---------|---------|
| course    | - .47      | .25      | .44     | .69      | 0.00    | 0.00    |
| court     | -1.31      | .85      | .95     | 1.83     | 0.00    | 0.00    |
| courts    |            |          |         |          |         |         |
| cover     | .49        | -.80     | .50     | 1.06     | 0.00    | 0.00    |
| covers    |            |          |         |          |         |         |
| covered   |            |          |         |          |         |         |
| covering  |            |          |         |          |         |         |
| cross     | -.05       | .46      | -.50    | .68      | 0.00    | 0.00    |
| crosses   |            |          |         |          |         |         |
| crossed   |            |          |         |          |         |         |
| crossing  |            |          |         |          |         |         |
| crowd     | -1.80      | 1.16     | -.19    | 2.15     | 0.00    | 0.00    |
| crowds    |            |          |         |          |         |         |
| cry       | -1.30      | .19      | -1.61   | 2.08     | 0.00    | 0.00    |
| cries     |            |          |         |          |         |         |
| cried     |            |          |         |          |         |         |
| crying    |            |          |         |          |         |         |
| custom    | -.05       | .60      | -.61    | .86      | 0.00    | 0.00    |
| customs   |            |          |         |          |         |         |
| cut       | -1.88      | .95      | -.67    | 2.21     | 0.00    | 0.00    |
| cuts      |            |          |         |          |         |         |
| cutting   |            |          |         |          |         |         |
| danger    | -2.75      | 1.49     | .53     | 3.17     | 0.00    | 0.00    |
| dangers   |            |          |         |          |         |         |
| dangerous | -2.43      | 1.86     | 1.04    | 3.23     | 0.00    | 0.00    |



|             | Evaluation | Activity | Potency | Polarity | N. Aff. | N. Ach. |
|-------------|------------|----------|---------|----------|---------|---------|
| daughter    | 1.68       | - .18    | -2.46   | 2.98     | 2.18    | 0.00    |
| daughters   |            |          |         |          |         |         |
| day         | .40        | - .22    | - .11   | .47      | 0.00    | 0.00    |
| days        |            |          |         |          |         |         |
| daydream    | .42        | -1.76    | -1.75   | 2.52     | 0.00    | 0.00    |
| daydreams   |            |          |         |          |         |         |
| daydreamed  |            |          |         |          |         |         |
| daydreaming |            |          |         |          |         |         |
| dead        | -1.77      | -4.17    | - .64   | 4.58     | 0.00    | 0.00    |
| death       | -2.76      | -2.29    | .10     | 3.59     | 0.00    | 0.00    |
| deaths      |            |          |         |          |         |         |
| debt        | -3.08      | - .39    | .01     | 3.11     | 0.00    | 0.00    |
| debts       |            |          |         |          |         |         |
| decide      | .42        | .71      | .52     | 1.01     | 0.00    | .51     |
| decides     |            |          |         |          |         |         |
| decided     |            |          |         |          |         |         |
| deciding    |            |          |         |          |         |         |
| decision    | - .46      | - .16    | .40     | .63      | 0.00    | 0.00    |
| decisions   |            |          |         |          |         |         |
| deep        | -1.30      | -1.37    | 1.38    | 2.34     | 0.00    | 0.00    |
| demand      | - .78      | 1.35     | .77     | 1.74     | 0.00    | 0.27    |
| demands     |            |          |         |          |         |         |
| demandd     |            |          |         |          |         |         |
| demanding   |            |          |         |          |         |         |
| department  | .15        | .25      | .60     | .67      | 0.00    | 0.00    |
| departments |            |          |         |          |         |         |

|              | Evaluation | Activity | Potency | Polarity | N. Aff. | N. Ach. |
|--------------|------------|----------|---------|----------|---------|---------|
| describe     | - .06      | - .59    | -1.35   | 1.47     | 0.00    | 0.00    |
| describes    |            |          |         |          |         |         |
| described    |            |          |         |          |         |         |
| describing   |            |          |         |          |         |         |
| desire       | .54        | 1.06     | -1.62   | 2.01     | 1.11    | 0.00    |
| desires      |            |          |         |          |         |         |
| desired      |            |          |         |          |         |         |
| desiring     |            |          |         |          |         |         |
| destroy      | -1.89      | 1.50     | .07     | 2.41     | 0.00    | 0.00    |
| destroys     |            |          |         |          |         |         |
| destroyed    |            |          |         |          |         |         |
| destroying   |            |          |         |          |         |         |
| develop      | .35        | .64      | 1.44    | 1.61     | 0.00    | .85     |
| develops     |            |          |         |          |         |         |
| developed    |            |          |         |          |         |         |
| developing   |            |          |         |          |         |         |
| die          | -1.54      | -2.54    | - .82   | 3.08     | 0.00    | 0.00    |
| dies         |            |          |         |          |         |         |
| died         |            |          |         |          |         |         |
| dying        |            |          |         |          |         |         |
| difference   | - .10      | - .28    | .34     | .45      | 0.00    | 0.00    |
| differences  |            |          |         |          |         |         |
| different    | - .76      | -1.28    | .49     | 1.57     | 0.00    | 0.00    |
| difficult    | -2.11      | .13      | .88     | 2.29     | 0.00    | 0.00    |
| difficulty   | -1.97      | - .68    | - .28   | 2.10     | 0.00    | 0.00    |
| difficulties |            |          |         |          |         |         |

|             | Evaluation | Activity | Potency | Polarity | N. Aff. | N. Ach. |
|-------------|------------|----------|---------|----------|---------|---------|
| direction   | - .14      | - .66    | .22     | .71      | 0.00    | 0.00    |
| discover    | .53        | 1.03     | .65     | 1.33     | 0.00    | .81     |
| discovers   |            |          |         |          |         |         |
| discovered  |            |          |         |          |         |         |
| discovering |            |          |         |          |         |         |
| discovery   | .90        | 1.47     | .39     | 1.77     | 0.00    | 1.06    |
| discoveries |            |          |         |          |         |         |
| discuss     | .17        | .82      | .15     | .85      | 0.00    | 0.00    |
| discusses   |            |          |         |          |         |         |
| discussed   |            |          |         |          |         |         |
| discussing  |            |          |         |          |         |         |
| disease     | -3.46      | .70      | .15     | 3.53     | 0.00    | 0.00    |
| diseases    |            |          |         |          |         |         |
| distance    | - .42      | - .13    | 1.09    | 1.18     | 0.00    | 0.00    |
| distances   |            |          |         |          |         |         |
| do          | - .72      | .39      | .15     | .83      | 0.00    | 0.00    |
| did         |            |          |         |          |         |         |
| doing       |            |          |         |          |         |         |
| done        |            |          |         |          |         |         |
| does        |            |          |         |          |         |         |
| doctor      | .88        | .73      | - .66   | 1.32     | .67     | 0.00    |
| doctors     |            |          |         |          |         |         |
| dog         | 1.30       | .93      | - .90   | 1.83     | 1.12    | 0.00    |
| dogs        |            |          |         |          |         |         |
| dollar      | .30        | .59      | 1.07    | 1.26     | 0.00    | .63     |
| dollars     |            |          |         |          |         |         |

|          | Evaluation | Activity | Potency | Polarity | N. Aff. | N. Ach. |
|----------|------------|----------|---------|----------|---------|---------|
| door     | -.42       | -1.57    | 1.19    | 2.01     | 0.00    | 0.00    |
| doors    |            |          |         |          |         |         |
| doorway  | .09        | -1.63    | 1.38    | 2.14     | 0.00    | 0.00    |
| doorways |            |          |         |          |         |         |
| doubt    | -1.19      | -.81     | -1.00   | 1.75     | 0.00    | 0.00    |
| doubts   |            |          |         |          |         |         |
| down     | -1.32      | -1.34    | -.12    | 1.88     | 0.00    | 0.00    |
| dream    | .63        | -1.03    | -1.97   | 2.31     | .77     | 0.00    |
| dreams   |            |          |         |          |         |         |
| dreamed  |            |          |         |          |         |         |
| dreaming |            |          |         |          |         |         |
| drive    | .58        | .76      | .14     | .97      | 0.00    | 0.00    |
| drives   |            |          |         |          |         |         |
| drove    |            |          |         |          |         |         |
| driving  |            |          |         |          |         |         |
| duty     | -1.00      | -.28     | 2.03    | 2.28     | 0.00    | 0.00    |
| ear      | .42        | -.58     | -.02    | .72      | 0.00    | 0.00    |
| ears     |            |          |         |          |         |         |
| early    | .27        | -.25     | -.56    | .67      | 0.00    | 0.00    |
| easily   | 1.05       | .13      | -.09    | 1.06     | 0.00    | 0.00    |
| easy     | .58        | -1.09    | -.84    | 1.49     | 0.00    | 0.00    |
| eat      | .63        | .34      | .59     | .93      | 0.00    | 0.00    |
| ate      |            |          |         |          |         |         |
| eaten    |            |          |         |          |         |         |
| eats     |            |          |         |          |         |         |

|           | Evaluation | Activity | Potency | Polarity | N. Aff. | N. Ach. |
|-----------|------------|----------|---------|----------|---------|---------|
| effect    | - .28      | .29      | .42-    | .58      | 0.00    | 0.00    |
| effects   |            |          |         |          |         |         |
| effort    | - .68      | 1.07     | .78     | 1.49     | 0.00    | 0.00    |
| efforts   |            |          |         |          |         |         |
| egg       | 1.12       | -3.13    | - .71   | 3.40     | 0.00    | 0.00    |
| eggs      |            |          |         |          |         |         |
| elect     | .51        | .64      | .44     | .93      | 0.00    | 0.00    |
| elects    |            |          |         |          |         |         |
| elected   |            |          |         |          |         |         |
| electing  |            |          |         |          |         |         |
| election  | - .13      | .24      | 1.09    | 1.12     | 0.00    | 0.00    |
| elections |            |          |         |          |         |         |
| electric  | - .17      | .76      | 1.36    | 1.57     | 0.00    | .65     |
| else      | -1.23      | -1.82    | - .95   | 2.39     | 0.00    | 0.00    |
| empire    | - .54      | 1.03     | 1.07    | 1.58     | 0.00    | 0.00    |
| empires   |            |          |         |          |         |         |
| end       | - .83      | -1.93    | .60     | 2.18     | 0.00    | 0.00    |
| ends      |            |          |         |          |         |         |
| enemy     | -3.33      | .33      | .30     | 3.36     | 0.00    | 0.00    |
| enemies   |            |          |         |          |         |         |
| enjoy     | 1.75       | 1.23     | -1.58   | 2.66     | 1.93    | 0.00    |
| enjoys    |            |          |         |          |         |         |
| enjoyed   |            |          |         |          |         |         |
| enjoying  |            |          |         |          |         |         |

|            | Evaluation | Activity | Potency | Polarity | N. Aff. | N. Ach. |
|------------|------------|----------|---------|----------|---------|---------|
| enlist     | -.92       | .14      | .83     | 1.25     | 0.00    | 0.00    |
| enlists    |            |          |         |          |         |         |
| enlisted   |            |          |         |          |         |         |
| enlisting  |            |          |         |          |         |         |
| enough     | -.12       | -1.42    | -.16    | 1.43     | 0.00    | 0.00    |
| enter      | 1.04       | .92      | -.41    | 1.45     | .56     | 0.00    |
| enters     |            |          |         |          |         |         |
| entered    |            |          |         |          |         |         |
| entering   |            |          |         |          |         |         |
| entire     | -.42       | -.04     | .13     | .44      | 0.00    | 0.00    |
| entirely   | .51        | .23      | .75     | .94      | 0.00    | 0.00    |
| escape     | -.84       | .95      | 1.80    | 2.20     | 0.00    | .51     |
| escapes    |            |          |         |          |         |         |
| escaped    |            |          |         |          |         |         |
| escaping   |            |          |         |          |         |         |
| even       | -.56       | -.98     | -.37    | 1.19     | 0.00    | 0.00    |
| evening    | 1.18       | -1.26    | -1.25   | 2.13     | .55     | 0.00    |
| event      | .11        | .19      | -.49    | .54      | 0.00    | 0.00    |
| events     |            |          |         |          |         |         |
| ever       | -.44       | -1.73    | .16     | 1.79     | 0.00    | 0.00    |
| every      | .27        | -.42     | -.32    | .59      | 0.00    | 0.00    |
| everything | .17        | -.13     | .05     | .22      | 0.00    | 0.00    |
| everywhere | -1.03      | .73      | -.29    | 1.30     | 0.00    | 0.00    |

|              | Evaluation | Activity | Potency | Polarity | N. Aff. | N. Ach. |
|--------------|------------|----------|---------|----------|---------|---------|
| example      | - .33      | - .95    | - .02   | 1.01     | 0.00    | 0.00    |
| examples     |            |          |         |          |         |         |
| excellent    | 1.64       | 1.67     | .48     | 2.39     | 0.00    | 1.41    |
| exist        | .12        | .84      | 1.19    | 1.46     | 0.00    | .79     |
| exists       |            |          |         |          |         |         |
| existed      |            |          |         |          |         |         |
| existing     |            |          |         |          |         |         |
| expect       | - .75      | - .50    | - .25   | .94      | 0.00    | 0.00    |
| expects      |            |          |         |          |         |         |
| expected     |            |          |         |          |         |         |
| expecting    |            |          |         |          |         |         |
| experience   | .56        | .83      | .26     | 1.03     | 0.00    | 0.00    |
| experiences  |            |          |         |          |         |         |
| experienced  |            |          |         |          |         |         |
| experiencing |            |          |         |          |         |         |
| experiment   | 0.00       | 1.38     | .88     | 1.64     | 0.00    | .93     |
| experiments  |            |          |         |          |         |         |
| explain      | .50        | .44      | - .06   | .67      | 0.00    | 0.00    |
| explains     |            |          |         |          |         |         |
| explained    |            |          |         |          |         |         |
| explaining   |            |          |         |          |         |         |
| express      | - .26      | - .09    | - .14   | .31      | 0.00    | 0.00    |
| expresses    |            |          |         |          |         |         |
| expressed    |            |          |         |          |         |         |
| expressing   |            |          |         |          |         |         |
| extent       | - .88      | - .78    | .23     | 1.20     | 0.00    | 0.00    |

|           | Evaluation | Activity | Potency | Polarity | N. Aff. | N. Ach. |
|-----------|------------|----------|---------|----------|---------|---------|
| eye       | .67        | .68      | -.69    | 1.18     | .56     | 0.00    |
| eyes      |            |          |         |          |         |         |
| face      | .23        | -.63     | -1.20   | 1.37     | 0.00    | 0.00    |
| faces     |            |          |         |          |         |         |
| fact      | .11        | .07      | .78     | .79      | 0.00    | 0.00    |
| facts     |            |          |         |          |         |         |
| factory   | -.93       | .44      | .92     | 1.38     | 0.00    | 0.00    |
| factories |            |          |         |          |         |         |
| fail      | -2.45      | -1.66    | -.34    | 2.98     | 0.00    | 0.00    |
| fails     |            |          |         |          |         |         |
| failed    |            |          |         |          |         |         |
| failing   |            |          |         |          |         |         |
| failure   | -2.96      | -1.58    | -.69    | 3.42     | 0.00    | 0.00    |
| failures  |            |          |         |          |         |         |
| fall      | -2.17      | -.04     | -.65    | 2.27     | 0.00    | 0.00    |
| falls     |            |          |         |          |         |         |
| fell      |            |          |         |          |         |         |
| fallen    |            |          |         |          |         |         |
| falling   |            |          |         |          |         |         |
| family    | 1.78       | 1.26     | -2.12   | 3.04     | 2.39    | 0.00    |
| families  |            |          |         |          |         |         |
| famous    | .74        | .65      | .03     | .98      | 0.00    | 0.00    |
| far       | -.34       | -1.13    | .49     | 1.28     | 0.00    | 0.00    |
| farm      | 1.48       | .56      | .01     | 1.58     | 0.00    | 0.00    |
| farms     |            |          |         |          |         |         |



|          | Evaluation | Activity | Potency | Polarity | N. Aff. | N. Ach. |
|----------|------------|----------|---------|----------|---------|---------|
| farmer   | 1.08       | 1.69     | 1.86    | 2.74     | 0.00    | 2.18    |
| farmers  |            |          |         |          |         |         |
| fast     | -.37       | 1.65     | .82     | 1.88     | 0.00    | .83     |
| father   | 1.22       | .64      | .20     | 1.39     | 0.00    | 0.00    |
| fathers  |            |          |         |          |         |         |
| fear     | -2.25      | -.04     | -.99    | 2.46     | 0.00    | 0.00    |
| fears    |            |          |         |          |         |         |
| feared   |            |          |         |          |         |         |
| fearing  |            |          |         |          |         |         |
| fellow   | .53        | -.06     | .96     | 1.10     | 0.00    | 0.00    |
| fellows  |            |          |         |          |         |         |
| few      | -.12       | -.64     | -.11    | .66      | 0.00    | 0.00    |
| field    | .21        | .48      | .73     | .90      | 0.00    | 0.00    |
| fight    | -2.27      | 2.11     | .26     | 3.11     | 0.00    | 0.00    |
| fight    |            |          |         |          |         |         |
| fights   |            |          |         |          |         |         |
| fought   |            |          |         |          |         |         |
| fighting |            |          |         |          |         |         |
| fill     | -.13       | .07      | -.07    | .16      | 0.00    | 0.00    |
| fills    |            |          |         |          |         |         |
| filled   |            |          |         |          |         |         |
| filling  |            |          |         |          |         |         |
| full     |            |          |         |          |         |         |
| finally  | -.45       | -.24     | -.34    | .61      | 0.00    | 0.00    |
| find     | .16        | .13      | -.48    | .52      | 0.00    | 0.00    |
| finds    |            |          |         |          |         |         |
| found    |            |          |         |          |         |         |
| finding  |            |          |         |          |         |         |

