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Jung's Word Association Test: Response Norms Annd Patterns of Disturbances

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JUNG'S WORD ASSOCIATION TEST: RESPONSE NORMS AND PATTERNS OF DISTURBANCES

by

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VITA

The author, Ross E. Keiser, is the son of Mrs. June (Riesenberg) Ulman and the late George E. Keiser. He was born on 21 April 1951 in Fostoria, Ohio.

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CHAPTER 1

THE PROBLEM

A great deal of research on word association tests has been published. Cramer (1968) lists over three hundred studies on word associations between 1950 and 1965, and it appears that at least that number have been published since. This is no doubt due in part to the ease by which word association tests can be given, and the ability to show verbal stimulus-response characteristics of individuals. Cramer (1968) goes so far as to state that "The word association test is perhaps the simplest of tasks meant to represent cognitive processes, in that we are looking at a complex chain of ideas we refer to as thinking."

In addition to research, word association tests are also used clinically. They have been used for the determination and diagnosis of pathology (Rapaport, Gill, & Schafer, 1968), for determination of autonomous complexes (Meier, 1968), and for suggestions for therapeutic focus (Kast, 1979).

While many researchers and clinicians formulate their own lists of stimulus words for word association tests based on studies of verbal learning, concept formation, recall, and recognition (Cramer, 1968), three more standard lists of stimulus words for word association tests are commonly used. These are the Kent-Rosanoff (Kent & Rosanoff, 1910),

the Menninger (Rapaport, Gill, & Schafer, 1968), and Jung (Lavin, 1980; Kast, 1979; & Riklin, 1955).

The response content norms for the Kent-Rosanoff word list have been published frequently (Jenkins & Palermo, 1960) and exhaustively (Palermo & Jenkins, 1964). Response content norms for the Menninger word list were published in 1946 (Rapaport, Gill, & Schafer, 1968) and updated with new norms in 1968 (Cramer). The necessity of publishing current response content norms for word association tests was established by Jenkins & Russell (1960) and by Jenkins & Palermo (1965), who found that response content norms changed both rapidly and systematically.

Despite its relative advantages of content and structure over the Menninger and Kent-Rosanoff lists, the Jung word list has not had English response content norms established, although German norms have been recently published (Kast, 1979). The use of the Jung word list, in both clinical and research settings, has no doubt been inhibited by this lack of response content norms.

Therefore, one problem of this research will be to establish a set of response content norms for the Jung word list. The responses of this norm group then may be compared and generalized to other groups and individuals, at other times, and/or under different testing situations (Buchwald, 1957).

A second area to be investigated in this study is the existence of the co-occurrence of disturbances of association

within the Jung word association test. While many studies have addressed the issue of structures of association (Cramer, 1968; Deese, 1964, 1965; and Johnson & Collier, 1969), these studies have all dealt with the relatedness and structure of the content of associative responses. No published studies have dealt with the structure or relatedness of disturbances of association to the stimulus words of this word list.

Hall and Lindzey (1965) describe Jung's notion of a complex as an "organized group or constellation of feelings, thought perceptions and memories" (p. 79), and Frey-Rohn (1964) states that Jung felt that disturbances of association were complex indicators. This assumes that delayed reaction time indicates that the stimulus word is somehow connected to a complex (Jung, 1906/1973), as does a failure to reproduce the response (Jung, 1909/1973).

It follows that, if increased reaction time or reproduction failure are disturbances of association, and if disturbances of association show a connection between a stimulus word and a complex, then correlations of co-occurrence of disturbances of association on various stimulus words would indicate correlations of co-occurrence of complexes.

Jung and Ricklin (1904/1973) postulated that normal subjects have chronic feeling toned complexes. If this is true, then an examination of the patterns of disturbances of association of normal subjects would show patterns of

complexes which should be relatively consistent. Assuming the relative homogeneity of a normal sample, it is hypothesized that the normal subjects would exhibit disturbances of association to substantially consistent tests of stimulus words. These disturbances would exist in clusters which would be relatively stable. It is the purpose of this study to, in addition to the determination of response content norms for the Jung word association test, show the existence and nature of the co-occurrences of disturbance of association to it, and the structure and strength of those co-occurrences.

This study should be of help to the clinician by providing response norms and disturbance norms which the clinician can compare to the responses and disturbances of his/her subjects. This will allow the clinician to determine areas in which subjects are similar or dissimilar to the norm group, and to make inferences therefrom about the subjects.

The researcher may use this study in determining response differences between this group of subjects and Kast's (1979) Swiss subjects. This study can also provide a baseline to which other groups at other times may be compared, on both the Jung word association test and other word association tests.

CHAPTER 2

A REVIEW OF THE LITERATURE

Word association tests can best be understood, especially as regards their importance, when viewed from the historical perspective. The concept of association has been discussed by Western philosophers since the time of the Greeks.

Aristotle established in his Metaphysics a frame of reference for the study of associations (1928). His system postulated that one idea of thought follows another according to a system of definite laws.

Aristotle speaks of the necessity of associability, that concepts are associated because of their basic properties, and that this is a natural, inevitable occurrence (1928). In this vein he also discusses that, for ideas to be associable, they must, like numbers, be successive, and neither identical nor unrelated. Similarly, ideas must not occur merely at random. Also, the quality in addition to the quantity (succession) is also a consideration in the determination of associability.

More succinctly, Warren (1921) summarized these as four principles; a) that the sequence of cognitive experiences occurs through a process of association rather than by chance, b) that habit is a factor in the determination of

this process of association, c) that contrast and contiguity are the sole bases of these associations, and d) that this process holds true for both purposive and spontaneous thought.

Of the many more recent philosophers writing on the concept of associations, the most important in the philosophical bases of word association tests seem to be Locke and Hume (Deese, 1965). Locke's most important contribution was that of crystallizing associations as a definite concept (Deese, 1965). Hume's most important contribution was the expansion of this concept and the subsequent establishment of a classification system (Deese, 1965). This classification system is still evident today when one examines writings on word associations. This system separates associations by means of resemblance, contiguity, and causality (Rapaport, 1974).

The concept of resemblance, which includes the concept of contrast, takes into account the qualitative aspects of an idea. This assumes that intrinsic aspects of an association are related. The concept of contiguity refers to the temporal and/or spatial relatedness of the perception or impressions. Causality points to the relationship between cause and effect.

Both Hume and Locke were considered to be of the British Empiricist school, and this empirical attitude probably influenced Sir Francis Galton in his experiments on word associations. Galton was preceded in his attempts to

measure the psyche in an empirical manner by Gustav Fechner, who published his experimental studies in Elemente der Psychophysik (1860). Fechner based much of his empirical method on the psychophysical work of Ernst Henrich Weber (Gescheider, 1976). Although Fechner's main interest was on metaphysical matters, his empirical studies, which were an attempt to prove the equivalence of mind and matter, were often concerned with associations (Gescheider, 1976). Both Fechner's and Weber's work on psychophysics had a large influence on Wilhelm Wundt who repeated and refined Galton's early studies on word associations, but using Fechner's and Weber's more precise methodology (Gescheider, 1976). Both Galton and Wundt experimented with word associations in an attempt to discover what happened with the mind between the sensory perception and the apperception, or comprehension, of the sensory perception (Deese, 1965; Frey-Rohn, 1974). Although they were largely unsuccessful in making this determination, their work did yield some insight into the structure of associations, and inspired further research (Meier, 1968).

Wundt worked in both Leipzig and Zurich. This brought his work into especially close contact with both Eugen Bleuler in Zurich and Emil Kraepelin in Leipzig (Frey-Rohn, 1974). Kraepelin began to use word association tests in psychiatry, and it appears that in his studies he was primarily concerned with the content of the response, the informal factor of the association (Meier, 1968). He was

attempting to use word association tests as a diagnostic instrument, and was generally unsuccessful (Meier, 1968). This same result has been often replicated by subsequent researchers. Edouard Clarapede published his paper, L'association des Idees, in 1903, the same year in which Jung began his experiments on word associations (Jung, 1904/1973). Like Kraepelin, Clarapede was primarily interested in the content of the response, and both viewed, as did Wundt and Galton before them, prolonged reaction times of associations as mistakes (Frey-Rohn, 1974).

Bleuler had different ideas, however, and although his assistant, Carl Jung, began his research in word associations by trying to refine Wundt's method into a diagnostic technique (Frey-Rohn, 1974), Jung and Bleuler gradually began to concentrate more on the disturbances of associations rather than on the content thereof. This movement was influenced by the publication of Sigmund Freud's The Psychopathology of Everyday Life in 1901 (Frey-Rohn, 1974). Freud's theories on the causes of parapraxes, the results of unconscious activity (Freud, 1901/1953), provided an explanation of the presence of disturbed associations. The attempt to validate this theory became the thrust of Jung's work (Frey-Rohn, 1974).

Therefore, in investigating disturbances of association, Jung hypothesized that increases in reaction time are signs of involvement of the unconscious. In an effort to explain this phenomenon, Jung developed the meaning of the term,

"feeling toned complex" (Jung, 1904/1973, p. 116). This term and its explanation were readily adopted by the Vienna school (Meier, 1968) since it adequately described their theories and observations in the study of neuroses, and "confirmed the applicability of Freud's association techniques to establishing the etiology of neuroses" (Frey-Rohn, 1974, p. 16).

In his studies on increased reaction times, Jung developed a system whereby he used some of Kraepelin's statistical techniques, especially the "probable mean" (Jung, 1905/1973, p. 224). He also provided validation of his methods by conducting experiments in which he took pneumograph and galvanic skin response readings while administering the word association test.

In these experiments Peterson and Jung (1907/1073) and Jung and Ricksher (1907) found that increases in their subjects' galvanic skin response readings, and sharp inhalations by their subjects, both of which are indicative of increased emotions, corresponded directly with increased reaction times (Peterson & Jung, 1907/1973).

Jung's extensive and elegant research spurred a great deal of interest in word association tests, both experimentally and clinically. More recently, however, clinical use of word association tests have generally fallen into disuse, especially in this country. This seems to be due to the development of other diagnostic methods, such as Rorschach, Thematic Apperception Test, and Minnesota

Multiphasic Personality Inventory.

Many experimental studies using word association tests are published in this country each year, although few use the Jung list. Many of these studies use the Menninger (Rapaport, Gill, & Schafer, 1968; Cramer, 1968) or the Kent-Rosanoff list (Kent & Rosanoff, 1910; Gough, 1976). Many others use lists developed by the researchers for their own purposes. Most of these efforts seem not to be directed toward clinical uses of word association tests but for other areas of research. Jung's list seems to be used currently much more often in Europe, but is also used clinically in this country, primarily by analytically oriented practitioners, such as Philip Morton of Darby, Montana, and Thomas Lavin of Evanston, Illinois.

The Kent-Rosanoff list consists of one hundred words. These are seventy-one nouns, twenty-one simple adjectives, and eight verb forms. Of the eight verb forms, six may be taken as nouns (comfort, whistle, command, wish, sleep, and trouble), and two are participle forms (working, eating). The adjective and verb forms are interspersed with no apparent purposive pattern, and all of the words would be generally considered to be innocuous.

The Menninger list consists of sixty nouns, which were chosen to elicit "familial, household and home, oral, anal, aggressive, phobic, and quite varied sexual connotations" (Rapaport, Gill, & Schafer, 1968, pp. 231-232). This list contains such stimulus words as 'penis' and 'bowel movement'

which would generally be considered to have some emotional impact on a subject. This would no doubt also tend to raise the anxiety level of many subjects.

Jung's list, on the other hand, contains one hundred words, and consists of fifty nouns, twenty-five verbs in infinitive form, and twenty-five adverb or adjective forms. These words are arranged in a repeating four-word pattern of noun, adjective or adverb, noun, verb. Like the Kent-Rosanoff list, the words of the Jung list would generally be considered to be free of intense affectual or emotional loading for the normal subject, and would not generally be considered to be anxiety arousing.

The use of and research on the Jung word association test was somewhat accurately summed up twenty-five years ago with the phrase, "a rather quiet life" (Riklin, 1955, p. 226). At the present time there seems to have been an increase of interest in Jung's test, beginning with Meier's (1968) work and continuing with Kast's (1979).

Meier (1968) views the word association test in the historical context of the development of analytic psychology. He describes the test in detail, and gives instructions for its use, but deals very little with interpretation or with use of the test as a research tool. He seems to be primarily interested in Jung's original use of the test as an experimental tool with which to provide empirical support for the idea of the existence of complexes in the unconscious.

Kast (1979), who deals more with the clinical use of the

word association test, which is more in keeping with the present use of the test, provides response content norms for the Jung list (see Table 1). While she describes the use of the test in a manner similar to Meier (1968), Kast (1979) seems to be more concerned with the use of the word association test as a clinical tool. To this end, the bulk of her book is devoted to the descriptions of individual cases, and of how she used the test to help her patients to understand their problems.

In one instance Kast (1979) lists the disturbed associations and responses for a married couple, and uses this to point out to the couple how they view and react to ideas differently. In another case, she uses the association test to aid in dream interpretation.

Kast also seems to be relatively uninterested in the use of the word association test as a research tool. However, the response content norms could be very valuable in this area.

There are no published studies on clusters of co-occurrence of disturbances of association on word association tests. Haight and Jones (1974) have discussed probabilistic treatment of qualitative data on word association tests. In this study they discuss a formula for determining the probability of a response being either usual or idiosyncratic.

There seems to have been little recent work done on increased reaction times on word association tests, with the exception of Scrivner (1970). Scrivner seems to be primarily

Table 1

A Sample of Kast's Response Content Norms (1979, p. 226).

1. Kopf

Reaktionen:	%	Reaktionen:	%
FuB	17	rund	4
Haar,-e	12	Gesicht	3
Hals	10	Bein	2
denken	10	Hand	2
Auge,-n	8	Haupt	2
Hirn, Gehirn	4	Herz	2
Kopfweh	4	Mensch	2
		Nase	2

je 1 Reaktion:

Head (Fremdspr.), Helm, Hut, Kasperli, HopfschliB, Kopfstand, Kopf stehen, Koperteil, Kragen, Indianer, Intelligenz, Mund, Musik, Tier, wohlgeformt, Puppe (n=16).

concerned with associative sets and networks rather than with disturbances of association.

In this hypothesis, high commonality response words have a typically shorter reaction time than do words that are more typically responded to idiosyncratically (Scrivner, 1970). The reason postulated for this is that there is a postulated habitual response, and this accounts for the given association. The stronger this habit-link, the more common and the quicker the response will be given (Scrivner, 1970).

As previously stated, it has been generally accepted that a delayed reaction time indicates that the stimulus word is somehow connected to a complex, as does a failure of reproduction (Jung, 1905/1973). Although certain characteristics of stimulus words tend to yield higher reaction times, such as low common-response words, this factor would be higher across the entire population. Because of this, and the method of using a reaction time of two-fifths or more greater than the probable mean to describe a delayed reaction time, this should not negatively affect this study.

Although this paper deals specifically with reaction times prolonged beyond the probable mean and failures of reproduction, these were just two of what Jung considered to be complex indicators (Jung, 1904/1973). The most important aspect of the evaluation of a protocol, however, is the assessment of the reaction time. One important aspect to

examine is the perseveration of increased reaction times. This is a serial disturbance, and can take two forms. The first form this can take is one in which the increased reaction time gradually diminishes back to the norm; in the other form the increased reaction time continues to increase on subsequent reactions, then diminishes. It is hypothesized that the greater the reaction time and the more pronounced the serial effect, the greater the underlying disturbance.