|            | Evaluation | Activity | Potency | Polarity | N. Aff. | N. Ach. |
|------------|------------|----------|---------|----------|---------|---------|
| fine       | 2.11       | .73      | -1.53   | 2.71     | 2.03    | 0.00    |
| fire       | -3.53      | 2.66     | .11     | 4.42     | 0.00    | 0.00    |
| fires      |            |          |         |          |         |         |
| first      | .43        | -.42     | .47     | .76      | 0.00    | 0.00    |
| flow       | -.36       | .28      | -.70    | .84      | 0.00    | 0.00    |
| flows      |            |          |         |          |         |         |
| flowed     |            |          |         |          |         |         |
| flowing    |            |          |         |          |         |         |
| flower     | 1.67       | -.30     | -2.20   | 2.78     | 1.95    | 0.00    |
| flowers    |            |          |         |          |         |         |
| follow     | -.07       | .20      | -.55    | .59      | 0.00    | 0.00    |
| follows    |            |          |         |          |         |         |
| followed   |            |          |         |          |         |         |
| following  |            |          |         |          |         |         |
| football   | .66        | 1.75     | 1.41    | 2.34     | 0.00    | 1.81    |
| footballs  |            |          |         |          |         |         |
| force      | -1.35      | 1.24     | 1.43    | 2.32     | 0.00    | 0.00    |
| forces     |            |          |         |          |         |         |
| forced     |            |          |         |          |         |         |
| forcing    |            |          |         |          |         |         |
| foreign    | -1.39      | -.09     | -.38    | 1.44     | 0.00    | 0.00    |
| forget     | -.83       | -1.60    | .05     | 1.80     | 0.00    | 0.00    |
| forgot     |            |          |         |          |         |         |
| forgotten  |            |          |         |          |         |         |
| forgets    |            |          |         |          |         |         |
| forgetting |            |          |         |          |         |         |

|              | Evaluation | Activity | Potency | Polarity | N. Aff. | N. Ach. |
|--------------|------------|----------|---------|----------|---------|---------|
| form         | .26        | -.56     | .09     | .62      | 0.00    | 0.00    |
| forms        |            |          |         |          |         |         |
| former       | -.65       | -1.70    | .09     | 1.82     | 0.00    | 0.00    |
| fraternity   | .77        | 1.58     | .36     | 1.79     | 0.00    | 1.06    |
| fraternities |            |          |         |          |         |         |
| free         | 1.02       | 1.28     | -.04    | 1.64     | 0.00    | .65     |
| freedom      | 1.70       | 1.17     | -.88    | 2.24     | 1.30    | 0.00    |
| freedoms     |            |          |         |          |         |         |
| fresh        | 1.60       | -.38     | -.68    | 1.78     | .77     | 0.00    |
| friend       | 2.06       | .88      | -1.55   | 2.72     | 2.05    | 0.00    |
| friends      |            |          |         |          |         |         |
| friendly     | 1.92       | 1.23     | -1.81   | 2.91     | 2.22    | 0.00    |
| front        | -.63       | -.49     | .18     | .82      | 0.00    | 0.00    |
| future       | -.82       | -.23     | .47     | .97      | 0.00    | 0.00    |
| gain         | 1.03       | .92      | .49     | 1.46     | 0.00    | .59     |
| gains        |            |          |         |          |         |         |
| gained       |            |          |         |          |         |         |
| gaining      |            |          |         |          |         |         |
| game         | .81        | 1.51     | .66     | 1.84     | 0.00    | 1.25    |
| games        |            |          |         |          |         |         |
| garden       | 1.42       | -1.17    | -.69    | 1.96     | 0.00    | 0.00    |
| gardens      |            |          |         |          |         |         |

|           | Evaluation | Activity | Potency | Polarity | N. Aff. | N. Ach. |
|-----------|------------|----------|---------|----------|---------|---------|
| gather    | .74        | .78      | -.12    | 1.08     | 0.00    | 0.00    |
| gathers   |            |          |         |          |         |         |
| gathered  |            |          |         |          |         |         |
| gathering |            |          |         |          |         |         |
| general   | .28        | -.16     | .35     | .48      | 0.00    | 0.00    |
| gentlemen | 1.42       | .92      | .58     | 1.79     | 0.00    | .94     |
| gentlemen |            |          |         |          |         |         |
| get       | -.35       | .22      | .07     | .42      | 0.00    | 0.00    |
| got       |            |          |         |          |         |         |
| fotten    |            |          |         |          |         |         |
| gets      |            |          |         |          |         |         |
| getting   |            |          |         |          |         |         |
| girl      | 1.45       | .59      | -2.99   | 3.38     | 2.60    | 0.00    |
| girls     |            |          |         |          |         |         |
| give      | 1.01       | .86      | -.73    | 1.51     | .76     | 0.00    |
| gives     |            |          |         |          |         |         |
| gave      |            |          |         |          |         |         |
| given     |            |          |         |          |         |         |
| giving    |            |          |         |          |         |         |
| glad      | 1.19       | .29      | -2.39   | 2.68     | 2.00    | 0.00    |
| go        | -.26       | .69      | -.45    | .86      | 0.00    | 0.00    |
| went      |            |          |         |          |         |         |
| gone      |            |          |         |          |         |         |
| goes      |            |          |         |          |         |         |
| going     |            |          |         |          |         |         |
| god       | 2.35       | .73      | -1.60   | 2.94     | 2.19    | 0.00    |
| gods      |            |          |         |          |         |         |

|            | Evaluation | Activity | Potency | Polarity | N. Aff. | N. Ach. |
|------------|------------|----------|---------|----------|---------|---------|
| good       | 1.70       | .08      | - .90   | 1.92     | 1.13    | 0.00    |
| goods      | - .09      | -1.11    | - .29   | 1.15     | 0.00    | 0.00    |
| government | .27        | 1.30     | 1.18    | 1.78     | 0.00    | 1.18    |
| government |            |          |         |          |         |         |
| great      | 1.55       | 2.41     | -1.85   | 3.41     | 1.72    | 0.00    |
| green      | .84        | -1.11    | - .92   | 1.67     | 0.00    | 0.00    |
| grey       | - .12      | -1.60    | .15     | 1.61     | 0.00    | 0.00    |
| gray       |            |          |         |          |         |         |
| ground     | - .05      | - .78    | .73     | 1.07     | 0.00    | 0.00    |
| group      | - .73      | 1.12     | .20     | 1.35     | 0.00    | 0.00    |
| groups     |            |          |         |          |         |         |
| grow       | .23        | 1.19     | .12     | 1.22     | 0.00    | .35     |
| grows      |            |          |         |          |         |         |
| grew       |            |          |         |          |         |         |
| growing    |            |          |         |          |         |         |
| grown      |            |          |         |          |         |         |
| hand       | .51        | .46      | .62     | .92      | 0.00    | 0.00    |
| hands      |            |          |         |          |         |         |
| hang       | - .91      | -1.44    | 1.54    | 2.30     | 0.00    | 0.00    |
| hung       |            |          |         |          |         |         |
| hangs      |            |          |         |          |         |         |
| hanging    |            |          |         |          |         |         |

|           | Evaluation | Activity | Potency | Polarity | N. Aff. | N. Ach. |
|-----------|------------|----------|---------|----------|---------|---------|
| happen    | - .53      | - .23    | - .49   | .76      | 0.00    | 0.00    |
| happens   |            |          |         |          |         |         |
| happened  |            |          |         |          |         |         |
| happening |            |          |         |          |         |         |
| happy     | 1.64       | 1.79     | -2.29   | 3.34     | 2.32    | 0.00    |
| hard      | - .53      | .95      | 1.64    | 1.97     | 0.00    | .92     |
| hardly    | -1.46      | - .68    | .05     | 1.61     | 0.00    | 0.00    |
| hate      | -3.11      | .11      | - .61   | 3.17     | 0.00    | 0.00    |
| hates     |            |          |         |          |         |         |
| hated     |            |          |         |          |         |         |
| hating    |            |          |         |          |         |         |
| have      | - .26      | .10      | .13     | .31      | 0.00    | 0.00    |
| has       |            |          |         |          |         |         |
| had       |            |          |         |          |         |         |
| head      | .13        | .36      | .87     | .95      | 0.00    | 0.00    |
| heads     |            |          |         |          |         |         |
| health    | 1.29       | .70      | .07     | 1.47     | 0.00    | 0.00    |
| hear      | .06        | .25      | - .81   | .85      | 0.00    | 0.00    |
| hears     |            |          |         |          |         |         |
| heard     |            |          |         |          |         |         |
| hearing   |            |          |         |          |         |         |
| heat      | - .52      | - .12    | .17     | .56      | 0.00    | 0.00    |
| heavy     | -1.68      | -1.40    | 1.85    | 2.86     | 0.00    | 0.00    |

|           | Evaluation | Activity | Potency | Polarity | N. Aff. | N. Ach. |
|-----------|------------|----------|---------|----------|---------|---------|
| help      | 1.08       | .24      | -1.48   | 1.85     | 1.32    | 0.00    |
| helps     |            |          |         |          |         |         |
| helped    |            |          |         |          |         |         |
| helping   |            |          |         |          |         |         |
| here      | .25        | -.53     | -.22    | .63      | 0.00    | 0.00    |
| hide      | -1.59      | .22      | -1.19   | 2.00     | 0.00    | 0.00    |
| hides     |            |          |         |          |         |         |
| hid       |            |          |         |          |         |         |
| hidden    |            |          |         |          |         |         |
| hiding    |            |          |         |          |         |         |
| high      | -.68       | .51      | .92     | 1.25     | 0.00    | 0.00    |
| hill      | .29        | -1.19    | 1.35    | 1.82     | 0.00    | 0.00    |
| hills     |            |          |         |          |         |         |
| history   | .27        | .77      | .62     | 1.02     | 0.00    | .52     |
| histories |            |          |         |          |         |         |
| hold      | -.07       | .32      | .33     | .46      | 0.00    | 0.00    |
| holds     |            |          |         |          |         |         |
| holding   |            |          |         |          |         |         |
| held      |            |          |         |          |         |         |
| home      | 2.12       | 1.73     | -2.44   | 3.67     | 2.74    | 0.00    |
| homes     |            |          |         |          |         |         |
| hope      | .90        | .10      | -1.23   | 1.53     | .91     | 0.00    |
| hopes     |            |          |         |          |         |         |
| hoped     |            |          |         |          |         |         |
| hoping    |            |          |         |          |         |         |
| hospital  | .96        | .65      | -.26    | 1.19     | 0.00    | 0.00    |
| hospitals |            |          |         |          |         |         |

|  | Evaluation | Activity | Potency | Polarity | N. Aff. | N. Ach. |
|--|------------|----------|---------|----------|---------|---------|
| hot  | -2.05      | 1.10     | .94     | 2.51     | 0.00    | 0.00    |
| hour<br>hours                                | .04        | .63      | .77     | 1.00     | 0.00    | 0.00    |
| house<br>houses                              | .77        | .33      | .01     | .84      | 0.00    | 0.00    |
| how  | -.57       | -.11     | .34     | .67      | 0.00    | 0.00    |
| human<br>humans                              | -.18       | .56      | -.90    | 1.08     | 0.00    | 0.00    |
| hurt<br>hurts<br>hurting                     | -2.65      | -.03     | -1.88   | 3.25     | 0.00    | 0.00    |
| husband<br>husbands                          | .47        | .14      | .07     | .50      | 0.00    | 0.00    |
| idea<br>ideas                                | .77        | 1.07     | .27     | 1.34     | 0.00    | .68     |
| imagine<br>imagines<br>imagined<br>imagining | -.35       | -.86     | -1.17   | 1.49     | 0.00    | 0.00    |
| importance                                   | .38        | -.53     | .58     | .87      | 0.00    | 0.00    |
| important                                    | .10        | .64      | .23     | .69      | 0.00    | 0.00    |
| impossible                                   | -1.93      | -.56     | 1.06    | 2.27     | 0.00    | 0.00    |



|             | Evaluation | Activity | Potency | Polarity | N. Aff. | N. Ach. |
|-------------|------------|----------|---------|----------|---------|---------|
| include     | - .07      | - .42    | -1.04   | 1.12     | 0.00    | 0.00    |
| includes    |            |          |         |          |         |         |
| included    |            |          |         |          |         |         |
| including   |            |          |         |          |         |         |
| increase    | .35        | .72      | .31     | .86      | 0.00    | .33     |
| increases   |            |          |         |          |         |         |
| increased   |            |          |         |          |         |         |
| increasing  |            |          |         |          |         |         |
| indeed      | .34        | .23      | -1.04   | 1.12     | .52     | 0.00    |
| independent | .23        | .49      | .59     | .80      | 0.00    | 0.00    |
| indicate    | .44        | .71      | - .01   | .84      | 0.00    | 0.00    |
| indicates   |            |          |         |          |         |         |
| indicated   |            |          |         |          |         |         |
| indicating  |            |          |         |          |         |         |
| industry    | .96        | 1.74     | 1.78    | 2.67     | 0.00    | 2.13    |
| industries  |            |          |         |          |         |         |
| influence   | .00        | .78      | .60     | .98      | 0.00    | .49     |
| influences  |            |          |         |          |         |         |
| influenced  |            |          |         |          |         |         |
| influencing |            |          |         |          |         |         |
| information | - .62      | .12      | .86     | 1.07     | 0.00    | 0.00    |
| instructor  | .02        | .61      | .62     | .87      | 0.00    | 0.00    |
| instructors |            |          |         |          |         |         |
| interest    | .52        | .58      | - .54   | .95      | 0.00    | .27     |
| interests   |            |          |         |          |         |         |
| interested  |            |          |         |          |         |         |

|             | Evaluation | Activity | Potency | Polarity | N. Aff. | N. Ach. |
|-------------|------------|----------|---------|----------|---------|---------|
| introduce   | .69        | .90      | -.84    | 1.41     | .70     | 0.00    |
| introduces  |            |          |         |          |         |         |
| introduced  |            |          |         |          |         |         |
| introducing |            |          |         |          |         |         |
| invention   | .33        | .62      | .69     | .98      | 0.00    | 0.00    |
| inventions  |            |          |         |          |         |         |
| inventor    | 1.06       | 1.53     | .42     | 1.91     | 0.00    | 1.17    |
| inventors   |            |          |         |          |         |         |
| invite      | .93        | .32      | -.10    | .99      | 0.00    | 0.00    |
| invites     |            |          |         |          |         |         |
| invited     |            |          |         |          |         |         |
| inviting    |            |          |         |          |         |         |
| iron        | .64        | -2.32    | 4.50    | 5.10     | 0.00    | 0.00    |
| job         | 1.03       | 1.20     | .81     | 1.78     | 0.00    | 1.20    |
| jobs        |            |          |         |          |         |         |
| join        | -.32       | .33      | -1.44   | 1.51     | 0.00    | 0.00    |
| joins       |            |          |         |          |         |         |
| joined      |            |          |         |          |         |         |
| joining     |            |          |         |          |         |         |
| joy         | 1.61       | 1.73     | -2.42   | 3.38     | 2.39    | 0.00    |
| joys        |            |          |         |          |         |         |
| judge       | -.65       | .63      | 1.80    | 2.02     | 0.00    | 0.00    |
| judges      |            |          |         |          |         |         |
| just        | -.47       | -.15     | -.38    | .62      | 0.00    | 0.00    |

|           | Evaluation | Activity | Potency | Polarity | N. Aff. | N. Ach. |
|-----------|------------|----------|---------|----------|---------|---------|
| keep      | -.27       | .70      | -.26    | .79      | 0.00    | 0.00    |
| keeps     |            |          |         |          |         |         |
| kept      |            |          |         |          |         |         |
| keeping   |            |          |         |          |         |         |
| kill      | -3.29      | .98      | -.27    | 3.44     | 0.00    | 0.00    |
| kills     |            |          |         |          |         |         |
| killed    |            |          |         |          |         |         |
| killing   |            |          |         |          |         |         |
| kind      | .59        | -.76     | -.98    | 1.37     | 0.00    | 0.00    |
| kinds     |            |          |         |          |         |         |
| kiss      | 1.85       | 1.90     | -3.52   | 4.41     | 2.99    | 0.00    |
| kisses    |            |          |         |          |         |         |
| kissed    |            |          |         |          |         |         |
| kissing   |            |          |         |          |         |         |
| know      | .18        | -.30     | -.29    | .45      | .35     | 0.00    |
| knows     |            |          |         |          |         |         |
| knew      |            |          |         |          |         |         |
| known     |            |          |         |          |         |         |
| knowledge | 1.50       | .98      | 1.21    | 2.16     | 0.00    | 1.38    |
| lady      | 1.37       | .91      | -2.37   | 2.88     | 2.27    | 0.00    |
| ladies    |            |          |         |          |         |         |
| lake      | .77        | -.26     | -.22    | .84      | 0.00    | 0.00    |
| lakes     |            |          |         |          |         |         |
| land      | .85        | -.77     | 1.39    | 1.80     | 0.00    | 0.00    |
| large     | -.56       | -.04     | .93     | 1.09     | 0.00    | 0.00    |

|          | Evaluation | Activity | Potency | Polarity | N. Aff. | N. Ach. |
|----------|------------|----------|---------|----------|---------|---------|
| last     | -2.08      | - .93    | - .68   | 2.38     | 0.00    | 0.00    |
| late     | -1.35      | -1.15    | - .62   | 1.88     | 0.00    | 0.00    |
| later    | -1.46      | -1.95    | - .19   | 2.44     | 0.00    | 0.00    |
| laugh    | .73        | 1.93     | -1.59   | 2.60     | 1.18    | 0.00    |
| laughs   |            |          |         |          |         |         |
| laughed  |            |          |         |          |         |         |
| laughing |            |          |         |          |         |         |
| law      | .46        | 1.05     | 2.36    | 2.62     | 0.00    | 1.52    |
| laws     |            |          |         |          |         |         |
| lead     | - .45      | .97      | .45     | 1.16     | 0.00    | 0.00    |
| leads    |            |          |         |          |         |         |
| led      |            |          |         |          |         |         |
| leading  |            |          |         |          |         |         |
| leader   | .02        | 1.40     | 1.62    | 2.14     | 0.00    | 1.32    |
| leaders  |            |          |         |          |         |         |
| learn    | .53        | - .12    | .51     | .74      | 0.00    | 0.00    |
| learns   |            |          |         |          |         |         |
| learned  |            |          |         |          |         |         |
| learning |            |          |         |          |         |         |
| leave    | - .69      | - .88    | - .14   | 1.13     | 0.00    | 0.00    |
| leaves   |            |          |         |          |         |         |
| left     |            |          |         |          |         |         |
| leaving  |            |          |         |          |         |         |
| less     | - .94      | -1.70    | - .71   | 2.07     | 0.00    | 0.00    |

|           | Evaluation | Activity | Potency | Polarity | N. Aff. | N. Ach. |
|-----------|------------|----------|---------|----------|---------|---------|
| let       | .37        | - .71    | - .26   | .84      | 0.00    | 0.00    |
| lets      |            |          |         |          |         |         |
| letting   |            |          |         |          |         |         |
| letter    | .54        | -1.04    | - .62   | 1.33     | 0.00    | 0.00    |
| letters   |            |          |         |          |         |         |
| life      | .98        | 1.11     | - .70   | 1.64     | .46     | 0.00    |
| lift      | - .55      | 1.70     | 1.45    | 2.30     | 0.00    | 1.04    |
| lifts     |            |          |         |          |         |         |
| lifted    |            |          |         |          |         |         |
| lifting   |            |          |         |          |         |         |
| like      | .74        | .28      | - .54   | .96      | 0.00    | 0.00    |
| likes     |            |          |         |          |         |         |
| liked     |            |          |         |          |         |         |
| liking    |            |          |         |          |         |         |
| likely    | - .43      | -1.61    | - .72   | 1.82     | 0.00    | 0.00    |
| limit     | - .21      | - .74    | .85     | 1.15     | 0.00    | 0.00    |
| limits    |            |          |         |          |         |         |
| limited   |            |          |         |          |         |         |
| limiting  |            |          |         |          |         |         |
| line      | .22        | - .73    | .17     | .78      | 0.00    | 0.00    |
| lines     |            |          |         |          |         |         |
| listen    | .48        | -2.09    | .03     | 2.14     | 0.00    | 0.00    |
| listens   |            |          |         |          |         |         |
| listened  |            |          |         |          |         |         |
| listening |            |          |         |          |         |         |

|            | Evaluation | Activity | Potency | Polarity | N. Aff. | N. Ach. |
|------------|------------|----------|---------|----------|---------|---------|
| literature | .77        | .83      | -.38    | 1.19     | 0.00    | 0.00    |
| little     | .76        | -.38     | -2.12   | 2.28     | 1.21    | 0.00    |
| live       | 1.22       | .83      | .07     | 1.48     | 0.00    | .34     |
| lives      |            |          |         |          |         |         |
| lived      |            |          |         |          |         |         |
| living     |            |          |         |          |         |         |
| local      | .56        | -.64     | .44     | .96      | 0.00    | 0.00    |
| long       | -.53       | -1.23    | .19     | 1.35     | 0.00    | 0.00    |
| look       | .57        | .08      | -.44    | .72      | 0.00    | 0.00    |
| looks      |            |          |         |          |         |         |
| looked     |            |          |         |          |         |         |
| looking    |            |          |         |          |         |         |
| lose       | -2.39      | -.79     | -1.45   | 2.90     | 0.00    | 0.00    |
| loses      |            |          |         |          |         |         |
| lost       |            |          |         |          |         |         |
| losing     |            |          |         |          |         |         |
| loss       | -1.72      | -1.32    | -.72    | 2.28     | 0.00    | 0.00    |
| love       | 1.76       | 1.10     | -3.33   | 3.92     | 2.76    | 0.00    |
| loves      |            |          |         |          |         |         |
| loved      |            |          |         |          |         |         |
| loving     |            |          |         |          |         |         |
| low        | -.25       | -2.44    | .02     | 2.45     | 0.00    | 0.00    |
| machine    | .26        | 1.02     | 1.67    | 1.97     | 0.00    | 1.20    |
| machines   |            |          |         |          |         |         |

|               | Evaluation | Activity | Potency | Polarity | N. Aff. | N. Ach. |
|---------------|------------|----------|---------|----------|---------|---------|
| machinery     | .07        | .92      | 1.60    | 1.85     | 0.00    | 1.00    |
| main          | .08        | -.34     | .13     | .37      | 0.00    | 0.00    |
| make          | .46        | .61      | .52     | .92      | 0.00    | .39     |
| makes         |            |          |         |          |         |         |
| made          |            |          |         |          |         |         |
| making        |            |          |         |          |         |         |
| man           | .05        | .64      | 1.31    | 1.46     | 0.00    | .66     |
| men           |            |          |         |          |         |         |
| manufacture   | -.07       | .53      | .23     | .58      | 0.00    | 0.00    |
| manufactures  |            |          |         |          |         |         |
| manufactured  |            |          |         |          |         |         |
| manufacturing |            |          |         |          |         |         |
| many          | -.24       | .14      | -.47    | .55      | 0.00    | 0.00    |
| mark          | .03        | -.28     | .07     | .29      | 0.00    | 0.00    |
| marks         |            |          |         |          |         |         |
| marked        |            |          |         |          |         |         |
| marking       |            |          |         |          |         |         |
| market        | -.13       | .75      | .99     | 1.25     | 0.00    | .50     |
| markets       |            |          |         |          |         |         |
| marry         | 1.94       | .68      | -2.34   | 3.12     | 2.62    | 0.00    |
| marries       |            |          |         |          |         |         |
| married       |            |          |         |          |         |         |
| marrying      |            |          |         |          |         |         |
| material      | .59        | -.77     | 1.92    | 2.15     | 0.00    | 0.00    |
| materials     |            |          |         |          |         |         |

|            | Evaluation | Activity | Potency | Polarity | N. Aff. | N. Ach. |
|------------|------------|----------|---------|----------|---------|---------|
| may        | -1.24      | - .87    | - .29   | 1.54     | 0.00    | 0.00    |
| might      |            |          |         |          |         |         |
| mean       | - .58      | - .85    | - .11   | 1.04     | 0.00    | 0.00    |
| means      |            |          |         |          |         |         |
| meant      |            |          |         |          |         |         |
| meaning    |            |          |         |          |         |         |
| meet       | 1.15       | .21      | -1.07   | 1.58     | 1.06    | 0.00    |
| meets      |            |          |         |          |         |         |
| met        |            |          |         |          |         |         |
| meeting    | - .03      | .47      | - .50   | .69      | 0.00    | 0.00    |
| meetings   |            |          |         |          |         |         |
| member     | 1.14       | 1.51     | .22     | 1.90     | 0.00    | 1.02    |
| members    |            |          |         |          |         |         |
| mention    | - .07      | - .47    | - .42   | .63      | 0.00    | 0.00    |
| mentions   |            |          |         |          |         |         |
| mentioned  |            |          |         |          |         |         |
| mentioning |            |          |         |          |         |         |
| merely     | - .22      | -1.25    | - .56   | 1.39     | 0.00    | 0.00    |
| metal      | .58        | -1.82    | 3.44    | 3.94     | 0.00    | 0.00    |
| metals     |            |          |         |          |         |         |
| middle     | -1.14      | -1.63    | - .71   | 2.11     | 0.00    | 0.00    |
| mile       | - .97      | - .42    | .26     | 1.09     | 0.00    | 0.00    |
| miles      |            |          |         |          |         |         |
| milk       | 1.38       | - .96    | .15     | 1.69     | 0.00    | 0.00    |



|           | Evaluation | Activity | Potency | Polarity | N. Aff. | N. Ach. |
|-----------|------------|----------|---------|----------|---------|---------|
| mind      | .56        | .86      | -.68    | 1.23     | .50     | 0.00    |
| minds     |            |          |         |          |         |         |
| minute    | .38        | .70      | 1.05    | 1.32     | 0.00    | .74     |
| minutes   |            |          |         |          |         |         |
| miss      | -1.82      | .09      | -.86    | 2.02     | 0.00    | 0.00    |
| misses    |            |          |         |          |         |         |
| missed    |            |          |         |          |         |         |
| missing   | -2.12      | .11      | -.48    | 2.18     | 0.00    | 0.00    |
| modern    | .86        | 1.13     | .55     | 1.52     | 0.00    | .94     |
| moment    | .06        | .30      | -.73    | .79      | 0.00    | 0.00    |
| money     | -.24       | .94      | .17     | .98      | 0.00    | 0.00    |
| month     | .36        | -.10     | -.77    | .86      | 0.00    | 0.00    |
| months    |            |          |         |          |         |         |
| moon      | .83        | -1.71    | -.64    | 2.01     | 0.00    | 0.00    |
| more      | -.30       | -.88     | 1.15    | 1.48     | 0.00    | 0.00    |
| morning   | .42        | -.41     | -.09    | .59      | 0.00    | 0.00    |
| mother    | 1.68       | 1.38     | -2.77   | 3.52     | 2.74    | 0.00    |
| mothers   |            |          |         |          |         |         |
| motor     | .15        | .81      | 1.13    | 1.40     | 0.00    | .76     |
| motors    |            |          |         |          |         |         |
| mountain  | .00        | -1.13    | 2.13    | 2.41     | 0.00    | 0.00    |
| mountains |            |          |         |          |         |         |

|           | Evaluation | Activity | Potency | Polarity | N. Aff. | N. Ach. |
|-----------|------------|----------|---------|----------|---------|---------|
| mouth     | - .65      | .68      | - .70   | 1.17     | 0.00    | 0.00    |
| mouths    |            |          |         |          |         |         |
| move      | - .74      | .67      | .13     | 1.01     | 0.00    | 0.00    |
| moves     |            |          |         |          |         |         |
| moved     |            |          |         |          |         |         |
| moving    |            |          |         |          |         |         |
| movement  | - .38      | 1.20     | - .57   | 1.38     | 0.00    | 0.00    |
| movements |            |          |         |          |         |         |
| much      | - .93      | - .85    | - .54   | 1.37     | 0.00    | 0.00    |
| music     | 2.08       | 1.33     | -2.57   | 3.56     | 2.92    | 0.00    |
| must      | -1.51      | .09      | .96     | 1.79     | 0.00    | 0.00    |
| name      | .25        | - .19    | .08     | .32      | 0.00    | 0.00    |
| names     |            |          |         |          |         |         |
| named     |            |          |         |          |         |         |
| naming    |            |          |         |          |         |         |
| nation    | 1.42       | .38      | 1.37    | 2.01     | 0.00    | .92     |
| nations   |            |          |         |          |         |         |
| national  | .21        | .28      | .61     | .70      | 0.00    | 0.00    |
| native    | .62        | - .11    | - .28   | .69      | 0.00    | 0.00    |
| natives   |            |          |         |          |         |         |
| nature    | .02        | -1.06    | - .46   | 1.16     | 0.00    | 0.00    |
| navy      | .62        | 1.41     | 1.56    | 2.19     | 0.00    | 1.62    |

|            | Evaluation | Activity | Potency | Polarity | N. Aff. | N. Ach. |
|------------|------------|----------|---------|----------|---------|---------|
| near       | - .14      | -1.34    | .18     | 1.36     | 0.00    | 0.00    |
| nearly     | - .34      | - .83    | - .61   | 1.08     | 0.00    | 0.00    |
| necessary  | - .65      | - .24    | .12     | .70      | 0.00    | 0.00    |
| need       | - .07      | .03      | - .64   | .64      | 0.00    | 0.00    |
| needs      |            |          |         |          |         |         |
| needed     |            |          |         |          |         |         |
| needing    |            |          |         |          |         |         |
| neighbor   | .40        | - .10    | - .18   | .45      | 0.00    | 0.00    |
| neighbors  |            |          |         |          |         |         |
| nervous    | -1.99      | - .53    | -1.76   | 2.71     | 0.00    | 0.00    |
| never      | -1.03      | - .83    | - .09   | 1.33     | 0.00    | 0.00    |
| new        | .89        | - .31    | .20     | .96      | 0.00    | 0.00    |
| newspaper  | .78        | .64      | .58     | 1.16     | 0.00    | .58     |
| newspapers |            |          |         |          |         |         |
| next       | .16        | - .04    | .25     | .30      | 0.00    | 0.00    |
| nice       | 1.76       | -1.28    | -1.42   | 2.60     | .90     | 0.00    |
| night      | 1.15       | -1.05    | -1.01   | 1.86     | 0.00    | 0.00    |
| no         | -2.09      | .27      | .37     | 2.14     | 0.00    | 0.00    |
| none       | -1.82      | -2.00    | .27     | 2.72     | 0.00    | 0.00    |
| not        | -1.36      | - .57    | .68     | 1.62     | 0.00    | 0.00    |

|           | Evaluation | Activity | Potency | Polarity | N. Aff. | N. Ach. |
|-----------|------------|----------|---------|----------|---------|---------|
| nothing   | -1.01      | -2.00    | -.13    | 2.24     | 0.00    | 0.00    |
| notice    | .19        | -.42     | .11     | .47      | 0.00    | 0.00    |
| notices   |            |          |         |          |         |         |
| noticed   |            |          |         |          |         |         |
| noticing  |            |          |         |          |         |         |
| now       | .18        | -.06     | .34     | .39      | 0.00    | 0.00    |
| numerous  | -.56       | .16      | -.33    | .67      | 0.00    | 0.00    |
| object    | .22        | -1.28    | .37     | 1.35     | 0.00    | 0.00    |
| objects   |            |          |         |          |         |         |
| observe   | .96        | -.96     | .19     | 1.37     | 0.00    | 0.00    |
| observes  |            |          |         |          |         |         |
| observed  |            |          |         |          |         |         |
| observing |            |          |         |          |         |         |
| occasion  | 1.00       | .40      | -1.14   | 1.57     | 1.06    | 0.00    |
| occasions |            |          |         |          |         |         |
| offer     | 1.00       | -.26     | -.43    | 1.12     | 0.00    | 0.00    |
| offers    |            |          |         |          |         |         |
| offered   |            |          |         |          |         |         |
| offering  |            |          |         |          |         |         |
| office    | .49        | .20      | .54     | .76      | 0.00    | .30     |
| offices   |            |          |         |          |         |         |
| officer   | .19        | 1.54     | 1.89    | 2.44     | 0.00    | 1.62    |
| officers  |            |          |         |          |         |         |

|  | Evaluation | Activity | Potency | Polarity | N. Aff. | N. Ach. |
|--|------------|----------|---------|----------|---------|---------|
| official<br>officials                    | - .63      | .52      | 1.31    | 1.54     | 0.00    | .34     |
| often                                    | .31        | .80      | -.32    | .92      | 0.00    | 0.00    |
| oil                                      | .36        | -.35     | 2.13    | 2.19     | 0.00    | 0.00    |
| old                                      | -.62       | -2.42    | -.22    | 2.51     | 0.00    | 0.00    |
| older                                    | .08        | -1.27    | .34     | 1.32     | 0.00    | 0.00    |
| once                                     | -.05       | -1.02    | -.56    | 1.16     | 0.00    | 0.00    |
| one                                      | -.13       | -1.19    | .46     | 1.28     | 0.00    | 0.00    |
| only                                     | -.40       | -.48     | .38     | .73      | 0.00    | 0.00    |
| open                                     | 1.15       | -.27     | .25     | 1.21     | 0.00    | 0.00    |
| opinion<br>opinions                      | -.02       | -.08     | .27     | .28      | 0.00    | 0.00    |
| oppose<br>opposes<br>opposed<br>opposing | -1.04      | 1.05     | 1.35    | 2.00     | 0.00    | 0.00    |
| order<br>orders<br>ordered<br>ordering   | -1.32      | .91      | 1.32    | 2.08     | 0.00    | 0.00    |
| original                                 | 1.09       | 1.05     | .08     | 1.52     | 0.00    | .62     |
| other<br>others                          | -.68       | -.26     | -.14    | .74      | 0.00    | 0.00    |