Jung's classification of disturbed associations, which are therefore complex indicators, are summarized by Meier (1968):

1. Prolonged reaction time. Two-fifths of a second or more longer than the probable mean.
2. Incorrect reproduction. Inability to recall reactions when stimulus words are repeated.
3. Perseveration. Continued prolonged reaction time, or a response which relates to the preceding stimulus word.
4. Failures. Inability to produce a reaction for forty seconds or longer.
5. Repetition of the stimulus word.
6. Misunderstanding of the stimulus word.
7. Mimicry or pantomime. Gesticulations accompanying the response.
8. Interjections and exclamations.
9. Stuttering or stammering.
10. Slips of the tongue. Parapraxes.
11. Meaningless reactions. No apparent connection between

the stimulus word and the reaction, possibly due to the misunderstanding of the stimulus word (#6 above).

12. Sound (Klang) reactions. Rhyming or alliterations.

13. Mediate reactions. The immediate reaction is suppressed and replaced.

14. Multi-word reactions. Subject unable to comply with the instructions.

15. Reactions in foreign languages. Probably a mediate reaction, unless the subject is not completely fluent in the language in which the test is being administered.

16. Stereotypes (perseveration). Repetitions of earlier reactions.

Once the reaction times have been graphed, and the other complex indicators noted, the stimulus words and reactions thereto which showed the existence of complexes are then discussed with the subject for reactions and further associations. This material can then be dealt with according to the orientation of the examiner, although a knowledge of complex theory is probably helpful.

Jung also used the word association experiments to develop a hypothesis of psychological types (Jung, 1904/1973), on which his later classifications were based (Frey-Rohn, 1974). This procedure was based on the classification of responses according to a grammatical and syntactical scheme. While this scheme is seldom used with Jung's word association test today, it is a good representation of the type of content analysis as practiced by Kraepelin and others (Meier, 1968),

and can offer some insight with certain subjects. Jung (1904/1973, pp. 36-39) organizes this material as follows:

Internal Associations

1. Coordination (cat-animal, lake-depth)
    a. simple contrasts (good-bad)
2. Predicates
    a. value judgments (mother-good)
    b. other predicates (snake-poisonous)
    c. definitions (ink-fluid for pens)

External Associations

4. Co-existence (ink-pen)
5. Identity (expensive-costly). This is different from definitions in that the former are multiple word reactions, and identities are single word responses.
6. Linguistic-motor Forms (needle-holder, hunger-suffer)
    a. linguistic-motor contrast (sweet-sour, light-dark)

Sound Reactions

7. Word Completion (wonder-ful)
8. Sound (humility-humidity)
9. Rhyme (king-ring)

Miscellaneous Reactions

10. Failures
11. Indirect Associations (repentance-black via mourning)
12. Meaningless Reactions
13. Simple Repetition of the stimulus word (lake-lake)
14. Perseveration (village-people, cold-person)
15. Egocentric Reactions

a. Direct ideas of reference (love-I)

b. Subjective value judgments (marry-pleasant)

In short, internal associations are based on similarity of content between stimulus and reaction, and external associations are based on common usage of stimulus and reaction word together. Generally, this type of classification is not particularly helpful unless one type of reaction predominates. In these cases, the following summaries can be made (Meier, 1968):

A subject who produces more than fifty per cent internal reactions can be classified as an evaluating type. This type is generally uneducated.

The superficial type is identified by more than fifty per cent external or shallow reactions, and is characteristic of educated persons who, rather than view the stimulus word in terms of its meaning, respond linguistically.

As can be seen from the preceding discussion, word associations are important from a philosophical (Rapaport, 1974), experimental (Gescheider, 1976), historical (Meier, 1968; and Frey-Rohn, 1974), and clinical (Rapaport, Gill, & Schafer, 1968; and Kast, 1979) viewpoint. Word association tests can be examined on the basis of qualitative content (Haight and Jones, 1974), structure (Scrivner, 1970; Deese, 1965; and Pollio, 1966), or complex indicator (Jung, 1904/1973; Meier, 1968; and Kast, 1979).

Most commonly, word association test lists of stimulus

words are either compiled by an investigator or clinician according to a hypothesis of verbal learning (Cramer, 1968), the Kent-Rosanoff (Kent & Rosanoff, 1910), Menninger (Rapaport, Gill, & Schafer, 1968), or Jung (1908) word lists. The Jung list is advantageous because of its inclusion of verbs, adjectives, and adverbs, in a cohesive pattern.

There is a need for response content norms for the Jung word association test in English, as exists for the Kent-Rosanoff (Palermo & Jenkins, 1964) and Menninger (Rapaport, Gill, & Schafer, 1968; and Cramer, 1968) word lists, and for the Jung word association test in German (Kast, 1979). The need for these norms to be current is also discussed by Jenkins & Russell (1960), Palermo & Jenkins (1965), and Jenkins & Palermo (1965).

Structure (Scrivner, 1970) and probability of response (Haight & Jones, 1974) have been investigated, but co-occurrences of disturbances of association has not. Following Hall & Lindzay's (1965) description of complexes, it follows that the co-occurrence of disturbances of association should exist among a homogeneous sample of individuals.

CHAPTER 3

METHODOLOGY

One-hundred and four volunteers from the undergraduate subject pool of the Psychology Department at Loyola University of Chicago were given the word association test of Carl Jung (1908) translated by Thomas Lavin (see attached sample protocol, Appendix D). Four protocols were considered invalid because the subject did not cooperate or could not speak English fluently.

The one hundred subjects whose protocols were used in this study included thirty-eight females and sixty-two males. The females included twenty-seven freshmen, eight sophomores, and three juniors. The males included thirty-six freshmen, twenty-one sophomores, one junior, and four seniors. The females' ages ranged from seventeen to twenty-two, with a mode of eighteen. The males' ages ranged from seventeen to twenty-three, with a mode of nineteen. Assuming an equal distribution of ages within each year, i.e., an average age of eighteen years and six months for the eighteen year-olds, etc., the mean age of the females was 18.8 years, with a standard deviation of .75 years. The average age of the males was 19.1 years, with a standard deviation of 1.1 years. As may be seen, this is a very small difference. All the subjects were unmarried. This material is compiled in Table 2.

Table 2

Sex, Age, and Education Level of Subjects

	Age							
Sex	17	18	19	20	21	22	23	Total
				Freshman				
Male	2	15	17	1	1			36
Female		15	10	1		1		27
Total	2	30	27	2	1	1		63
				Sophomore				
Male			14	6	1			21
Female	1		4	3				8
Total	1		18	9	1			29
				Junior				
Male					1			1
Female				2	1			3
Total				2	2			4
				Senior				
Male					1	2	1	4
Female								
Total					1	2	1	4
				Total Group				
Male	2	15	31	7	4	2	1	62
Female	1	15	14	6	1	1		38
Total	3	30	45	13	5	3	1	100

This test was given individually by the investigator in the Psychology Department's testing offices on the tenth floor of Loyola University of Chicago's Damen Hall. This eliminated confounding variables introduced by giving the test in various locations. This also eliminated confounding variables which could be introduced by differences in administration by different examiners, and differences in responses which might be elicited by differences in examiners.

Examples of differences of examiner effects are included in McDonald and DeWolfe (1976) who found examiner sex differences in schizophrenics; and by Milner and Moses (1972), Abramson and Handschumacher (1978), and Garske and Berardi (1977), who found examiner sex differences affecting sexual responsiveness. Garske and Berardi (1977) also found that the social desirability of the examiner can be a factor in subjects' responses.

This may have limited external validity to a certain extent, by reducing the generalizability of the findings to examiners not similar to the investigator, or possibly to dissimilar testing environments. However, it is believed that the resulting increased confidence that this study is free of as many confounding variables as possible is worth this loss, as the external validity may be determined with subsequent studies using different examiners.

The examiner was seated at a desk and the subject seated

in such a manner that the examiner and the subject were able to see each other. The examiner had the form containing the list of words (see Appendix D), a pen or pencil, and a stopwatch with one-fifth second gradations.

After marking the subject's initials, sex, occupation, date of birth, educational level, and marital status, and the date of administration on the testing protocol, the examiner then read to the subject the following instructions: "I shall read to you the one hundred words in the list, separately, one after the other. Please reply to each word as soon as you can, with the first word that comes into your mind. Where possible, you should reply with one word only, and I shall measure the time you take until you reply. Do you understand?"

After determining that the subject understood the instructions, the examiner read the stimulus words clearly and distinctly in a normal tone of voice. As the examiner pronounced the first accented vowel of the stimulus word, the stopwatch was started. The stopwatch was stopped as the subject pronounced the first sound of his reply. The reply (reaction) and time were recorded in the appropriate places on the protocol. After the one hundred reactions and times have been recorded, the subject was given the following instructions: "Now, I am going to repeat the list in order to find out if you remember what you said. Take as long as you need to remember what you said. I shall not be recording the time. Do you understand?"

After ascertaining that the subject understood the instructions, the examiner repeated the list as before, this time marking each correct reproduction with an X or similar mark, and marking each incorrect reproduction by recording the new word in the appropriate column in the protocol. This was done in such a manner as not to give the subject feedback as to whether or not the reproduction was correct, which could have distracted or increased the anxiety of the subject.

If a subject was unable or unwilling to produce a verbal response to a word in forty seconds, it was noted on the protocol as a failure, and scored as 200/5ths of a second. If the subject repeated the stimulus word, failed to hear the stimulus word, or corrected a reaction while it was being given, this information was recorded on the protocol, along with the reaction which the subject did give, if any, and scored as a disturbance.

It was a relatively simple matter to determine response norms for content on the word association test. This was done by giving the word association test to an appropriate number of subjects, and then counting their responses. However, determining the patterns of co-occurrence was a more difficult task, accomplished as follows.

Following the administrations of the word association test, the protocols were scored by means of determining a "probable mean" of reaction times (Jung, 1905/1973, p. 224) for the first and last halves of each protocol. This

probable mean, which is actually a crude median, was determined by arranging the reaction times in order of length, from shortest to longest. The twenty-fifth longest reaction time was considered to be the probable mean. The probable mean for each half of each protocol was determined in order to control for lengthened reaction times on the second part of the test which would be due to increasing sensitivity of the subjects during the administration of the word association test. The probable mean is used instead of the mean because the latter would be increased excessively by the few greatly lengthened response times caused by rejections or failures of association.

Response times which exceeded the individual's probable mean by two-fifths of a second or more, or failures to respond, were considered to be disturbed associations. Failures to hear the stimulus word, or repetitions of the stimulus word, and corrections of reactions by the subject were also considered to be disturbed associations, as were reproduction failures.

When the disturbed associations for each protocol were determined, Pearson product-moment correlation coefficients (r's) were determined for disturbed associations. These correlations were calculated between each stimulus and each of the other ninety-nine stimulus words. This procedure generated a matrix of ten thousand r's, although half of these were repetitions, i.e., the correlation of head to green is the same as the correlation of green to head. These

correlations were accompanied by a two-tailed test for statistical significance in order to evaluate the significance of findings in either direction.

The correlations were then subjected to a modified McQuitty linkage analysis (McQuitty, 1959) in order to determine clusters of occurrence of disturbances of association. The purpose of this analysis was to isolate multiple patterns of nominative data, i.e., disturbed versus non-disturbed associations, in relatively large matrices of variables. In this procedure, the highest r between stimulus words was found, and these two stimulus words formed the core of matrix I. Then, the highest r for each stimulus word was found. In the instances where the highest r was to one of the core words of matrix I, those stimulus words were added to the matrix. This procedure was repeated for the added words to the matrix, until matrix I contained all of the stimulus words which were more highly correlated to each other than to any other stimulus words. Then, the highest r for any words not included in matrix I was found, and these words formed the core of matrix II, and the procedure was repeated until all of the stimulus words were in matrices. The results of this are in Appendix A.

Prolonged reaction times, failures to produce a response, repetitions of the stimulus word, correction of the response, and failure to reproduce the response were considered to be disturbances of association because they indicated the presence of some sort of blocking by the

subject of the associative process. This can be explained as the result of some unconscious activity on the part of the subject which the stimulus words provokes, in a manner similar to Freud's hypothesis of parapraxes (1901/1953).

Response norms were also determined for each stimulus word. This was accomplished by counting the number of times a particular response was given to each stimulus word. New responses on the reproduction phase of the word association test were not counted.

Following determination of elementary linkage by McQuitty cluster analysis, determinations of the cohesiveness of the clusters were made by examining the cross correlations of the members of the clusters. Members showing linkage of an $\underline{r}$ of .20 or more, either positive or negative, were joined, and these clusters were shown by additional arrows and the members were underlined. The prime numbers of the clusters, those having their highest correlation to each other, are in capitals. This was done to show the existence of highly related patterns of co-occurrence of disturbed association.

The subjects were all informed of the nature and purpose of this study, and that individual protocols would not be interpreted, so that feedback would be available only in normative form. They gave their informed consent to participate and have their data used.

CHAPTER 4

RESULTS OF THE STUDY

The popular responses for the Jung word association test are in Table 3. The complete content responses are in Appendix C. The number of idiosyncratic responses, as shown in Table 4, is correlated negatively with the number of popular responses. This correlation is -0.69, and significant at the 0.001 level. The mean number of popular response per stimulus word is 36.20, with a standard deviation of 20.37. The mean number of idiosyncratic responses per stimulus word is 18.19, with a standard deviation of 8.86 .

The mean number of disturbances of association per stimulus word is 38.32, with a standard deviation of 18.47. The range is from six disturbances on the word 'rich,' to eighty-two on the stimulus word 'to sin.' Position in the list is probably not related to number of disturbances per stimulus word, as shown by 'rich' being the thirtieth stimulus word, and 'to sin' being the twenty-eighth. The range of the number of popular responses per stimulus word ranged from eleven on 'to sin' and 'to paint,' the sixty-eighth stimulus word, to ninety-five responses for 'old' to the thirty-eighth stimulus word, 'new.' The range of the distribution of idiosyncratic responses was from four, on the thirtieth

Table 3

Stimuli, Popular Responses, and Frequencies

Stimulus Number	Stimulus	Response	Frequency
1.	head	tail	24
2.	green	blue	53
3.	water	drink	3
4.	to sing	dance	28
5.	death	life	65
6.	long	short	92
7.	ship	boat	49
8.	to pay	money	18
9.	window	pane	33
10.	friendly	mean	13
11.	table	chair	82
12.	to ask	question	32
13.	village	town	55
14.	cold	hot	67
15.	stem	flower	20
16.	to dance	sing	44
17.	lake	water	42
18.	sick	well	26
19.	pride	joy	30
20.	to cook	eat	31
21.	ink	pen	55
22.	angry	mad	42
23.	needle	thread	53
24.	to swim	water	22
25.	voyage	trip	39
26.	blue	green	44
27.	lamp	shade	44