|            | Evaluation | Activity | Potency | Polarity | N. Aff. | N. Ach. |
|------------|------------|----------|---------|----------|---------|---------|
| ought      | - .57      | -1.14    | .00     | 1.27     | 0.00    | 0.00    |
| out        | -1.61      | - .43    | .13     | 1.67     | 0.00    | 0.00    |
| outside    | - .14      | .46      | - .36   | .60      | 0.00    | 0.00    |
| over       | - .89      | - .44    | - .08   | 1.00     | 0.00    | 0.00    |
| own        | .52        | - .12    | .45     | .70      | 0.00    | 0.00    |
| paper      | .20        | -1.18    | 1.05    | 1.59     | 0.00    | 0.00    |
| parents    | 1.34       | - .02    | -1.41   | 1.94     | 1.35    | 0.00    |
| part       | .17        | - .04    | - .21   | .27      | 0.00    | 0.00    |
| particular | - .06      | - .89    | .37     | .97      | 0.00    | 0.00    |
| pass       | .20        | .47      | .25     | .57      | 0.00    | .25     |
| passes     |            |          |         |          |         |         |
| passed     |            |          |         |          |         |         |
| passing    |            |          |         |          |         |         |
| past       | .19        | - .30    | - .37   | .51      | 0.00    | 0.00    |
| pay        | - .19      | - .27    | .75     | .82      | 0.00    | 0.00    |
| pays       |            |          |         |          |         |         |
| paid       |            |          |         |          |         |         |
| paying     |            |          |         |          |         |         |
| peace      | 2.03       | -1.82    | - .30   | 2.74     | 0.00    | 0.00    |
| people     | .18        | .89      | -1.06   | 1.40     | .36     | 0.00    |
| perhaps    | - .79      | - .73    | - .30   | 1.12     | 0.00    | 0.00    |

|            | Evaluation | Activity | Potency | Polarity | N. Aff. | N. Ach. |
|------------|------------|----------|---------|----------|---------|---------|
| permanent  | .02        | -1.99    | 1.66    | 2.59     | 0.00    | 0.00    |
| permit     | .06        | -.99     | -.76    | 1.25     | 0.00    | 0.00    |
| permits    |            |          |         |          |         |         |
| permitted  |            |          |         |          |         |         |
| permitting |            |          |         |          |         |         |
| person     | .19        | .19      | -.73    | .78      | 0.00    | 0.00    |
| persons    |            |          |         |          |         |         |
| personnel  | .19        | -1.76    | -.84    | 1.96     | 0.00    | 0.00    |
| picture    | 1.41       | -1.79    | -.22    | 2.29     | 0.00    | 0.00    |
| pictures   |            |          |         |          |         |         |
| piece      | -.41       | -.91     | -.85    | 1.31     | 0.00    | 0.00    |
| pieces     |            |          |         |          |         |         |
| place      | .61        | -1.05    | .04     | 1.22     | 0.00    | 0.00    |
| places     |            |          |         |          |         |         |
| placed     |            |          |         |          |         |         |
| placing    |            |          |         |          |         |         |
| plan       | -.54       | -.52     | .16     | .77      | 0.00    | 0.00    |
| plans      |            |          |         |          |         |         |
| play       | .29        | 1.85     | -.39    | 1.91     | 0.00    | 0.00    |
| plays      |            |          |         |          |         |         |
| played     |            |          |         |          |         |         |
| playing    |            |          |         |          |         |         |
| pleasant   | 2.18       | -1.63    | -1.28   | 3.01     | .69     | 0.00    |
| poet       | .93        | -.84     | -2.39   | 2.70     | 1.27    | 0.00    |
| poets      |            |          |         |          |         |         |

|             | Evaluation | Activity | Potency | Polarity | N. Aff. | N. Ach. |
|-------------|------------|----------|---------|----------|---------|---------|
| point       | - .15      | - .16    | .39     | .45      | 0.00    | 0.00    |
| points      |            |          |         |          |         |         |
| pointed     |            |          |         |          |         |         |
| pointing    |            |          |         |          |         |         |
| politics    | -1.38      | 1.11     | 1.81    | 2.53     | 0.00    | 0.00    |
| poor        | -1.63      | -1.50    | -1.69   | 2.79     | 0.00    | 0.00    |
| popular     | .91        | .83      | -.80    | 1.47     | .81     | 0.00    |
| position    | .36        | .07      | .94     | 1.01     | 0.00    | 0.00    |
| positions   |            |          |         |          |         |         |
| possess     | .37        | .05      | .02     | .37      | 0.00    | 0.00    |
| possesses   |            |          |         |          |         |         |
| possessed   |            |          |         |          |         |         |
| possessing  |            |          |         |          |         |         |
| possible    | .73        | .31      | .82     | 1.14     | 0.00    | 0.00    |
| power       | -.36       | 1.51     | 2.06    | 2.58     | 0.00    | 1.28    |
| powers      |            |          |         |          |         |         |
| practically | .04        | -.07     | -.04    | .09      | 0.00    | 0.00    |
| prepare     | .48        | 1.38     | 1.28    | 1.94     | 0.00    | 1.40    |
| prepares    |            |          |         |          |         |         |
| prepared    |            |          |         |          |         |         |
| preparing   |            |          |         |          |         |         |
| presence    | -.28       | .00      | -.46    | .54      | 0.00    | 0.00    |



|             | Evaluation | Activity | Potency | Polarity | N. Aff. | N. Ach. |
|-------------|------------|----------|---------|----------|---------|---------|
| present     | .28        | - .39    | - .54   | .72      | 0.00    | 0.00    |
| presents    |            |          |         |          |         |         |
| presented   |            |          |         |          |         |         |
| presenting  |            |          |         |          |         |         |
| pressure    | -.99       | .88      | .96     | 1.64     | 0.00    | 0.00    |
| pressures   |            |          |         |          |         |         |
| prevent     | .49        | .82      | 1.63    | 1.89     | 0.00    | 1.13    |
| prevents    |            |          |         |          |         |         |
| prevented   |            |          |         |          |         |         |
| preventing  |            |          |         |          |         |         |
| price       | -1.33      | .21      | .19     | 1.36     | 0.00    | 0.00    |
| prices      |            |          |         |          |         |         |
| private     | .31        | - .51    | - .13   | .61      | 0.00    | 0.00    |
| probably    | -.94       | - .64    | - .29   | 1.17     | 0.00    | 0.00    |
| problem     | -1.60      | - .43    | - .21   | 1.67     | 0.00    | 0.00    |
| problems    |            |          |         |          |         |         |
| produce     | .60        | 1.06     | .75     | 1.43     | 0.00    | .93     |
| produces    |            |          |         |          |         |         |
| produced    |            |          |         |          |         |         |
| producing   |            |          |         |          |         |         |
| product     | .16        | - .15    | .23     | .32      | 0.00    | 0.00    |
| products    |            |          |         |          |         |         |
| profession  | .67        | .82      | .29     | 1.10     | 0.00    | 0.00    |
| professions |            |          |         |          |         |         |

|            | Evaluation | Activity | Potency | Polarity | N. Aff. | N. Ach. |
|------------|------------|----------|---------|----------|---------|---------|
| profit     | .78        | .14      | .84     | 1.15     | 0.00    | 0.00    |
| profits    |            |          |         |          |         |         |
| progress   | .87        | 1.39     | 1.15    | 2.00     | 0.00    | 1.50    |
| proper     | .45        | -.90     | .12     | 1.01     | 0.00    | 0.00    |
| property   | 1.07       | -.62     | 1.22    | 1.74     | 0.00    | 0.00    |
| properties |            |          |         |          |         |         |
| protect    | 1.32       | 1.19     | .04     | 1.78     | 0.00    | .72     |
| protects   |            |          |         |          |         |         |
| protected  |            |          |         |          |         |         |
| protecting |            |          |         |          |         |         |
| prove      | .00        | 1.31     | .49     | 1.40     | 0.00    | .66     |
| proves     |            |          |         |          |         |         |
| proven     |            |          |         |          |         |         |
| proved     |            |          |         |          |         |         |
| proving    |            |          |         |          |         |         |
| provide    | .13        | -.55     | -.92    | 1.08     | 0.00    | 0.00    |
| provides   |            |          |         |          |         |         |
| provided   |            |          |         |          |         |         |
| providing  |            |          |         |          |         |         |
| public     | -.13       | .86      | .19     | .89      | 0.00    | 0.00    |
| pull       | -.44       | 1.64     | .32     | 1.73     | 0.00    | 0.00    |
| pulls      |            |          |         |          |         |         |
| pulled     |            |          |         |          |         |         |
| pulling    |            |          |         |          |         |         |
| purpose    | -.11       | .19      | .68     | .71      | 0.00    | 0.00    |
| purposes   |            |          |         |          |         |         |

|            | Evaluation | Activity | Potency | Polarity | N. Aff. | N. Ach. |
|------------|------------|----------|---------|----------|---------|---------|
| put        | .14        | .27      | .22     | .38      | 0.00    | 0.00    |
| puts       |            |          |         |          |         |         |
| putting    |            |          |         |          |         |         |
| quality    | 1.35       | -.18     | -.34    | 1.40     | 0.00    | 0.00    |
| qualities  |            |          |         |          |         |         |
| quantity   | -.38       | -.51     | .72     | .96      | 0.00    | 0.00    |
| quantities |            |          |         |          |         |         |
| question   | -.56       | -.34     | .52     | .84      | 0.00    | 0.00    |
| questions  |            |          |         |          |         |         |
| quick      | -.12       | 1.73     | .10     | 1.74     | 0.00    | .55     |
| quickly    | .44        | 1.36     | .74     | 1.61     | 0.00    | 2.05    |
| quiet      | 1.17       | -2.57    | -.82    | 2.94     | 0.00    | 0.00    |
| quit       | -1.83      | -.39     | .76     | 2.02     | 0.00    | 0.00    |
| quits      |            |          |         |          |         |         |
| quitting   |            |          |         |          |         |         |
| quite      | -.11       | -.97     | -.79    | 1.26     | 0.00    | 0.00    |
| rate       | .28        | -.57     | 1.06    | 1.24     | 0.00    | 0.00    |
| rates      |            |          |         |          |         |         |
| rather     | -.64       | -1.04    | .16     | 1.23     | 0.00    | 0.00    |
| reach      | -.55       | .37      | -.27    | .72      | 0.00    | 0.00    |
| reaches    |            |          |         |          |         |         |
| reached    |            |          |         |          |         |         |
| reaching   |            |          |         |          |         |         |

|           | Evaluation | Activity | Potency | Polarity | N. Aff. | N. Ach. |
|-----------|------------|----------|---------|----------|---------|---------|
| read      | .58        | - .04    | - .01   | .58      | 0.00    | 0.00    |
| reads     |            |          |         |          |         |         |
| reading   |            |          |         |          |         |         |
| ready     | - .10      | .55      | .47     | .73      | 0.00    | 0.00    |
| realize   | - .26      | - .92    | .31     | 1.01     | 0.00    | 0.00    |
| realizes  |            |          |         |          |         |         |
| realized  |            |          |         |          |         |         |
| realizing |            |          |         |          |         |         |
| really    | - .15      | - .08    | - .19   | .26      | 0.00    | 0.00    |
| reason    | .26        | - .54    | .04     | .60      | 0.00    | 0.00    |
| reasons   |            |          |         |          |         |         |
| receive   | 1.08       | .73      | -1.33   | 1.86     | 1.32    | 0.00    |
| receives  |            |          |         |          |         |         |
| received  |            |          |         |          |         |         |
| receiving |            |          |         |          |         |         |
| recent    | .10        | - .50    | - .27   | .58      | 0.00    | 0.00    |
| recently  | - .53      | - .56    | .21     | .80      | 0.00    | 0.00    |
| red       | - .84      | .90      | - .21   | 1.25     | 0.00    | 0.00    |
| refuse    | -1.73      | .21      | .89     | 1.96     | 0.00    | 0.00    |
| refuses   |            |          |         |          |         |         |
| refused   |            |          |         |          |         |         |
| refusing  |            |          |         |          |         |         |
| regard    | .75        | - .09    | .13     | .77      | 0.00    | 0.00    |
| regards   |            |          |         |          |         |         |
| regarded  |            |          |         |          |         |         |

|              | Evaluation | Activity | Potency | Polarity | N. Aff. | N. Ach. |
|--------------|------------|----------|---------|----------|---------|---------|
| relation     | .09        | -1.04    | - .39   | 1.11     | 0.00    | 0.00    |
| religion     | 1.57       | .59      | -1.75   | 2.42     | 1.92    | 0.00    |
| religions    |            |          |         |          |         |         |
| religious    | 2.07       | .02      | - .79   | 2.22     | 1.18    | 0.00    |
| remain       | - .45      | -1.61    | .15     | 1.68     | 0.00    | 0.00    |
| remains      |            |          |         |          |         |         |
| remained     |            |          |         |          |         |         |
| remaining    |            |          |         |          |         |         |
| remember     | .57        | - .20    | - .56   | .82      | 0.00    | 0.00    |
| remembers    |            |          |         |          |         |         |
| remembered   |            |          |         |          |         |         |
| remembering  |            |          |         |          |         |         |
| reply        | .62        | .12      | -1.07   | 1.24     | .71     | 0.00    |
| replies      |            |          |         |          |         |         |
| replied      |            |          |         |          |         |         |
| replying     |            |          |         |          |         |         |
| report       | .02        | - .27    | .51     | .58      | 0.00    | 0.00    |
| reports      |            |          |         |          |         |         |
| reported     |            |          |         |          |         |         |
| reporting    |            |          |         |          |         |         |
| represent    | .44        | .20      | .83     | .96      | 0.00    | 0.00    |
| represents   |            |          |         |          |         |         |
| represented  |            |          |         |          |         |         |
| representing |            |          |         |          |         |         |
| rest         | .92        | -1.49    | - .44   | 1.80     | 0.00    | 0.00    |
| rests        |            |          |         |          |         |         |
| rested       |            |          |         |          |         |         |
| resting      |            |          |         |          |         |         |

|           | Evaluation | Activity | Potency | Polarity | n. Aff. | N. Ach. |
|-----------|------------|----------|---------|----------|---------|---------|
| result    | -.68       | -.35     | .71     | 1.04     | 0.00    | 0.00    |
| results   |            |          |         |          |         |         |
| resulted  |            |          |         |          |         |         |
| resulting |            |          |         |          |         |         |
| return    | .78        | -.71     | -.63    | 1.23     | 0.00    | 0.00    |
| returns   |            |          |         |          |         |         |
| returned  |            |          |         |          |         |         |
| returning |            |          |         |          |         |         |
| rich      | -.19       | .24      | .00     | .31      | 0.00    | 0.00    |
| ride      | .29        | 1.11     | .33     | 1.19     | 0.00    | .57     |
| rides     |            |          |         |          |         |         |
| rode      |            |          |         |          |         |         |
| ridden    |            |          |         |          |         |         |
| right     | .65        | .48      | .27     | .85      | 0.00    | .31     |
| rights    |            |          |         |          |         |         |
| rise      | .08        | .75      | .27     | .80      | 0.00    | 0.00    |
| rises     |            |          |         |          |         |         |
| rose      |            |          |         |          |         |         |
| risen     |            |          |         |          |         |         |
| river     | -.24       | 1.07     | .61     | 1.25     | 0.00    | 0.00    |
| rivers    |            |          |         |          |         |         |
| road      | .48        | -1.53    | 2.00    | 2.56     | 0.00    | 0.00    |
| roads     |            |          |         |          |         |         |
| rock      | -.30       | -3.16    | 3.85    | 4.99     | 0.00    | 0.00    |
| rocks     |            |          |         |          |         |         |
| room      | .43        | -.96     | -1.07   | 1.50     | 0.00    | 0.00    |
| rooms     |            |          |         |          |         |         |
| run       | .20        | .98      | -.58    | 1.16     | 0.00    | 0.00    |
| runs      |            |          |         |          |         |         |
| ran       |            |          |         |          |         |         |
| running   |            |          |         |          |         |         |

|   | Evaluation | Activity | Potency | Polarity | N. Aff. | N. Ach. |
|---|------------|----------|---------|----------|---------|---------|
| safe  | .99        | - .13    | - .69   | 1.21     | .57     | 0.00    |
| sailor<br>sailors                               | .67        | 2.43     | 1.21    | 2.80     | 0.00    | 2.08    |
| sand  | .38        | -1.24    | 1.34    | 1.86     | 0.00    | 0.00    |
| satisfy<br>satisfies<br>satisfied<br>satisfying | 1.66       | .04      | .09     | 1.66     | 0.00    | 0.00    |
| say<br>says<br>said<br>saying                   | -.66       | .23      | -1.12   | 1.32     | 0.00    | 0.00    |
| scarce  | -.80       | -1.04    | -.05    | 1.31     | 0.00    | 0.00    |
| school<br>schools                               | .66        | -.09     | .21     | .70      | 0.00    | 0.00    |
| sea<br>seas                                     | .13        | 1.29     | .80     | 1.52     | 0.00    | .90     |
| see<br>sees<br>saw<br>seen                      | .42        | .13      | -.19    | .48      | 0.00    | 0.00    |
| seem<br>seems<br>seemed<br>seeming              | .34        | -1.89    | -.31    | 1.94     | 0.00    | 0.00    |

|          | Evaluation | Activity | Potency | Polarity | N. Aff. | N. Ach. |
|----------|------------|----------|---------|----------|---------|---------|
| sell     | .30        | .03      | .17     | .35      | 0.00    | 0.00    |
| sells    |            |          |         |          |         |         |
| sold     |            |          |         |          |         |         |
| selling  |            |          |         |          |         |         |
| send     | .27        | .09      | -.05    | .29      | 0.00    | 0.00    |
| sends    |            |          |         |          |         |         |
| sent     |            |          |         |          |         |         |
| sending  |            |          |         |          |         |         |
| serious  | .08        | -1.05    | .51     | 1.17     | 0.00    | 0.00    |
| service  | -.33       | 1.06     | 1.14    | 1.59     | 0.00    | .67     |
| services |            |          |         |          |         |         |
| set      | .15        | -.24     | .58     | .64      | 0.00    | 0.00    |
| sets     |            |          |         |          |         |         |
| setting  |            |          |         |          |         |         |
| settle   | .09        | .10      | -.38    | .40      | 0.00    | 0.00    |
| settled  |            |          |         |          |         |         |
| settles  |            |          |         |          |         |         |
| settling |            |          |         |          |         |         |
| several  | -.13       | -.28     | -.08    | .32      | 0.00    | 0.00    |
| ship     | .70        | .77      | 1.45    | 1.78     | 0.00    | 1.10    |
| ships    |            |          |         |          |         |         |
| shoot    | -2.46      | .30      | .04     | 2.48     | 0.00    | 0.00    |
| shoots   |            |          |         |          |         |         |
| shot     |            |          |         |          |         |         |
| shooting |            |          |         |          |         |         |
| shore    | .50        | 1.01     | .10     | 1.13     | 0.00    | 0.00    |
| shores   |            |          |         |          |         |         |



|          | Evaluation | Activity | Potency | Polarity | N. Aff. | N. Ach. |
|----------|------------|----------|---------|----------|---------|---------|
| short    | -.91       | -1.08    | .42     | 1.47     | 0.00    | 0.00    |
| should   | -.14       | .02      | .35     | .38      | 0.00    | 0.00    |
| shoulder | -.12       | .26      | .68     | .74      | 0.00    | 0.00    |
| show     | .37        | .85      | -.56    | 1.08     | 0.00    | 0.00    |
| shows    |            |          |         |          |         |         |
| showed   |            |          |         |          |         |         |
| showing  |            |          |         |          |         |         |
| side     | -.52       | .01      | -.07    | .52      | 0.00    | 0.00    |
| sides    |            |          |         |          |         |         |
| sign     | .05        | -.33     | -.24    | .41      | 0.00    | 0.00    |
| signs    |            |          |         |          |         |         |
| signed   |            |          |         |          |         |         |
| signing  |            |          |         |          |         |         |
| silence  | .63        | -2.74    | -.06    | 2.81     | 0.00    | 0.00    |
| silences |            |          |         |          |         |         |
| silent   | 1.63       | -3.41    | .21     | 3.78     | 0.00    | 0.00    |
| silver   | 1.23       | -.85     | 1.40    | 2.05     | 0.00    | 0.00    |
| simple   | .81        | -.43     | -.29    | .96      | 0.00    | 0.00    |
| simply   | -.77       | -1.58    | -1.12   | 2.08     | 0.00    | 0.00    |
| sing     | .65        | .78      | -2.38   | 2.59     | 1.66    | 0.00    |
| sings    |            |          |         |          |         |         |
| sang     |            |          |         |          |         |         |
| singing  |            |          |         |          |         |         |

|            | Evaluation | Activity | Potency | Polarity | N. Aff. | N. Ach. |
|------------|------------|----------|---------|----------|---------|---------|
| single     | -1.22      | - .76    | .13     | 1.44     | 0.00    | 0.00    |
| singles    |            |          |         |          |         |         |
| sister     | 1.11       | .48      | -2.80   | 3.05     | 2.19    | 0.00    |
| sisters    |            |          |         |          |         |         |
| sit        | - .15      | -1.53    | - .10   | 1.54     | 0.00    | 0.00    |
| sits       |            |          |         |          |         |         |
| sat        |            |          |         |          |         |         |
| sitting    |            |          |         |          |         |         |
| situation  | -1.40      | - .15    | - .59   | 1.53     | 0.00    | 0.00    |
| situations |            |          |         |          |         |         |
| sky        | .48        | - .87    | - .90   | 1.34     | 0.00    | 0.00    |
| skies      |            |          |         |          |         |         |
| sleep      | 1.67       | -3.20    | - .67   | 3.67     | 0.00    | 0.00    |
| sleeps     |            |          |         |          |         |         |
| slept      |            |          |         |          |         |         |
| sleeping   |            |          |         |          |         |         |
| slow       | .. .66     | -2.09    | - .17   | 2.20     | 0.00    | 0.00    |
| small      | 1.08       | - .91    | - .76   | 1.60     | 0.00    | 0.00    |
| so         | - .36      | - .67    | .22     | .79      | 0.00    | 0.00    |
| social     | .55        | .31      | -1.09   | 1.26     | .72     | 0.00    |
| soft       | 1.49       | -2.16    | -1.38   | 2.96     | 0.00    | 0.00    |
| soldier    | .43        | 1.13     | 1.44    | 1.88     | 0.00    | 1.27    |
| soldiers   |            |          |         |          |         |         |

|           | Evaluation | Activity | Potency | Polarity | N. Aff. | N. Ach. |
|-----------|------------|----------|---------|----------|---------|---------|
| solve     | .59        | 1.25     | 1.26    | 1.87     | 0.00    | 1.35    |
| solves    |            |          |         |          |         |         |
| solved    |            |          |         |          |         |         |
| solving   |            |          |         |          |         |         |
| some      | .00        | -.52     | .38     | .64      | 0.00    | 0.00    |
| something | .01        | -.14     | -.66    | .68      | 0.00    | 0.00    |
| sometimes | -1.04      | -1.23    | -.53    | 1.70     | 0.00    | 0.00    |
| somewhat  | -1.02      | -.77     | -.34    | 1.32     | 0.00    | 0.00    |
| son       | 1.45       | 1.49     | -2.00   | 2.88     | 2.06    | 0.00    |
| sons      |            |          |         |          |         |         |
| soon      | .03        | .26      | -.61    | .66      | 0.00    | 0.00    |
| sorrow    | -1.71      | -1.70    | -2.52   | 3.49     | 0.00    | 0.00    |
| sorrows   |            |          |         |          |         |         |
| sorry     | .13        | -1.57    | -.60    | 1.69     | 0.00    | 0.00    |
| sort      | -.71       | -.65     | -.37    | 1.03     | 0.00    | 0.00    |
| sorts     |            |          |         |          |         |         |
| soul      | .63        | -.24     | -1.87   | 1.99     | 1.11    | 0.00    |
| sound     | .46        | .11      | -.46    | .66      | 0.00    | 0.00    |
| sounds    |            |          |         |          |         |         |
| sounded   |            |          |         |          |         |         |
| sounding  |            |          |         |          |         |         |
| space     | -.08       | -1.64    | 1.03    | 1.94     | 0.00    | 0.00    |
| spaces    |            |          |         |          |         |         |

|           | Evaluation | Activity | Potency | Polarity | N. Aff. | N. Ach. |
|-----------|------------|----------|---------|----------|---------|---------|
| speak     | .50        | 0.00     | -.27    | .57      | 0.00    | 0.00    |
| speaks    |            |          |         |          |         |         |
| spoke     |            |          |         |          |         |         |
| spoken    |            |          |         |          |         |         |
| speaking  |            |          |         |          |         |         |
| special   | .86        | -.63     | -.68    | 1.26     | 0.00    | 0.00    |
| speech    | .62        | .80      | -.13    | 1.92     | 0.00    | 0.00    |
| speeches  |            |          |         |          |         |         |
| spend     | .87        | .60      | -.52    | 1.18     | .53     | 0.00    |
| spends    |            |          |         |          |         |         |
| spent     |            |          |         |          |         |         |
| spending  |            |          |         |          |         |         |
| spirits   | .37        | .15      | -.20    | .45      | 0.00    | 0.00    |
| spread    | -.86       | -.09     | .12     | .87      | 0.00    | 0.00    |
| spreads   |            |          |         |          |         |         |
| spreading |            |          |         |          |         |         |
| spring    | 1.59       | 1.05     | -2.33   | 3.01     | 2.41    | 0.00    |
| stand     | .15        | -.70     | 1.09    | 1.30     | 0.00    | 0.00    |
| stands    |            |          |         |          |         |         |
| stood     |            |          |         |          |         |         |
| standing  |            |          |         |          |         |         |
| star      | 1.39       | .05      | -.78    | 1.60     | 0.00    | .51     |
| stars     |            |          |         |          |         |         |
| start     | -.50       | .65      | -.07    | .82      | 0.00    | 0.00    |
| starts    |            |          |         |          |         |         |
| started   |            |          |         |          |         |         |
| starting  |            |          |         |          |         |         |

|            | Evaluation | Activity | Potency | Polarity | N. Aff. | N. Ach. |
|------------|------------|----------|---------|----------|---------|---------|
| state      | .26        | .51      | .63     | .85      | 0.00    | .57     |
| states     |            |          |         |          |         |         |
| stated     |            |          |         |          |         |         |
| stating    |            |          |         |          |         |         |
| statements | -.27       | -.18     | .30     | .44      | 0.00    | 0.00    |
| statements |            |          |         |          |         |         |
| station    | .57        | -.26     | .41     | .75      | 0.00    | 0.00    |
| stations   |            |          |         |          |         |         |
| stay       | .00        | -.81     | -.24    | .84      | 0.00    | 0.00    |
| stays      |            |          |         |          |         |         |
| stayed     |            |          |         |          |         |         |
| staying    |            |          |         |          |         |         |
| steel      | .37        | -2.01    | 4.60    | 5.03     | 0.00    | 0.00    |
| step       | .30        | .86      | .05     | .91      | 0.00    | .35     |
| steps      |            |          |         |          |         |         |
| stepped    |            |          |         |          |         |         |
| stepping   |            |          |         |          |         |         |
| still      | -.93       | -.88     | -.62    | 1.42     | 0.00    | 0.00    |
| stone      | -.50       | -2.87    | 2.68    | 3.96     | 0.00    | 0.00    |
| stones     |            |          |         |          |         |         |
| stop       | -1.19      | -.80     | 1.27    | 1.92     | 0.00    | 0.00    |
| stops      |            |          |         |          |         |         |
| stopped    |            |          |         |          |         |         |
| stopping   |            |          |         |          |         |         |
| story      | .83        | -.12     | -1.18   | 1.45     | .85     | 0.00    |
| stories    |            |          |         |          |         |         |

|  | Evaluation | Activity | Potency | Polarity | N. Aff. | N. Ach. |
|--|------------|----------|---------|----------|---------|---------|
| strange  | -1.46      | -1.00    | .23     | 1.78     | 0.00    | 0.00    |
| street<br>streets                              | -.31       | .71      | .73     | 1.06     | 0.00    | 0.00    |
| strong   | -.42       | 1.09     | 2.21    | 2.50     | 0.00    | .99     |
| student<br>students                            | .48        | .27      | -.20    | .59      | 0.00    | 0.00    |
| study<br>studies<br>studied<br>studying        | .06        | -.20     | 1.13    | 1.15     | 0.00    | 0.00    |
| subject<br>subjects                            | -.17       | -.87     | .87     | 1.24     | 0.00    | 0.00    |
| succeed<br>succeeds<br>succeeded<br>succeeding | 1.12       | .36      | .40     | 1.24     | 0.00    | 0.00    |
| success<br>successes                           | 1.56       | 1.46     | .76     | 2.27     | 0.00    | 1.47    |
| successful                                     | 1.75       | 1.75     | .90     | 2.63     | 0.00    | 1.79    |
| such   | .10        | .13      | -.25    | .30      | 0.00    | 0.00    |
| suffer<br>suffers<br>suffered<br>suffering     | -2.23      | -.95     | -1.93   | 3.10     | 0.00    | 0.00    |

|            | Evaluation | Activity | Potency | Polarity | N. Aff. | N. Ach. |
|------------|------------|----------|---------|----------|---------|---------|
| suggest    | .00        | - .11    | - .20   | .23      | 0.00    | 0.00    |
| suggests   |            |          |         |          |         |         |
| suggested  |            |          |         |          |         |         |
| suggesting |            |          |         |          |         |         |
| summer     | 1.22       | 1.27     | -1.59   | 2.37     | 1.62    | 0.00    |
| summers    |            |          |         |          |         |         |
| sun        | .64        | .08      | .52     | .83      | 0.00    | 0.00    |
| suns       |            |          |         |          |         |         |
| supply     | .28        | - .17    | .95     | 1.00     | 0.00    | .27     |
| supplies   |            |          |         |          |         |         |
| supplied   |            |          |         |          |         |         |
| supplying  |            |          |         |          |         |         |
| support    | 1.32       | 1.54     | - .11   | 2.03     | 0.00    | .82     |
| supports   |            |          |         |          |         |         |
| supported  |            |          |         |          |         |         |
| supporting |            |          |         |          |         |         |
| suppose    | - .68      | - .71    | - .27   | 1.02     | 0.00    | 0.00    |
| supposes   |            |          |         |          |         |         |
| supposed   |            |          |         |          |         |         |
| supposing  |            |          |         |          |         |         |
| sure       | .51        | - .02    | .60     | .79      | 0.00    | .33     |
| surface    | .02        | - .78    | 1.51    | 1.70     | 0.00    | 0.00    |
| surfaces   |            |          |         |          |         |         |
| surprise   | .52        | 1.63     | -1.12   | 2.04     | .77     | 0.00    |
| surprises  |            |          |         |          |         |         |
| surprised  |            |          |         |          |         |         |
| surprising |            |          |         |          |         |         |

|             | Evaluation | Activity | Potency | Polarity | N. Aff. | N. Ach. |
|-------------|------------|----------|---------|----------|---------|---------|
| surround    | -1.40      | .78      | .79     | 1.79     | 0.00    | 0.00    |
| surrounds   |            |          |         |          |         |         |
| surrounded  |            |          |         |          |         |         |
| surrounding |            |          |         |          |         |         |
| sweet       | 1.83       | -.09     | -2.44   | 3.05     | 2.31    | 0.00    |
| take        | -.55       | .36      | -.13    | .67      | .10     | 0.00    |
| takes       |            |          |         |          |         |         |
| took        |            |          |         |          |         |         |
| taken       |            |          |         |          |         |         |
| taking      |            |          |         |          |         |         |
| talk        | .57        | 1.04     | -.28    | 1.22     | 0.00    | 0.00    |
| talks       |            |          |         |          |         |         |
| talked      |            |          |         |          |         |         |
| talking     |            |          |         |          |         |         |
| tax         | -1.76      | 1.19     | 1.26    | 2.47     | 0.00    | 0.00    |
| taxes       |            |          |         |          |         |         |
| teach       | .80        | .22      | -.03    | .83      | 0.00    | 0.00    |
| teaches     |            |          |         |          |         |         |
| taught      |            |          |         |          |         |         |
| teaching    |            |          |         |          |         |         |
| teacher     | .28        | .20      | 1.08    | 1.13     | 0.00    | 0.00    |
| teachers    |            |          |         |          |         |         |
| tell        | -.11       | -.11     | -.42    | .45      | 0.00    | 0.00    |
| tells       |            |          |         |          |         |         |
| told        |            |          |         |          |         |         |
| telling     |            |          |         |          |         |         |
| terrible    | -3.26      | .33      | -.26    | 3.29     | 0.00    | 0.00    |