Table 3, continued

Stimulus Number	Stimulus	Response	Frequency
28.	to sin	evil	11
29.	bread	water	46
30.	rich	poor	91
31.	tree	leaves	21
32.	to stick	poke	13
33.	pity	sorrow	32
34.	yellow	green	33
35.	mountain	hill	25
36.	to die	live	56
37.	salt	pepper	43
38.	new	old	95
39.	custom	tradition	33
40.	to pray	God	20
41.	money	rich	21
42.	foolish	stupid	22
43.	pamphlet	booklet	20
44.	to despise	hate	80
45.	finger	hand(s)	31
46.	expensive	cheap	39
47.	bird	fly	15
48.	to fall	hurt	28
49.	book	read	36
50.	unjust	unfair	29
51.	frog	toad	14
52.	to separate	divide	15
53.	hunger	thirst	38
54.	white	black	87
55.	child	adult	32
56.	to take care	help	15
57.	pencil	pen	45

Table 3, continued

Stimulus Number	Stimulus	Response	Frequency
58.	sad	happy	73
59.	plum	fruit(s)	23
60.	to marry	divorce	35
61.	house	home	38
62.	darling	sweetheart	17
63.	glass	window	22
64.	to quarrel	fight	60
65.	fur	coat	46
66.	big	small	46
67.	carrot	vegetable	18
68.	to paint	house	11
69.	part	piece	15
70.	old	new	76
71.	flower	pretty	12
72.	to hit	hurt	23
73.	box	fight	13
74.	wild	crazy	28
75.	family	friends	17
76.	to wash	clean	61
77.	cow	milk	48
78.	strange	weird	22
79.	luck	good	19
80.	to lie	cheat	36
81.	politeness	nice	14
82.	narrow	wide	33
83.	brother	sister	80
84.	to fear	afraid	17
85.	stork	baby (babies)	51
86.	false	true	60
87.	anxiety	fear	24

Table 3, continued

Stimulus Number	Stimulus	Response	Frequency
88.	to kiss	love	40
89.	bride	groom	62
90.	pure	white	18
91.	door	knob	36
92.	to choose	pick	44
93.	hay	horse(s)	25
94.	satisfied	happy	27
95.	ridicule	make fun (of)	23
96.	to sleep	rest	21
97.	month	year	43
98.	pretty	ugly	39
99.	woman	man	51
100.	to insult	hurt	12

Table 4

Stimuli and Number of Idiosyncratic Responses to Each.

Stimulus Number	Stimulus	Frequency	Stimulus Number	Stimulus	Frequency
1.	head	17	28.	to sin	31
2.	green	11	29.	bread	12
3.	water	19	30.	rich	4
4.	to sing	19	31.	tree	13
5.	death	20	32.	to stick	20
6.	long	6	33.	pity	24
7.	ship	6	34.	yellow	9
8.	to pay	18	35.	mountain	18
9.	window	21	36.	to die	21
10.	friendly	24	37.	salt	8
11.	table	8	38.	new	5
12.	to ask	11	39.	custom	32
13.	village	5	40.	to pray	24
14.	cold	9	41.	money	24
15.	stem	9	42.	foolish	23
16.	to dance	16	43.	pamphlet	19
17.	lake	20	44.	to despise	11
18.	sick	22	45.	finger	16
19.	pride	38	46.	expensive	17
20.	to cook	12	47.	bird	17
21.	ink	5	48.	to fall	19
22.	angry	14	49.	book	16
23.	needle	8	50.	unjust	21
24.	to swim	20	51.	frog	12
25.	voyage	11	52.	to separate	26
26.	blue	6	53.	hunger	13
27.	lamp	6	54.	white	6

Table 4, continued

Stimulus Number	Stimulus	Frequency	Stimulus Number	Stimulus	Frequency
55.	child	15	78.	strange	26
56.	to take care	40	79.	luck	21
57.	pencil	7	80.	to lie	14
58.	sad	14	81.	politeness	31
59.	plum	7	82.	narrow	12
60.	to marry	25	83.	brother	8
61.	house	31	84.	to fear	34
62.	darling	19	85.	stork	12
63.	glass	17	86.	false	11
64.	to quarrel	11	87.	anxiety	26
65.	fur	21	88.	to kiss	18
66.	big	13	89.	bride	11
67.	carrot	25	90.	purse	26
68.	to paint	30	91.	door	15
69.	part	36	92.	to choose	26
70.	old	12	93.	hay	18
71.	flower	14	94.	satisfied	30
72.	to hit	20	95.	ridicule	32
73.	box	40	96.	to sleep	28
74.	wild	22	97.	month	8
75.	family	26	98.	pretty	15
76.	to wash	11	99.	woman	17
77.	cow	15	100.	to insult	37

stimulus word, 'rich,' to forty on the fifty-sixth and seventy-third stimulus words, 'to take care' and 'box' respectively.

The percentage of disturbed responses per stimulus words is represented in Appendix B. As might be expected from the above discussion, the number of disturbed responses per stimulus word correlates positively with the number of idiosyncratic responses ($r = .73$, significant at the $p < .001$ level). The correlation of the number of disturbed responses per stimulus word and the number of popular responses per stimulus word is negatively correlated ($r = -.69$, significant at the $p < .001$ level). These figures are assembled in Table 5.

For the nouns, the mean of the number of disturbed associations is 35.6, with a standard deviation of 18.4. The mean and standard deviation of the number of disturbed associations to the adjectives and adverbs are 34.4 and 18.0. For the verbs the mean number of disturbed associations is 48.0 with a standard deviation of 15.7.

The mean number of popular responses to nouns is 34.6, with a standard deviation of 16.8. To adjectives and adverbs the mean number of popular responses is 46.9 with a standard deviation of 26.0, and to verbs the mean number of popular responses is 31.0, with a standard deviation of 17.4.

For idiosyncratic responses, the mean number for nouns is 17.5, with a standard deviation of 9.1; for adjectives and adverbs the mean is 13.7 with a standard deviation of 7.6;

Table 5

Distributions and Correlations Between Disturbances of Association, Number of Popular Responses, and Number of Idiosyncratic Responses.

Group	Popular Responses	Idiosyncratic Responses
Disturbed Associations	$r = -.69$	$r = .73$
Popular Responses		$r = -.64$

Note. All responses are significant at the $p < .001$ level.

and for verbs the mean is 21.7 with a standard deviation of 8.5. These figures are recapitulated in Table 6.

The probable means of the response times range from six to thirteen, with a mode of eight-fifths of a second. In all but four protocols, the probable means of the response times of the second fifty stimulus words is greater or equal to those of the first fifty stimulus words. In thirty-nine cases the response times are equal, and in fifty-seven cases the probable mean of the response times of the second fifty stimulus words is greater than the response times of the first fifty stimulus words. Of these, forty-seven are one-fifth of a second longer, nine are two-fifths of a second longer, and one is three-fifths of a second longer. In three cases of the four in which the probable mean decreases the decrease is one-fifth of a second. In the fourth decreasing case the decrease is two-fifths of a second. This data is recapitulated in Table 7.

The mean of the probable means of response times is 8.02 fifths of a second, with a standard deviation of 1.17 fifths of a second. The means of the probable means of the response times of the first and second fifty stimulus words are 8.03 and 8.65, respectively, and the standard deviations thereof are 1.22 and 1.41, respectively.

In Table 8 are the highest mutual correlations of disturbances of association to the listed stimulus words. In this list, the stimulus words that have a higher probability of co-occurrence of disturbances of association with each

Table 6

Ranges, Means, and Standard Deviations of Number of Disturbed, Popular, and Idiosyncratic Responses for Nouns, Adjectives and Adverbs, Verbs, and the Entire List.

Parts of Speech	Range	Mean	Standard Deviation
	Disturbed Associations		
Nouns[a]	6 - 79	35.6	18.4
Adjectives/ Adverbs[b]	6 - 68	34.4	18.0
Verbs[b]	16 - 82	48.0	15.4
Entire List[c]	6 - 82	38.3	18.5
	Popular Responses		
Nouns[a]	12 - 82	34.6	16.8
Adjectives/ Adverbs[b]	13 - 95	46.9	26.0
Verbs[b]	11 - 80	31.0	36.2
Entire List[c]	11 - 95	36.2	20.4
	Idiosyncratic Responses		
Nouns[a]	5 - 40	17.5	9.1
Adjectives/ Adverbs[b]	4 - 30	13.7	17.6
Verbs[b]	11 - 40	21.7	8.5
Entire List[c]	4 - 40	18.2	8.9

[a] N = 50
[b] N = 25
[c] N = 100

Table 7

"Probable Means" of Response Times.