|          | Evaluation | Activity | Potency | Polarity | N. Aff. | N. Ach. |
|----------|------------|----------|---------|----------|---------|---------|
| their    | -.14       | -.84     | -.37    | .93      | 0.00    | 0.00    |
| theirs   |            |          |         |          |         |         |
| then     | .19        | -.35     | .07     | .40      | 0.00    | 0.00    |
| thing    | -1.63      | -.43     | .11     | 1.69     | 0.00    | 0.00    |
| things   |            |          |         |          |         |         |
| think    | .36        | .07      | .10     | .38      | 0.00    | 0.00    |
| thinks   |            |          |         |          |         |         |
| thought  |            |          |         |          |         |         |
| thinking | .41        | .83      | -.29    | .97      | 0.00    | 0.00    |
| throw    | -1.20      | .53      | -.02    | 1.31     | 0.00    | 0.00    |
| throws   |            |          |         |          |         |         |
| threw    |            |          |         |          |         |         |
| thrown   |            |          |         |          |         |         |
| thus     | -.47       | -1.07    | -.25    | 1.20     | 0.00    | 0.00    |
| time     | .23        | .24      | .73     | .80      | 0.00    | 0.00    |
| times    |            |          |         |          |         |         |
| together | 1.22       | -.41     | -1.55   | 2.02     | 1.22    | 0.00    |
| too      | -1.40      | -.09     | -.44    | 1.47     | 0.00    | 0.00    |
| total    | .38        | .12      | .42     | .58      | 0.00    | 0.00    |
| town     | .70        | .41      | -.64    | 1.03     | .50     | 0.00    |
| towns    |            |          |         |          |         |         |

|           | Evaluation | Activity | Potency | Polarity | N. Aff. | N. Ach. |
|-----------|------------|----------|---------|----------|---------|---------|
| train     | .38        | 1.12     | 1.35    | 1.80     | 0.00    | 1.20    |
| trains    |            |          |         |          |         |         |
| trained   |            |          |         |          |         |         |
| training  |            |          |         |          |         |         |
| tree      | 1.23       | -.65     | 2.17    | 2.58     | 0.00    | 0.00    |
| trees     |            |          |         |          |         |         |
| trouble   | -2.59      | .49      | -.31    | 2.65     | 0.00    | 0.00    |
| troubles  |            |          |         |          |         |         |
| troubled  |            |          |         |          |         |         |
| troubling |            |          |         |          |         |         |
| true      | 1.23       | .41      | -.18    | 1.31     | .55     | 0.00    |
| truth     | .29        | .39      | .75     | .89      | 0.00    | 0.00    |
| truths    |            |          |         |          |         |         |
| try       | .03        | .26      | .03     | .26      | 0.00    | 0.00    |
| tries     |            |          |         |          |         |         |
| tried     |            |          |         |          |         |         |
| trying    |            |          |         |          |         |         |
| turn      | -.03       | .03      | -.29    | .29      | 0.00    | 0.00    |
| turns     |            |          |         |          |         |         |
| turned    |            |          |         |          |         |         |
| turning   |            |          |         |          |         |         |
| type      | -.16       | -1.16    | -.07    | 1.17     | 0.00    | 0.00    |
| types     |            |          |         |          |         |         |
| uncle     | 1.36       | .29      | -.23    | 1.41     | 0.00    | 0.00    |
| uncles    |            |          |         |          |         |         |

|               | Evaluation | Activity | Potency | Polarity | N. Aff. | N. Ach. |
|---------------|------------|----------|---------|----------|---------|---------|
| understand    | .95        | - .97    | .27     | 1.38     | 0.00    | 0.00    |
| understands   |            |          |         |          |         |         |
| understood    |            |          |         |          |         |         |
| understanding |            |          |         |          |         |         |
| university    | .99        | 1.41     | .16     | 1.73     | 0.00    | .88     |
| universities  |            |          |         |          |         |         |
| up            | -.66       | -.71     | -.27    | 1.01     | 0.00    | 0.00    |
| use           | -.58       | -.17     | -.16    | .62      | 0.00    | 0.00    |
| uses          |            |          |         |          |         |         |
| used          |            |          |         |          |         |         |
| using         |            |          |         |          |         |         |
| usual         | -.49       | -1.18    | -.02    | 1.28     | 0.00    | 0.00    |
| usually       | -.22       | -.93     | -.41    | 1.04     | 0.00    | 0.00    |
| value         | .77        | -.37     | .34     | .92      | 0.00    | 0.00    |
| various       | .42        | -.25     | -.36    | .61      | 0.00    | 0.00    |
| very          | -.09       | .39      | .04     | .40      | 0.00    | 0.00    |
| victory       | 1.06       | 1.35     | 1.30    | 2.15     | 0.00    | 1.62    |
| victories     |            |          |         |          |         |         |
| view          | .22        | -.25     | -.18    | .38      | 0.00    | 0.00    |
| views         |            |          |         |          |         |         |
| visit         | .71        | -.14     | -1.13   | 1.34     | .73     | 0.00    |
| visits        |            |          |         |          |         |         |
| visited       |            |          |         |          |         |         |
| visiting      |            |          |         |          |         |         |

|         | Evaluation | Activity | Potency | Polarity | N. Aff. | N. Ach. |
|---------|------------|----------|---------|----------|---------|---------|
| voice   | 1.08       | - .02    | -1.77   | 2.07     | 1.45    | 0.00    |
| voices  |            |          |         |          |         |         |
| vote    | .75        | .19      | 1.18    | 1.41     | 0.00    | .36     |
| votes   |            |          |         |          |         |         |
| voted   |            |          |         |          |         |         |
| voting  |            |          |         |          |         |         |
| wait    | - .39      | -1.29    | .56     | 1.46     | 0.00    | 0.00    |
| waits   |            |          |         |          |         |         |
| waited  |            |          |         |          |         |         |
| waiting |            |          |         |          |         |         |
| walk    | .45        | 1.24     | .13     | 1.32     | 0.00    | .57     |
| walks   |            |          |         |          |         |         |
| walked  |            |          |         |          |         |         |
| walking |            |          |         |          |         |         |
| wall    | .24        | -1.99    | .43     | 2.05     | 0.00    | 0.00    |
| walls   |            |          |         |          |         |         |
| want    | - .43      | - .06    | - .19   | .47      | 0.00    | 0.00    |
| wants   |            |          |         |          |         |         |
| wanted  |            |          |         |          |         |         |
| wanting |            |          |         |          |         |         |
| war     | -3.96      | 2.22     | - .04   | 4.54     | 0.00    | 0.00    |
| wars    |            |          |         |          |         |         |
| warn    | - .64      | 1.88     | .07     | 1.99     | 0.00    | 0.00    |
| warns   |            |          |         |          |         |         |
| warned  |            |          |         |          |         |         |
| warning |            |          |         |          |         |         |

|          | Evaluation | Activity | Potency | Polarity | N. Aff. | N. Ach. |
|----------|------------|----------|---------|----------|---------|---------|
| watch    | - .07      | - .90    | - .75   | 1.17     | 0.00    | 0.00    |
| watches  |            |          |         |          |         |         |
| watched  |            |          |         |          |         |         |
| watching |            |          |         |          |         |         |
| water    | .66        | 1.18     | - .30   | 1.38     | 0.00    | 0.00    |
| way      | - .30      | .15      | .50     | .60      | 0.00    | 0.00    |
| ways     |            |          |         |          |         |         |
| wealth   | .35        | 1.08     | - .33   | 1.18     | 0.00    | 0.00    |
| wear     | - .01      | .51      | - .44   | .67      | 0.00    | 0.00    |
| wears    |            |          |         |          |         |         |
| wore     |            |          |         |          |         |         |
| worn     |            |          |         |          |         |         |
| wearing  |            |          |         |          |         |         |
| week     | - .24      | .78      | .15     | .83      | 0.00    | 0.00    |
| weeks    |            |          |         |          |         |         |
| when     | - .84      | - .61    | .12     | 1.04     | 0.00    | 0.00    |
| white    | 1.13       | -1.31    | - .41   | 1.78     | 0.00    | 0.00    |
| whole    | .66        | -1.33    | .53     | 1.58     | 0.00    | 0.00    |
| wide     | - .54      | -1.21    | .30     | 1.36     | 0.00    | 0.00    |
| wife     | .97        | - .32    | -3.12   | 3.28     | 1.85    | 0.00    |
| wives    |            |          |         |          |         |         |
| wild     | -1.94      | 1.42     | .17     | 2.41     | 0.00    | 0.00    |
| win      | 1.28       | 2.20     | .43     | 2.58     | 0.00    | 1.59    |
| wins     |            |          |         |          |         |         |
| won      |            |          |         |          |         |         |
| winning  |            |          |         |          |         |         |

|           | Evaluation | Activity | Potency | Polarity | N. Aff. | N. Ach. |
|-----------|------------|----------|---------|----------|---------|---------|
| wind      | - .83      | .69      | .57     | 1.22     | 0.00    | 0.00    |
| winds     |            |          |         |          |         |         |
| window    | .65        | -2.69    | .77     | 2.87     | 0.00    | 0.00    |
| windows   |            |          |         |          |         |         |
| winter    | -2.21      | 1.06     | 1.36    | 2.80     | 0.00    | 0.00    |
| winters   |            |          |         |          |         |         |
| wise      | 1.49       | .88      | 1.26    | 2.14     | 0.00    | 1.32    |
| wish      | 1.14       | - .75    | -1.25   | 1.85     | .81     | 0.00    |
| woman     | 1.65       | .73      | -2.69   | 3.24     | 2.65    | 0.00    |
| women     |            |          |         |          |         |         |
| wonder    | - .13      | - .82    | - .94   | 1.25     | 0.00    | 0.00    |
| wonders   |            |          |         |          |         |         |
| wondered  |            |          |         |          |         |         |
| wondering |            |          |         |          |         |         |
| wonderful | 1.42       | 1.00     | -1.73   | 2.45     | 1.86    | 0.00    |
| word      | - .06      | - .33    | - .56   | .65      | 0.00    | 0.00    |
| words     |            |          |         |          |         |         |
| work      | .06        | 1.07     | 1.16    | 1.58     | 0.00    | .79     |
| works     |            |          |         |          |         |         |
| worked    |            |          |         |          |         |         |
| working   |            |          |         |          |         |         |
| world     | -1.03      | .94      | .05     | 1.40     | 0.00    | 0.00    |
| worry     | -2.20      | .25      | -1.64   | 2.76     | 0.00    | 0.00    |
| worries   |            |          |         |          |         |         |
| worried   |            |          |         |          |         |         |
| worrying  |            |          |         |          |         |         |

|         | Evaluation | Activity | Potency | Polarity | N. Aff. | N. Ach. |
|---------|------------|----------|---------|----------|---------|---------|
| worth   | .65        | .11      | .42     | .78      | 0.00    | 0.00    |
| write   | .51        | .21      | .25     | .60      | 0.00    | 0.00    |
| writes  |            |          |         |          |         |         |
| wrote   |            |          |         |          |         |         |
| written |            |          |         |          |         |         |
| writing |            |          |         |          |         |         |
| year    | .24        | -.26     | -.18    | .40      | 0.00    | 0.00    |
| years   |            |          |         |          |         |         |
| yes     | .38        | .86      | -.35    | 1.00     | 0.00    | 0.00    |
| yet     | -1.45      | -1.16    | -.51    | 1.93     | 0.00    | 0.00    |
| young   | .98        | 1.02     | -2.60   | 2.96     | 2.07    | 0.00    |
| younger | .18        | .74      | -1.82   | 1.97     | .97     | 0.00    |

## APPENDIX III

Lists of selected words having high, medium and low values for Semantic Differential factors evaluation, activity, potency and polarity; lists of all words having other than zero value on Semantic Differential factors need affiliation and need achievement.



List of words from the modified Heise dictionary having Semantic Differential evaluation factor values falling within three high, medium, and low ranges: 1.00 or more, .20 to -.20, and -1.00 or less.

| +1.00 or more |      | + .20----- - .20 |       | -1.00 or less |       |
|---------------|------|------------------|-------|---------------|-------|
| beauty        | 2.21 | above            | .05   | about         | -1.75 |
| appoint       | 1.15 | actual           | - .14 | alone         | -1.96 |
| baby          | 1.39 | again            | - .15 | argue         | -2.85 |
| bank          | 1.24 | all              | .11   | argument      | -2.47 |
| bed           | 1.37 | allow            | .05   | attack        | -2.27 |
| best          | 1.31 | almost           | - .11 | bad           | -3.35 |
| bird          | 1.07 | always           | .11   | battle        | -2.93 |
| boat          | 1.08 | appear           | - .06 | away          | -1.43 |
| book          | 1.07 | arm              | .05   | behind        | -1.03 |
| <b>born</b>   | 1.01 | ask              | - .18 | black         | -1.80 |
| bread         | 1.14 | attempt          | - .15 | blood         | -1.11 |
| brother       | 1.41 | attention        | - .19 | blow          | -1.09 |
| build         | 1.03 | box              | .07   | break         | -2.44 |
| child         | 1.32 | bright           | - .11 | burn          | -2.47 |
| church        | 2.40 | center           | - .08 | casse         | -2.06 |
| college       | 1.07 | certain          | - .02 | cold          | -2.41 |
| color         | 1.09 | chance           | - .02 | cost          | -1.00 |
| content       | 1.28 | change           | .04   | court         | -1.31 |
| country       | 1.24 | chose            | .09   | crowd         | -1.80 |
| daughter      | 1.68 | class            | .09   | cry           | -1.30 |
| dog           | 1.30 | cloud            | .19   | cut           | +1.88 |
| easy          | 1.05 | come             | .10   | danger        | -2.75 |
| egg           | 1.12 | connection       | - .11 | dangerous     | -2.43 |

## Evaluation factor

| +1.00 or more |      | +.20----- -.20 |      | -1.00 or less |       |
|---------------|------|----------------|------|---------------|-------|
| enjoy         | 1.75 | contain        | .20  | dead          | -1.77 |
| enter         | 1.04 | cross          | -.05 | deaths        | -2.76 |
| evening       | 1.18 | custom         | -.05 | debt          | -3.08 |
| excellent     | 1.64 | department     | .15  | deep          | -1.30 |
| family        | 1.78 | describe       | -.06 | destroy       | -1.89 |
| farm          | 1.48 | difference     | -.10 | die           | -1.54 |
| farmer        | 1.08 | direction      | -.14 | difficult     | -2.11 |
| father        | 1.22 | discuss        | .17  | difficulty    | -1.97 |
| fine          | 2.11 | doorway        | .09  | disease       | -3.46 |
| flower        | 1.67 | election       | -.13 | doubts        | -1.19 |
| free          | 1.02 | electric       | -.17 | down          | -1.32 |
| freedom       | 1.70 | enough         | -.12 | duty          | -1.00 |
| fresh         | 1.60 | event          | .11  | else          | -1.23 |
| friend        | 2.06 | exist          | .12  | enemy         | -3.33 |
| friendly      | 1.92 | experiment     | .00  | everywhere    | -1.03 |
| gain          | 1.03 | fact           | .11  | fail          | -2.45 |
| garden        | 1.42 | few            | -.12 | failure       | -2.96 |
| gentleman     | 1.42 | fill           | -.13 | fall          | -2.17 |
| girl          | 1.45 | find           | .16  | fear          | -2.25 |
| give          | 1.01 | fellow         | -.07 | fight         | -2.27 |
| glad          | 1.19 | goods          | -.09 | fire          | -3.53 |
| god           | 2.35 | grey           | -.12 | force         | -1.35 |
| good          | 1.70 | ground         | -.05 | foreign       | -1.39 |
| great         | 1.55 | head           | .13  | hardly        | -1.46 |
| happy         | 1.64 | hear           | .06  | hate          | -3.11 |
| health        | 1.29 | hold           | -.07 | heavy         | -1.68 |

## Evaluation factor

| +1.00 or more |      | +.20----- -.20 |       | - 1.00 or less |       |
|---------------|------|----------------|-------|----------------|-------|
| help          | 1.08 | hour           | .04   | hide           | -1.59 |
| home          | 2.12 | human          | - .18 | hot            | -2.05 |
| inventor      | 1.06 | important      | .10   | hurt           | -2.65 |
| job           | 1.03 | include        | - .07 | impossible     | -1.93 |
| joy           | 1.61 | influence      | .00   | kill           | -3.29 |
| kiss          | 1.85 | instructor     | .02   | last           | -2.08 |
| knowledge     | 1.50 | know           | .18   | late           | -1.35 |
| lady          | 1.37 | leader         | .02   | later          | -1.46 |
| live          | 1.22 | machinery      | .07   | lost           | -2.39 |
| love          | 1.76 | main           | .08   | loss           | -1.72 |
| marry         | 1.94 | man            | .05   | might          | -1.24 |
| mat           | 1.15 | manufacture    | - .07 | middle         | -1.14 |
| members       | 1.14 | mark           | .03   | miss           | -1.82 |
| milk          | 1.38 | market         | - .13 | missing        | -2.12 |
| mother        | 1.68 | meeting        | - .03 | must           | -1.51 |
| music         | 2.08 | mention        | - .07 | nervous        | -1.99 |
| nation        | 1.42 | moment         | .06   | never          | -1.03 |
| nice          | 1.76 | motor          | .15   | no             | -2.09 |
| night         | 1.15 | mountain       | .00   | none           | -1.82 |
| occasion      | 1.00 | nature         | .02   | not            | -1.36 |
| offer         | 1.00 | need           | - .07 | nothing        | -1.01 |
| open          | 1.15 | next           | .16   | oppose         | -1.04 |
| original      | 1.09 | notice         | .19   | order          | -1.32 |
| parent        | 1.34 | now            | .18   | out            | -1.61 |
| peace         | 2.03 | officer        | .19   | politics       | -1.38 |
| picture       | 1.41 | older          | .08   | poor           | -1.63 |