Response times for stimulus words 1-50	Response times for words 51-100								
	6	7	8	9	10	11	12	13	Totals
6	3	4	1						8
7	1	10	16						27
8		1	15	16	5				37
9				8	5	2			15
10			1		2	5	1	1	10
11						1	1		2
12						1			1
Totals	4	15	33	24	12	9	2	1	100

Note: Response times are in fifths of a second.

Table 8

Highest Mutual Correlations of Disturbances of Association.

Stimulus Word	Stimulus Word	Correlation
to sin	to pray	r = .44
door	salt	r = .37
rich	cold	r = .37
blue	to dance	r = .36
to choose	flower	r = -.36
ink	woman	r = .35
sick	to lie	r = .35
friendly	brother	r = -.34
frog	white	r = .34
window	child	r = .33
big	false	r = .33
water	anxiety	r = .32
to take care	to insult	r = .31
green	despise	r = .30
angry	to fall	r = .30
pity	pretty	r = -.30
home	old	r = .29
to marry	to cook	r = -.28
head	luck	r = -.28
darling	family	r = .28
ship	lamp	r = .28
pride	bride	r = .26
to kiss	book	r = .25
mountain	to separate	r = .25
pencil	to quarrel	r = .24

other than with any other stimulus word are listed. This list includes fifty words, showing the relatively small size of any patterns or matrices of co-occurrence of disturbed associations. Of these twenty-five correlations, only three are negative.

In Appendix A the complete matrices of co-occurrence of disturbance of association are listed. In these, the purpose is to show the probability of groups of words eliciting disturbance associations. These matrices were determined by use of a modified McQuitty cluster analysis (McQuitty, 1959). As stated previously, this procedure involved the determination of the correlations of disturbed associations to each of the stimulus words. The highest mutual correlation between each of the stimulus words, where it existed, was determined. This resulted in Table 8. Following this determination, the highest correlations of the remaining stimulus words are sequentially determined, and then cross correlations between the members of each cluster were determined. Correlations smaller than $\underline{r} = .20$, either negative or positive, were considered too small to show a meaningful relationship, as they would explain less than four per cent of the variance. The cluster members, by this method, are more closely related to the other members of the cluster than to the members of any other cluster. In Appendix A, all one hundred words have been listed, in order of decreasing value of the correlation of disturbed associations between the two central, in this case, capitalized, stimulus words.

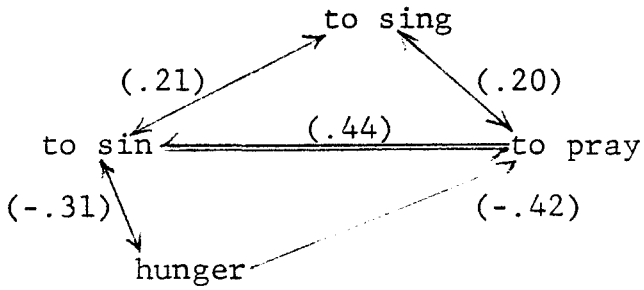
The numbers in parentheses are r's, showing the degree of relatedness, and the direction, negative or positive. The double arrows indicate the mutual highest correlation between the capitalized, or core, stimulus words. The single arrows show the direction of the relatedness, from the words further from the core words to those nearer, in order of ascending size of the correlation. The double headed arrows show a non-linear correlation, in which the words are more highly related to other words. The underlined words are those words which are a member of a cohesive cluster, that is, a cluster in which the words are not just linearly related. In these clusters, each word is linked to at least two other words in the cluster. These clusters are listed in Table 9. Only thirty stimulus words are so linked. Eight of these are linked to three other words, and one is linked to five. The eight stimulus words which are linked to three stimulus words are 'sin,' 'sad,' 'woman,' 'pamphlet,' 'brother,' 'carrot,' 'window,' and 'child.' The stimulus word which is linked to five other stimulus words is 'new.'

Table 9

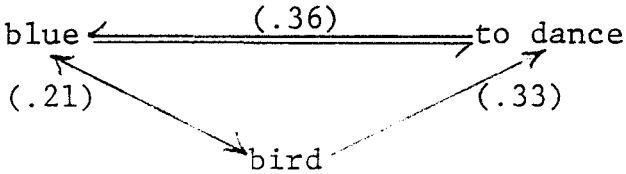
Cohesive Clusters of Co-occurrence of Disturbed Associations.

Cluster

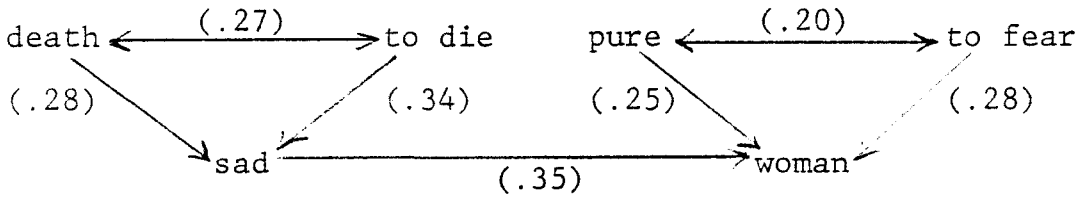
Cluster I



Cluster II



Cluster III



Cluster IV

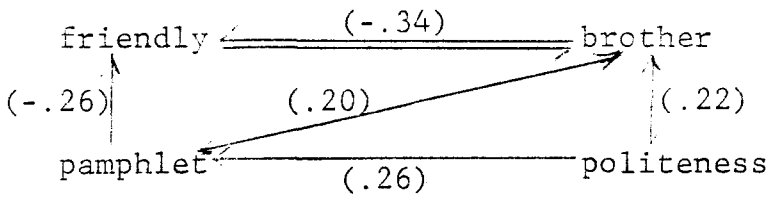
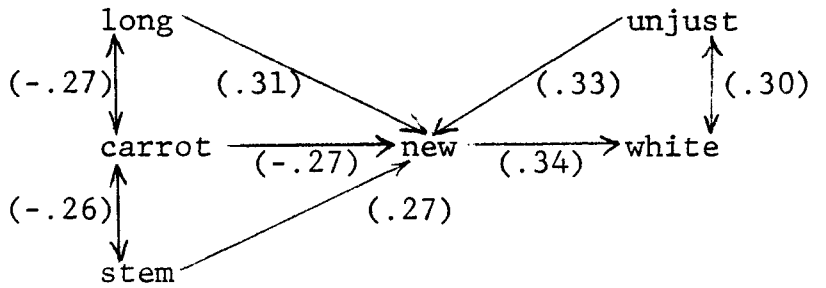


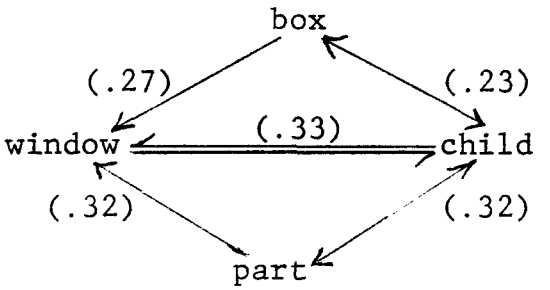
Table 9 (continued)

Cluster

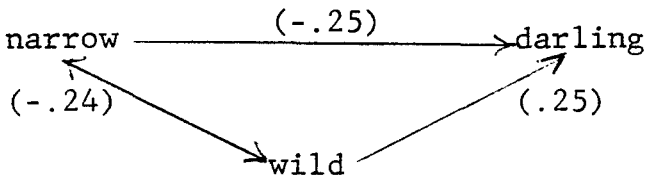
Cluster V



Cluster VI



Cluster VII



CHAPTER 5

ANALYSIS OF THE RESULTS AND CONCLUSIONS

As shown in Table 5, the correlation between the number of disturbed associations and idiosyncratic responses is positive, and the correlations between popular responses and disturbed associations and idiosyncratic responses are negative. This fits with the hypothesis that the greater the habit strength of an association, the lower the response time (Scrivner, 1970), as higher reaction times will be more likely listed as disturbed.

Table 6 shows that verbs have a thirty-five per cent and forty per cent greater proportional number of disturbed associations than do nouns or adjectives and adverbs, respectively. This is consistent with Jung's findings on differences of response time for different parts of speech, where he found that verbs had higher average response times than did adjectives or concrete nouns (1905/1973). These differences are correlated positively with the higher percentage of responses given to adjectives and adverbs over nouns and verbs (thirty-six per cent and fifty-one per cent, respectively). This is also consistent with Scrivner's discussion of habit strength (1970).

As might be expected from the above discussion, the differences of idiosyncratic responses among the parts of

speech are correlated negatively with those of popular responses. The mean number of idiosyncratic responses to verbs is twenty-four per cent higher than those to nouns, and fifty-eight per cent higher than those responses given to adjectives and adverbs. These data would suggest that the habit strength of responses to nouns is greater than that to verbs, but less than that to adjectives and adverbs. This would conform with a hypothesis that the associative strength of a verb is mitigated by the action which that verb implies, and that this is a stronger influence that the thoughts of the concrete object which a noun describes, and even more than that of a modifier, which would generally only elicit the response of a noun which it modifies. This is also consistent with Jung's findings (1905/1973).

The probable means of response times in Table 7 shows that in fifty-seven of the cases the probable mean increased for the second fifty words. This shows the need of finding the probable mean for both halves of the test. The mean of the probable means of reaction times increases thirteen per cent, from 8.02 fifths of a second to 8.65 fifths of a second from the first to the second half of the test. The standard deviation also increases with the means of the distributions, from 1.22 to 1.41, showing a decrease in the consistency of response time. This could be attributed to increasing anxiety or sensitivity, or fatigue of the subjects.

In thirty-nine cases, the probable mean remained constant, and in four cases the probable mean decreased. In those four

cases it is expected that the subject entered the testing situation with a relatively high anxiety level, which gradually decreased as the testing proceeded in the non-threatening environment of the testing situation.

The highest mutual correlations of disturbed associations are listed in Table 8. This list shows the cores of the correlational matrices, and includes twenty-two nouns, fourteen verbs, and fourteen adjectives and adverbs. This is not a significant difference from the distribution of the parts of speech in the total list, of fifty nouns, twenty-five verbs, and twenty-five adjectives and adverbs.

Eleven, or forty-four per cent of the core correlations are between similar parts of speech, between two nouns, two verbs, or two modifiers. This is eleven per cent higher than would be expected in a chance distribution. This also tends to confirm the existence of differences of association among different parts of speech as was indicated by the relative differences in numbers of disturbed, popular, and idiosyncratic responses.

There are eleven stimulus words of the core correlations which are in the cohesive matrices, which are shown in Table 9. These include three verbs, four modifiers, and four nouns. This is one more modifier and two fewer nouns than would be expected from a chance distribution. The cohesive correlations contain six verbs, eleven modifiers, and thirteen nouns. This is two fewer nouns and verbs, and three more modifiers than would be expected with a chance distribution.

This shows that modifiers tend to fall into patterns of disturbed association at a higher rate than do nouns and verbs. However, of the eight stimulus words which are linked to three other stimulus words, six are nouns, and the stimulus word which is linked to five other stimulus words is an adjective. Altogether, there is no clear pattern which evolves from these data, except that nouns and modifiers have a somewhat higher level of associative strength than do verbs.

In Appendix A, the words listed are the stimulus words on the word association test. The purpose of these matrices is to show the co-occurrence of disturbances of association on one stimulus word to another.

What seems to be most striking about the matrices in Appendix A is the lack of large, highly cohesive matrices of co-occurrence of disturbances of association. The lack of high correlations between pairs of stimulus words, with no correlations above .45, and only 2 correlations greater than .40, is also surprising. The meaning of this appears to be that each word on the list is relatively independent of each other word in eliciting disturbances of association.

As may be seen in Table 9, in the reduction of the elementary linkage of the matrices to more cohesive patterns, the twenty-four elementary matrices only contain seven relatively cohesive clusters. It may also be noted that, as stated above, the correlations involved are relatively low, with a mean strength of $\underline{r}$ = .29, and a standard deviation of

the distribution of r's equal to .06.

In examining differences between clustered and non-clustered stimulus words, the non-clustered words have an average disturbance rate of 38.3%, while the clustered words have a disturbance rate of 38.4%. This difference of one-tenth of one per cent is not significant.

The list of stimulus words contains fifty nouns, twenty-five verbs, and adjectives and adverbs totalling twenty-five. The thirty clustered words in Table 9 contain fifteen nouns, which would be the anticipated number if this distribution mirrored that of the stimulus list as a whole. Table 9 contains six verbs and ten adjectives and adverbs, one less verb and two more modifiers than would be anticipated. This reflects the higher number of popular responses to adjectives and adverbs than to verbs, but this is a small difference.

In Matrix I the cluster consists of the stimulus words to sin, to pray, hunger, and to sing. Hunger is negatively correlated to to sin and to pray. Some hypotheses concerning mental imagery and similarity of content therein may be drawn concerning these four words. It would be logically expected that the words to sin and to pray would be correlated, as both concern religion. That the word to sing would be mutually correlated may evoke the association of singing with religious services, and hunger being correlated with to sin and to pray could point to the connection between religion and the fulfillment of needs. This is speculation at best, however.

The second cluster, in Matrix IV, consists of blue, to dance, and bird. It would seem that any attempts to explain this cluster would be strained at best. This writer can see no logical reason for this relationship.

The third cluster, in Matrix VI, consists of two parts, the first being death, to die, and sad; the second consists of woman, pure, and to fear. This bears more promise for interpretation if viewed in these two separate parts. To die, death, and sad would intuitively be considered to have high correlations, higher, in fact, than they do have. Woman, pure, and to fear would seem to take a greater leap in order to find meaning, although pure and to fear may show the existence of values. That these values are sometimes placed on women might help to explain this. The connection between the two parts of this cluster, from sad to woman, is most easily explained in a sexist and less than complimentary manner.

The fourth cluster, consisting of friendly, brother, pamphlet, and politeness, in Matrix VIII, would be much easier to interpret if friendly and politeness were directly correlated at or above the lowest level which this investigator felt to be meaningful ($\underline{r} \geq .20$). Nonetheless, friendly, brother, and politeness all refer to relationships, and only pamphlet defies a logical explanation for its inclusion.

The fifth cluster, in Matrix IX, is the most complex of the seven. Various parts of this cluster seem to make

intuitive sense in their being linked, such as new and white, and carrot, stem, and long, as carrot and stem could be related as growing things, and both could be long, or even considered to be phallic. Long, white, new, and unjust are adjectives, and stem and carrot are nouns, but, as a whole this cluster makes little sense.

The sixth and seventh clusters, in Matrices X and XX, respectively, also seem to make little intuitive sense. The sixth cluster contains all nouns, and window and child could be considered domestic in content, but little else can be said about it. The seventh cluster, showing narrow to be negatively correlated to wild and darling, could have raised sexual issues, but the responses seem to contradict this explanation, and no other seems to fit well.