## Evaluation factor

| +1.00 or more |      | +.20----- -.20 |       | -1.00 or less |       |
|---------------|------|----------------|-------|---------------|-------|
| pleasant      | 2.18 | once           | - .15 | price         | -1.33 |
| property      | 1.07 | one            | - .13 | problem       | -1.60 |
| protect       | 1.32 | opinion        | - .02 | quit          | -1.83 |
| quality       | 1.35 | outside        | - .14 | refuse        | -1.73 |
| quiet         | 1.17 | paper          | .20   | sheet         | -2.46 |
| receive       | 1.08 | part           | .17   | single        | -1.22 |
| religion      | 1.57 | particular     | - .06 | situation     | -1.40 |
| religious     | 2.07 | pass           | .20   | sometime      | -1.04 |
| satisfy       | 1.66 | past           | .19   | somewhat      | -1.02 |
| silent        | 1.63 | pay            | - .19 | sorrow        | -1.71 |
| silver        | 1.23 | people         | .18   | stop          | -1.19 |
| sister        | 1.11 | permanent      | .02   | strange       | -1.46 |
| sleep         | 1.67 | permit         | .06   | suffer        | -2.23 |
| small         | 1.08 | person         | .19   | surround      | -1.40 |
| soft          | 1.49 | personal       | .19   | tax           | -1.76 |
| son           | 1.45 | point          | - .15 | terrible      | -3.26 |
| spring        | 1.59 | practically    | .04   | thing         | -1.63 |
| star          | 1.39 | product        | .16   | throw         | -1.20 |
| succeed       | 1.12 | prove          | .00   | too           | -1.40 |
| success       | 1.56 | provide        | .13   | trouble       | -2.59 |
| successful    | 1.75 | public         | - .13 | war           | -3.96 |
| summer        | 1.22 | purpose        | - .11 | wild          | -1.94 |
| support       | 1.32 | put            | .14   | winter        | -2.21 |
| sweet         | 1.83 | quick          | - .12 | world         | -1.03 |
| together      | 1.22 | quite          | - .11 | worry         | -2.20 |
| tree          | 1.23 | ready          | - .10 | yet           | -1.45 |

## Evaluation factor

| +1.00 or more |      | + .20----- -.20 |       | -1.00 or less |
|---------------|------|-----------------|-------|---------------|
| true          | 1.23 | really          | - .15 |               |
| uncle         | 1.36 | recent          | .10   |               |
| victory       | 1.06 | relation        | .09   |               |
| voice         | 1.08 | report          | .02   |               |
| white         | 1.13 | rich            | - .19 |               |
| won           | 1.28 | rise            | .08   |               |
| wise          | 1.49 | run             | .20   |               |
| wish          | 1.14 | sea             | .13   |               |
| woman         | 1.65 | serious         | .08   |               |
| wonderful     | 1.42 | set             | .15   |               |
|               |      | settle          | .09   |               |
|               |      | several         | - .13 |               |
|               |      | should          | - .14 |               |
|               |      | shoulder        | - .12 |               |
|               |      | sign            | .05   |               |
|               |      | sit             | - .15 |               |
|               |      | some            | .00   |               |
|               |      | something       | .01   |               |
|               |      | soon            | .03   |               |
|               |      | sorry           | .13   |               |
|               |      | space           | - .08 |               |
|               |      | stand           | .15   |               |
|               |      | stay            | .00   |               |
|               |      | study           | .06   |               |
|               |      | subject         | - .17 |               |
|               |      | such            | .10   |               |

Evaluation factor

244

+1.00 or more

+ .20----- -.20

-1.00 or less

|         |       |
|---------|-------|
| suggest | .00   |
| surface | .02   |
| tell    | - .11 |
| their   | - .14 |
| then    | .19   |
| try     | .03   |
| turn    | - .03 |
| type    | - .16 |
| very    | - .09 |
| watch   | - .07 |
| wear    | - .01 |
| wonder  | - .13 |
| word    | - .06 |
| work    | .06   |
| younger | .18   |

List of words from the modified Heise dictionary having Semantic Differential activity factor values falling within three high, medium, and low ranges: 1.00 or more, .20 to -.20, and -1.00 or less.

| +1.00 or more |      | +.20----- -.20 |       | -1.00 or less |       |
|---------------|------|----------------|-------|---------------|-------|
| action        | 1.43 | admit          | - .16 | ago           | -1.09 |
| appoint       | 1.08 | again          | - .03 | alone         | -1.88 |
| argue         | 1.32 | ask            | - .14 | beauty        | -1.23 |
| argument      | 1.38 | attention      | .17   | bed           | -1.40 |
| arrive        | 1.20 | bank           | - .06 | black         | -2.07 |
| attack        | 2.36 | buy            | .20   | box           | -1.38 |
| attempt       | 1.03 | cause          | .16   | bread         | -1.75 |
| baby          | 1.42 | change         | .14   | building      | -1.42 |
| ball          | 1.40 | class          | .06   | center        | -1.39 |
| battle        | 1.82 | cold           | .05   | classroom     | -1.04 |
| begin         | 1.26 | compete        | - .17 | contain       | -1.48 |
| best          | 1.01 | concern        | .00   | content       | -1.02 |
| bird          | 2.05 | consider       | .14   | continue      | -1.11 |
| blood         | 1.33 | daughter       | - .18 | daydream      | -1.76 |
| blow          | 1.21 | decision       | - .16 | dead          | -4.17 |
| box           | 1.16 | difficult      | .13   | death         | -2.29 |
| brother       | 1.13 | distance       | - .13 | deep          | -1.37 |
| build         | 1.54 | easily         | .13   | die           | -2.54 |
| chief         | 1.31 | enlist         | .14   | different     | -1.28 |
| child         | 1.55 | entire         | - .04 | door          | -1.57 |
| city          | 1.08 | event          | .19   | doorway       | -1.63 |
| college       | 1.29 | everything     | - .13 | down          | -1.34 |
| crowd         | 1.16 | express        | - .09 | dream         | -1.03 |

## Activity factor

| +1.00 or more |      | +.20----- -.20 |       | -1.00 or less |       |
|---------------|------|----------------|-------|---------------|-------|
| danger        | 1.49 | fact           | .07   | easy          | -1.09 |
| dangerous     | 1.86 | fall           | - .04 | egg           | -3.13 |
| demand        | 1.35 | fear           | - .04 | else          | -1.82 |
| desire        | 1.06 | fellow         | - .06 | end           | -1.92 |
| destroy       | 1.50 | fill           | .07   | enough        | -1.42 |
| discover      | 1.03 | find           | .13   | evening       | -1.26 |
| discovery     | 1.47 | follow         | .20   | ever          | -1.73 |
| effort        | 1.07 | foreign        | - .09 | fail          | -1.66 |
| empire        | 1.03 | general        | - .16 | failure       | -1.58 |
| enjoy         | 1.23 | good           | .08   | far           | -1.13 |
| excellent     | 1.67 | hate           | .11   | forget        | -1.60 |
| experiment    | 1.38 | have           | .10   | former        | -1.70 |
| family        | 1.26 | heat           | - .12 | garden        | -1.17 |
| farmer        | 1.69 | hope           | .10   | goods         | -1.11 |
| fast          | 1.65 | how            | - .11 | green         | -1.11 |
| fight         | 2.11 | hurt           | - .03 | grey          | -1.60 |
| fire          | 2.66 | husband        | .14   | hang          | -1.44 |
| football      | 1.75 | information    | .12   | heavy         | -1.40 |
| force         | 1.24 | just           | - .15 | hill          | -1.19 |
| fraternity    | 1.58 | learn          | - .12 | iron          | -2.32 |
| free          | 1.28 | look           | .08   | late          | -1.15 |
| freedom       | 1.17 | missing        | .11   | later         | -1.95 |
| friendly      | 1.23 | month          | - .10 | less          | -1.70 |
| game          | 1.51 | must           | .09   | letter        | -1.04 |
| government    | 1.30 | native         | - .11 | likely        | -1.61 |
| great         | 2.41 | need           | .03   | listen        | -2.09 |



## Activity factor

| +1.00 or more |      | +.20----- -.20 |       | -1.00 or less |       |
|---------------|------|----------------|-------|---------------|-------|
| group         | 1.12 | neighbor       | - .10 | long          | -1.23 |
| grow          | 1.19 | next           | - .04 | loss          | -1.32 |
| happy         | 1.79 | now            | - .06 | low           | -2.44 |
| home          | 1.73 | numerous       | .16   | merely        | -1.25 |
| hot           | 1.10 | office         | .20   | metal         | -1.82 |
| idea          | 1.07 | opinion        | - .08 | middle        | -1.63 |
| industry      | 1.74 | own            | - .12 | moon          | -1.71 |
| inventor      | 1.53 | parent         | - .02 | mountain      | -1.13 |
| job           | 1.20 | part           | - .04 | nature        | -1.06 |
| joy           | 1.73 | person         | .19   | near          | -1.34 |
| kiss          | 1.90 | point          | - .16 | nice          | -1.28 |
| laugh         | 1.93 | position       | .07   | night         | -1.05 |
| law           | 1.05 | possess        | .05   | none          | -2.00 |
| leader        | 1.40 | practically    | - .07 | nothing       | -2.00 |
| life          | 1.11 | presence       | .00   | object        | -1.28 |
| lift          | 1.70 | product        | - .15 | old           | -2.42 |
| love          | 1.10 | profit         | .14   | older         | -1.27 |
| machine       | 1.02 | purpose        | .19   | once          | -1.02 |
| member        | 1.51 | quality        | - .18 | one           | -1.19 |
| modern        | 1.13 | read           | - .04 | ought         | -1.14 |
| mother        | 1.38 | really         | - .08 | paper         | -1.18 |
| movement      | 1.20 | regard         | - .09 | peace         | -1.82 |
| music         | 1.33 | religious      | .02   | permanent     | -1.99 |
| navy          | 1.41 | remember       | - .20 | personal      | -1.76 |
| officer       | 1.54 | reply          | .12   | picture       | -1.79 |

## Activity factor

| +1.00 or more |      | +.20----- -.20 |       | -1.00 or less |       |
|---------------|------|----------------|-------|---------------|-------|
| oppose        | 1.05 | represent      | .20   | place         | -1.05 |
| original      | 1.05 | safe           | - .13 | pleasant      | -1.63 |
| play          | 1.85 | satisfy        | .04   | poor          | -1.50 |
| politics      | 1.11 | school         | - .09 | quiet         | -2.57 |
| power         | 1.51 | see            | .13   | rather        | -1.04 |
| prepare       | 1.38 | sell           | .03   | relation      | -1.04 |
| produce       | 1.06 | send           | .09   | remain        | -1.61 |
| progress      | 1.39 | settle         | .10   | rest          | -1.49 |
| protect       | 1.19 | should         | .02   | road          | -1.53 |
| prove         | 1.31 | side           | .01   | rock          | -3.16 |
| pull          | 1.64 | situation      | - .15 | sand          | -1.24 |
| quick         | 1.73 | something      | - .14 | scarce        | -1.04 |
| quickly       | 1.36 | sound          | .11   | seem          | -1.89 |
| ride          | 1.11 | speak          | .00   | serious       | -1.05 |
| river         | 1.07 | spirit         | .15   | short         | -1.08 |
| sailor        | 2.43 | spread         | - .09 | silence       | -2.74 |
| sea           | 1.29 | star           | .05   | silent        | -3.41 |
| service       | 1.06 | statement      | - .18 | simply        | -1.58 |
| shore         | 1.01 | story          | - .12 | sit           | -1.53 |
| soldier       | 1.13 | study          | - .20 | sleep         | -3.20 |
| solve         | 1.25 | such           | .13   | slow          | -2.09 |
| son           | 1.49 | suggest        | - .11 | soft          | -2.16 |
| spring        | 1.05 | sun            | .08   | sometimes     | -1.23 |
| success       | 1.46 | supply         | - .17 | sorrow        | -1.70 |
| successful    | 1.75 | sure           | - .02 | sorry         | -1.57 |
| summer        | 1.27 | sweet          | - .09 | space         | -1.64 |

## Activity factor

| +1.00 or more |      | +.20----- -.20 |       | -1.00 or less |       |
|---------------|------|----------------|-------|---------------|-------|
| support       | 1.54 | teacher        | .20   | steel         | -2.01 |
| surprise      | 1.63 | tell           | - .11 | stone         | -2.87 |
| talk          | 1.04 | thought        | .07   | strange       | -1.00 |
| tax           | 1.19 | too            | - .09 | thus          | -1.07 |
| train         | 1.12 | total          | .12   | type          | -1.16 |
| university    | 1.41 | turn           | .03   | usual         | -1.18 |
| victory       | 1.35 | use            | - .17 | wait          | -1.29 |
| walk          | 1.24 | visit          | - .14 | wall          | -1.99 |
| war           | 2.22 | voice          | - .02 | white         | -1.31 |
| warn          | 1.88 | vote           | .19   | whole         | -1.33 |
| water         | 1.18 | want           | - .06 | wide          | -1.21 |
| wealth        | 1.08 | way            | .15   | window        | -2.69 |
| wild          | 1.42 | worth          | .11   | yet           | -1.16 |
| win           | 1.28 |                |       |               |       |
| winter        | 1.06 |                |       |               |       |
| wonderful     | 1.00 |                |       |               |       |
| work          | 1.07 |                |       |               |       |
| young         | 1.02 |                |       |               |       |

List of words from the modified Heise dictionary having Semantic Differential potency factor values falling within three high, medium, and low ranges; 1.00 or more, .15 to -.15, and -1.00 or less.

| +1.00 or more |      | +.15----- -.15 |       | -1.00 or less |       |
|---------------|------|----------------|-------|---------------|-------|
| admiral       | 1.49 | above          | .05   | alone         | -1.26 |
| advantage     | 1.14 | actual         | .13   | artist        | -1.37 |
| army          | 1.77 | along          | - .12 | away          | -1.44 |
| attempt       | 1.34 | apprentice     | - .03 | baby          | -3.20 |
| attention     | 1.09 | ask            | . .05 | beautiful     | -2.83 |
| ball          | 1.06 | before         | - .02 | beauty        | -2.40 |
| bank          | 1.59 | beginning      | - .13 | bird          | -2.17 |
| black         | 1.24 | belong         | .03   | born          | -1.71 |
| build         | 1.45 | blow           | .00   | child         | -2.69 |
| building      | 2.40 | body           | - .08 | content       | -1.40 |
| car           | 1.04 | both           | - .15 | cry           | -1.61 |
| chief         | 1.21 | bright         | - .08 | daughter      | -2.46 |
| cold          | 1.39 | brother        | - .14 | daydream      | -1.75 |
| college       | 1.98 | carry          | .10   | describe      | -1.35 |
| control       | 1.69 | center         | .03   | desire        | -1.62 |
| dangerous     | 1.04 | choose         | - .11 | doubt         | -1.00 |
| deep          | 1.38 | complete       | .10   | dream         | -1.97 |
| develop       | 1.44 | consider       | - .01 | enjoy         | -1.58 |
| distance      | 1.09 | day            | - .11 | evening       | -1.25 |
| dollar        | 1.07 | death          | .10   | face          | -1.20 |
| door          | 1.19 | debt           | .01   | family        | -2.12 |
| doorway       | 1.38 | destroy        | .07   | fine          | -1.53 |
| duty          | 2.03 | discuss        | .15   | flower        | -2.20 |
| election      | 1.09 | disease        | .15   | friend        | -1.55 |

## Potency factor

| +1.00 or more |      | +.15----- -.15 |       | -1.00 or less |       |
|---------------|------|----------------|-------|---------------|-------|
| electric      | 1.36 | do             | .15   | friendly      | -1.81 |
| empire        | 1.07 | down           | - .12 | girl          | -2.99 |
| escape        | 1.80 | drive          | .14   | glad          | -2.39 |
| exist         | 1.19 | ear            | - .02 | god           | -1.60 |
| farmer        | 1.86 | easily         | - .09 | great         | -1.85 |
| football      | 1.41 | entire         | .13   | happy         | -2.29 |
| force         | 1.43 | everything     | .05   | help          | -1.48 |
| government    | 1.18 | example        | - .02 | hide          | -1.19 |
| hang          | 1.54 | explain        | - .06 | home          | -2.44 |
| hard          | 1.64 | express        | - .14 | hope          | -1.23 |
| heavy         | 1.85 | famous         | .03   | hurt          | -1.88 |
| hill          | 1.35 | farm           | .01   | imagine       | -1.17 |
| impossible    | 1.06 | few            | - .11 | include       | -1.04 |
| industry      | 1.78 | fill           | - .07 | indeed        | -1.04 |
| iron          | 4.50 | fire           | .11   | join          | -1.44 |
| judge         | 1.80 | forget         | - .05 | joy           | -2.42 |
| knowledge     | 1.21 | free           | - .04 | kiss          | -3.52 |
| land          | 1.39 | gather         | - .12 | lady          | -2.37 |
| law           | 2.36 | got            | .07   | laugh         | -1.59 |
| leader        | 1.62 | grey           | .15   | little        | -2.12 |
| lift          | 1.45 | grow           | .12   | lose          | -1.45 |
| machine       | 1.67 | hardly         | .05   | love          | -3.33 |
| machinery     | 1.60 | have           | .13   | marry         | -2.34 |
| man           | 1.31 | health         | .07   | meet          | -1.07 |
| material      | 1.92 | house          | .01   | mother        | -2.77 |

## Potency factor

| +1.00 or more |      | +.15----- -.15 |      | -1.00 or less |       |
|---------------|------|----------------|------|---------------|-------|
| metal         | 3.44 | husband        | .07  | music         | -2.57 |
| minute        | 1.05 | indicate       | -.01 | nervous       | -1.76 |
| more          | 1.15 | invite         | -.10 | nice          | -1.42 |
| motor         | 1.13 | leave          | -.14 | night         | -1.01 |
| mountain      | 2.13 | listen         | .03  | occasion      | -1.14 |
| nation        | 1.37 | live           | .07  | parent        | -1.41 |
| navy          | 1.56 | low            | .02  | people        | -1.06 |
| officer       | 1.89 | main           | .13  | pleasant      | -1.28 |
| official      | 1.31 | mark           | .07  | poet          | -2.39 |
| oil           | 2.13 | mean           | -.11 | poor          | -1.69 |
| oppose        | 1.35 | milk           | .15  | receive       | -1.33 |
| order         | 1.32 | morning        | -.09 | religion      | -1.75 |
| paper         | 1.08 | move           | .13  | reply         | -1.07 |
| permanent     | 1.66 | name           | .08  | room          | -1.07 |
| politics      | 1.81 | necessary      | .12  | say           | -1.12 |
| power         | 2.06 | never          | -.09 | simply        | -1.12 |
| prepare       | 1.28 | nothing        | -.13 | song          | -2.38 |
| prevent       | 1.63 | notice         | .11  | sister        | -2.80 |
| progress      | 1.15 | original       | .08  | social        | -1.09 |
| property      | 1.22 | other          | -.14 | soft          | -1.38 |
| rate          | 1.06 | ought          | .00  | son           | -2.00 |
| read          | 2.00 | out            | .13  | sorrow        | -2.52 |
| rock          | 3.85 | place          | .04  | soul          | -1.87 |
| sailor        | 1.21 | possess        | .02  | spring        | -2.33 |
| sand          | 1.34 | practically    | -.04 | story         | -1.18 |

## Potency factor

|               |      | +.15----- -.15 |       | -1.00 or less |       |
|---------------|------|----------------|-------|---------------|-------|
| +1.00 or more |      |                |       |               |       |
| service       | 1.14 | private        | - .13 | suffer        | -1.93 |
| ship          | 1.45 | proper         | .12   | summer        | -1.59 |
| silver        | 1.40 | protect        | .04   | surprise      | -1.12 |
| soldier       | 1.44 | quick          | .10   | sweet         | -2.44 |
| solve         | 1.26 | read           | - .01 | together      | -1.55 |
| space         | 1.03 | reason         | .04   | visit         | -1.13 |
| stand         | 1.09 | regard         | .13   | voice         | -1.77 |
| steel         | 4.60 | remain         | .15   | wife          | -3.12 |
| stone         | 2.68 | rich           | .00   | wish          | -1.25 |
| stop          | 1.27 | satisfy        | .09   | woman         | -2.69 |
| strong        | 2.21 | scarce         | - .05 | wonderful     | -1.73 |
| study         | 1.13 | send           | - .05 | worry         | -1.64 |
| surface       | 1.51 | several        | - .08 | young         | -2.60 |
| tax           | 1.26 | short          | .04   | younger       | -1.82 |
| teacher       | 1.08 | shore          | .10   |               |       |
| train         | 1.35 | side           | - .07 |               |       |
| tree          | 2.17 | silence        | - .06 |               |       |
| victory       | 1.30 | single         | .13   |               |       |
| vote          | 1.18 | sit            | - .10 |               |       |
| winter        | 1.36 | speech         | - .13 |               |       |
| wise          | 1.26 | spread         | .12   |               |       |
| work          | 1.16 | start          | - .07 |               |       |
|               |      | step           | .05   |               |       |
|               |      | support        | - .11 |               |       |
|               |      | take           | - .13 |               |       |

## Potency factor

+1.00 or more

+.15----- -.15

-1.00 or less

|         |       |
|---------|-------|
| teach   | .03   |
| then    | .07   |
| thing   | .11   |
| thought | .10   |
| throw   | - .02 |
| try     | .03   |
| type    | - .07 |
| usual   | - .02 |
| very    | .04   |
| walk.   | .13   |
| war     | - .04 |
| warn    | .07   |
| week    | .15   |
| when    | .12   |
| wild    | .17   |
| world   | .05   |



List of words from the modified Heise dictionary having Semantic Differential polarity factor values falling within three high, medium, and low ranges: .60 or less, 1.35 to 1.65, and 2.75 or more.

| .60 or less |     | 1.35-----1.65 |      | +2.75 or more |      |
|-------------|-----|---------------|------|---------------|------|
| across      | .57 | action        | 1.50 | alone         | 2.99 |
| actual      | .35 | around        | 1.37 | argue         | 3.18 |
| admit       | .35 | arrive        | 1.62 | argument      | 2.84 |
| almost      | .39 | artist        | 1.60 | attack        | 3.41 |
| apprentice  | .55 | begin         | 1.35 | baby          | 3.77 |
| ask         | .23 | big           | 1.39 | bad           | 3.48 |
| both        | .54 | blow          | 1.63 | battle        | 3.49 |
| bright      | .52 | boat          | 1.52 | beauty        | 3.49 |
| certainly   | .54 | box           | 1.51 | bird          | 3.17 |
| chance      | .53 | boy           | 1.48 | black         | 3.01 |
| come        | .31 | renter        | 1.39 | building      | 2.93 |
| committee   | .58 | city          | 1.41 | child         | 3.37 |
| complete    | .35 | classroom     | 1.41 | cold          | 2.78 |
| consider    | .51 | company       | 1.43 | danger        | 3.17 |
| day         | .47 | contain       | 1.59 | dangerous     | 3.23 |
| difference  | .45 | continue      | 1.41 | daughter      | 2.98 |
| effect      | .58 | country       | 1.46 | dead          | 4.58 |
| entire      | .44 | describe      | 1.47 | death         | 3.59 |
| event       | .54 | develop       | 1.61 | debt          | 3.10 |
| every       | .59 | different     | 1.57 | die           | 3.08 |
| everything  | .22 | easy          | 1.49 | disease       | 3.53 |
| express     | .31 | effort        | 1.49 | egg           | 3.40 |
| fill        | .16 | electric      | 1.56 | enemy         | 3.36 |
| find        | .52 | empire        | 1.58 | fail          | 2.98 |

## Polarity factor

| .60 or less |     | 1.35-----1.65 |      | +2.75 or more |      |
|-------------|-----|---------------|------|---------------|------|
| follow      | .59 | enough        | 1.43 | failure       | 3.42 |
| general     | .48 | enter         | 1.45 | family        | 3.04 |
| get         | .42 | exist         | 1.46 | fight         | 3.11 |
| have        | .31 | experiment    | 1.64 | fire          | 4.42 |
| heat        | .56 | face          | 1.37 | flower        | 2.78 |
| hold        | .46 | factory       | 1.38 | friendly      | 2.91 |
| husband     | .50 | farm          | 1.58 | girl          | 3.38 |
| know        | .45 | father        | 1.39 | god           | 2.94 |
| main        | .37 | foreign       | 1.44 | great         | 3.41 |
| manufacture | .58 | free          | 1.64 | happy         | 3.34 |
| many        | .55 | gain          | 1.46 | hate          | 3.17 |
| mark        | .29 | give          | 1.51 | heavy         | 2.86 |
| morning     | .59 | grey          | 1.61 | home          | 3.67 |
| name        | .32 | group         | 1.35 | hurt          | 3.25 |
| need        | .64 | hardly        | 1.61 | iron          | 5.10 |
| neighbor    | .45 | health        | 1.47 | joy           | 3.38 |
| next        | .30 | hope          | 1.53 | kill          | 3.44 |
| notice      | .47 | imagine       | 1.49 | kiss          | 4.41 |
| now         | .39 | introduce     | 1.41 | lady          | 2.88 |
| opinion     | .28 | join          | 1.51 | lose          | 2.90 |
| outside     | .60 | kind          | 1.37 | love          | 3.92 |
| part        | .27 | life          | 1.64 | marry         | 3.12 |
| pass        | .57 | live          | 1.48 | metal         | 3.94 |
| past        | .51 | long          | 1.35 | mother        | 3.52 |
| point       | .45 | man           | 1.46 | music         | 3.56 |

## Polarity factor

| .60 or less |     | 1.35-----1.65 |      | +2.75 or more |      |
|-------------|-----|---------------|------|---------------|------|
| possess     | .37 | may           | 1.54 | pleasant      | 3.01 |
| practically | .09 | meet          | 1.58 | poor          | 2.79 |
| presence    | .54 | merely        | 1.39 | quiet         | 2.94 |
| product     | .32 | modern        | 1.52 | rock          | 4.99 |
| put         | .38 | more          | 1.48 | sailor        | 2.80 |
| read        | .58 | motor         | 1.40 | silence       | 2.81 |
| really      | .26 | movement      | 1.38 | silent        | 3.78 |
| reason      | .60 | much          | 1.37 | sister        | 3.05 |
| recent      | .58 | navy          | 1.36 | sleep         | 3.67 |
| report      | .57 | not           | 1.62 | soft          | 2.96 |
| rich        | .31 | object        | 1.35 | son           | 2.88 |
| see         | .48 | observe       | 1.37 | sorrow        | 3.49 |
| sell        | .35 | occassion     | 1.57 | sprung        | 3.01 |
| send        | .29 | official      | 1.54 | steel         | 5.03 |
| settle      | .40 | original      | 1.52 | stones        | 3.96 |
| several     | .32 | paper         | 1.59 | suffer        | 3.10 |
| should      | .38 | people        | 1.40 | sweet         | 3.05 |
| side        | .52 | popular       | 1.47 | terrible      | 3.29 |
| sign        | .41 | pressure      | 1.64 | war           | 4.54 |
| speak       | .57 | price         | 1.36 | wife          | 3.28 |
| spirit      | .45 | produce       | 1.43 | window        | 2.87 |
| statement   | .44 | prove         | 1.40 | winter        | 2.80 |
| student     | .59 | quality       | 1.40 | woman         | 3.24 |
| such        | .30 | quickly       | 1.61 | young         | 2.96 |
| suggest     | .23 | room          | 1.50 |               |      |
| tell        | .45 | sea           | 1.52 |               |      |

## Polarity factor

| .60 or less |     | 1.35-----1.65 |      | +2.75 or more |
|-------------|-----|---------------|------|---------------|
| then        | .40 | service       | 1.59 |               |
| thought     | .38 | short         | 1.47 |               |
| total       | .58 | single        | 1.44 |               |
| try         | .26 | sit           | 1.54 |               |
| turn        | .29 | situation     | 1.53 |               |
| very        | .40 | small         | 1.60 |               |
| view        | .38 | star          | 1.60 |               |
| want        | .47 | still         | 1.42 |               |
| way         | .60 | story         | 1.45 |               |
| write       | .60 | too           | 1.47 |               |
|             |     | uncle         | 1.41 |               |
|             |     | understand    | 1.38 |               |
|             |     | vote          | 1.41 |               |
|             |     | wait          | 1.46 |               |
|             |     | water         | 1.38 |               |
|             |     | whole         | 1.58 |               |
|             |     | work          | 1.58 |               |
|             |     | world         | 1.40 |               |

List of all words from the modified Heise dictionary  
having Semantic Differential need affiliation  
values.

|           |      |           |      |           |      |
|-----------|------|-----------|------|-----------|------|
| again     | .26  | fine      | 2.03 | little    | 1.21 |
| arrive    | .71  | flower    | 1.95 | love      | 2.76 |
| artist    | 1.03 | freedom   | 1.30 | marry     | 2.62 |
| baby      | 2.66 | fresh     | .77  | meet      | 1.06 |
| beautiful | 1.62 | friend    | 2.05 | mind      | .50  |
| beauty    | 1.65 | friendly  | 2.22 | mother    | 2.74 |
| bird      | 1.74 | girl      | 2.60 | music     | 2.92 |
| born      | .99  | give      | .76  | nice      | .90  |
| boy       | .52  | glad      | 2.00 | occasion  | 1.06 |
| brother   | .51  | god       | 2.19 | parent    | 1.35 |
| child     | 2.21 | good      | 1.13 | people    | .36  |
| church    | 1.05 | great     | 1.72 | pleasant  | .69  |
| content   | .84  | happy     | 2.32 | poet      | 1.27 |
| country   | .38  | help      | 1.32 | popular   | .81  |
| daughter  | 2.18 | home      | 2.74 | receive   | 1.32 |
| desire    | 1.11 | hope      | .91  | religion  | 1.92 |
| doctor    | .67  | indeed    | .52  | religious | 1.18 |
| dog       | 1.12 | introduce | .70  | reply     | .71  |
| dream     | .77  | joy       | 2.39 | safe      | .57  |
| enjoy     | 1.93 | kiss      | 2.99 | song      | 1.66 |
| enter     | .56  | know      | .35  | sister    | 2.19 |
| evening   | .55  | lady      | 2.27 | social    | .72  |
| eye       | .56  | laugh     | 1.18 | son       | 2.06 |
| family    | 2.39 | life      | .46  | soul      | 1.11 |

List of all words from the modified Heise dictionary having Semantic Differential need affiliation values.

|           |      |
|-----------|------|
| spend     | .53  |
| spring    | 2.41 |
| story     | .85  |
| summer    | 1.62 |
| surprise  | .77  |
| sweet     | 2.31 |
| take      | .10  |
| together  | 1.22 |
| town      | .50  |
| true      | .55  |
| visit     | .73  |
| voice     | 1.45 |
| wife      | 1.85 |
| wish      | .81  |
| woman     | 2.65 |
| wonderful | 1.86 |
| young     | 2.07 |
| younger   | .97  |

List of all words from the modified Heise dictionary having Semantic Differential need achievement factor values.

|           |      |            |      |           |      |
|-----------|------|------------|------|-----------|------|
| admiral   | 1.03 | excellent  | 1.41 | lift      | 1.04 |
| advantage | .85  | exist      | .79  | live      | .34  |
| answer    | .29  | experiment | .93  | machine   | 1.20 |
| appoint   | 1.01 | farmer     | 2.18 | machinery | 1.00 |
| arm       | .64  | fast       | .83  | make      | .39  |
| attempt   | .80  | football   | 1.81 | man       | .66  |
| ball      | 1.26 | fraternity | 1.06 | market    | .50  |
| best      | 1.07 | free       | .65  | member    | 1.02 |
| boat      | .84  | gain       | .59  | minute    | .74  |
| brother   | .56  | game       | 1.25 | modern    | .94  |
| build     | 1.84 | gentleman  | .94  | motor     | .76  |
| car       | .51  | government | 1.18 | nation    | .92  |
| chief     | .67  | grow       | .35  | navy      | 1.62 |
| college   | 1.88 | hard       | .92  | newspaper | .58  |
| company   | .90  | history    | .52  | office    | .30  |
| control   | 1.25 | idea       | .68  | officer   | 1.62 |
| country   | .48  | increase   | .33  | official  | .34  |
| decide    | .51  | industry   | 2.13 | original  | .62  |
| demand    | .27  | influence  | .49  | pass      | .25  |
| develop   | .85  | interest   | .27  | power     | 1.28 |
| discover  | .81  | inventor   | 1.17 | prepare   | 1.40 |
| discovery | 1.06 | job        | 1.20 | prevent   | 1.13 |
| dollar    | .63  | knowledge  | 1.38 | produce   | .93  |
| electric  | .65  | law        | 1.52 | progress  | 1.50 |
| escape    | .51  | leader     | 1.32 | protect   | .72  |

List of all words from the modified Heise dictionary having Semantic Differential need achievement factor values.

|            |      |      |      |
|------------|------|------|------|
| prove      | .66  | win  | 1.59 |
| quick      | .55  | wise | 1.32 |
| quickly    | 1.05 | work | .79  |
| ride       | .57  |      |      |
| right      | .31  |      |      |
| sailor     | 2.08 |      |      |
| sea        | .90  |      |      |
| service    | .67  |      |      |
| ship       | 1.10 |      |      |
| soldier    | 1.27 |      |      |
| solve      | 1.35 |      |      |
| star       | .51  |      |      |
| state      | .57  |      |      |
| step       | .35  |      |      |
| strong     | .99  |      |      |
| success    | 1.47 |      |      |
| successful | 1.79 |      |      |
| supply     | .27  |      |      |
| support    | .82  |      |      |
| sure       | .33  |      |      |
| train      | 1.20 |      |      |
| university | .88  |      |      |
| victory    | 1.62 |      |      |
| vote       | .36  |      |      |
| walk       | .57  |      |      |