In viewing what a correlational analysis of disturbances of association on the word association test shows, few conclusions can be drawn. Several questions, however, are raised. One would assume that many words in the word association test should be highly correlated, such as death and to die. However, only about seven per cent of the variance in disturbances of association on one is determined by the disturbed responses on the other. This pattern of low correlations is consistent, so that it may be concluded that the stimulus words on the word association test are relatively independent in their likelihood of eliciting disturbances, regardless of seemingly apparent similarities of content.

The second question revolves around the presupposition that the word association test will help to detect the existences of complexes, and that many complexes are commonly found in normal subjects. If this is the case, it would seem that one should be able to find matrices of disturbed associations which would show these common complexes. Since these matrices are not apparent in this study, it would seem that either this study lacks validity, which seems unlikely, or that the word association test does not show these complexes in an objective manner. This latter explanation would fit the theory that complexes are common (Frey-Rohn, 1974), if one accepts the explanation that complex indicators are not common, but idiosyncratic.

This study has attempted to provide response norms for the Jung word association test for complete and popular responses, idiosyncratic responses, and disturbed associations. In this respect, it has been successful.

As noted above, response times vary according to the part of speech of the stimulus word, the habit strength, or commonality of the response, and the ability of the stimulus word to elicit disturbed associations. The average number of disturbed associations to a stimulus word is directly correlated to the number of its idiosyncratic responses, and inversely correlated to the number of its popular responses. The probable mean of response times also increases in the second half of the test.

This study has also shown cohesive patterns of

co-occurrence of disturbed associations.

Correlations of disturbed associations between stimulus words were lower than expected, and did not yield a few large, highly correlated clusters, but instead yielded twenty-four relatively small, loosely correlated matrices. These did not contain stimulus words which seem to be meaningfully related, in terms of their content. This indicates that the words on the Jung word association test are relatively independent of each other in eliciting disturbances of association. There is little of an apparently predictive nature to determine which words will be in clusters, and which will not.

While this study shows that the words in the word association test are relatively independent, and none should be omitted for redundancy, it raises questions for further research. First, this study should be replicated, to help determine its reliability. If this study is shown by subsequent research to be representative of the types of data generated by administering word association tests to large numbers of nonclinical subjects, this would reaffirm the apparently common conception that the word association test does not indicate complexes in an objective, quantitative manner, but rather in a subjective, clinical manner.

Another possibility for further research is in the area of cross-cultural research. With subjects who are not regularly subjected to large amounts of verbal media, more cohesive clusters may appear, because of the lack of

desensitization of the affect of words by heavy exposure to words through the media. Also, a clinical population may yield different results.

In conclusion, it is hoped that this study will provide a basis for further research on word association tests, and that its norms will aid in its clinical use and interpretation.

CHAPTER 6

SUMMARY

This study set out to provide current response content norms in English for the Jung word association test, as are available for the Menninger (Cramer, 1968) and Kent-Rosanoff (Palermo & Jenkins, 1964) word association tests. This study also attempted to show meaningful clusters of co-occurrence of disturbances of association to stimulus words on the Jung word association test. It was hoped that these would show patterns of disturbed responses which would indicate common complexes among a nonclinical population.

The literature on word association tests was reviewed, and a need for current response content norms was indicated. It was also shown that word association tests can be examined from several aspects, including response content, structure, and complex indication. Although word association tests have been studied for structure, the study of the structure of co-occurrence of disturbed associations has not been included in those studies.

The experimental procedure involved the administration of the Jung word association test to one hundred undergraduate volunteers at Loyola University of Chicago. The test was administered by one examiner, individually, and included a timed, discrete free-association trial of the entire list,

immediately followed by an untimed recall trial. Following the administration of the tests, the protocols were scored for disturbances of association. In this study, disturbed associations were defined as failures to respond, increased reaction time, and failure to remember associations. The occurrences of disturbances of association were then correlated, and the correlations were subjected to a modified McQuitty (1959) cluster analysis.

Complete content response norms were determined by counting all responses to each stimulus word. Popular responses and their percentages of occurrence, and the percentages of idiosyncratic responses for each stimulus word were also determined. Distributions and correlations between disturbances of association, percentages of popular responses, and percentages of idiosyncratic responses were calculated, as were ranges, means, and standard deviations of the percentages of disturbed associations, popular responses, and idiosyncratic responses for the nouns, verbs, and adjectives and adverbs on the list, in addition to the entire list.

Matrices of co-occurrence of disturbances of association and cohesive clusters of co-occurrence of disturbances of association were constructed. The correlations of the occurrence of disturbed associations among the stimulus words were lower than expected, although they were consistent with previous findings as to their relative strengths among different parts of speech. The matrices of co-occurrence of disturbed associations were loosely joined, and did not show

meaningful patterns between stimulus words, in terms of their respective contents.

It was hypothesized that the matrices of co-occurrence of disturbances of association would show strong patterns, and in light of these results, this has been re-examined. An alternate explanation is that the stimulus words on the Jung word association test are relatively independent in their relative abilities to elicit disturbed associations. It follows from this that the indication of complexes on the Jung word association test is idiosyncratic, and that it is a qualitative, subjective, clinical instrument. It does not appear from this study that the Jung word association test is usable as an objectively scored, quantitative, empirical instrument in its ability to determine complexes amongst groups of persons. This is not to disparage its clinical use, but, rather, it suggests that it is best interpreted individually, for each subject.

Finally, the need for further research was indicated. This included the possibilities of cross-cultural applications, and for the replication of this study with clinical populations.

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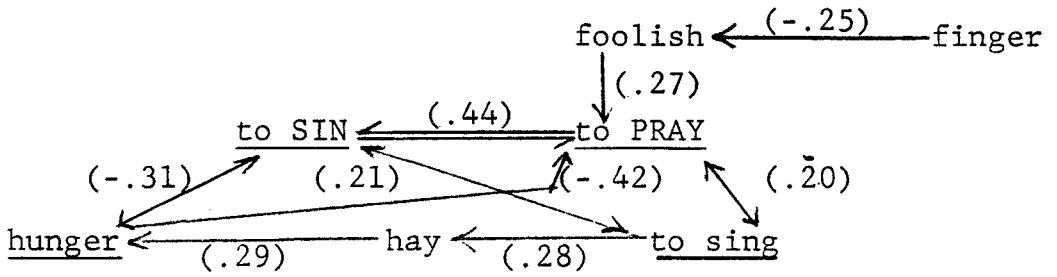
APPENDIX A

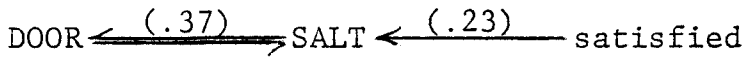
APPENDIX A

MATRICES OF CO-OCCURRENCE OF DISTURBANCES OF ASSOCIATION

Matrix I



Matrix II



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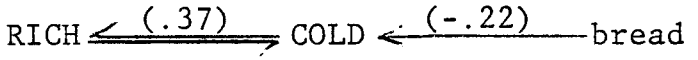

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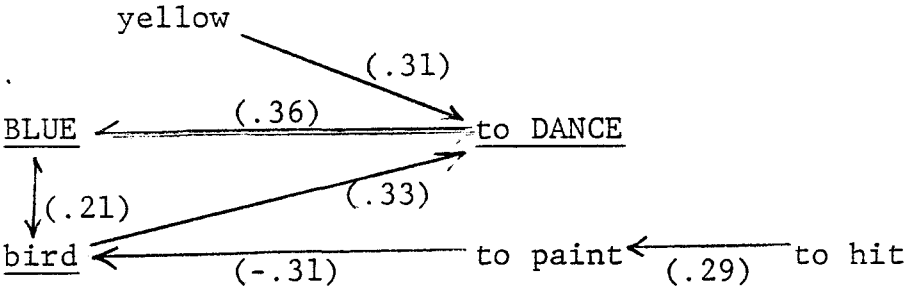

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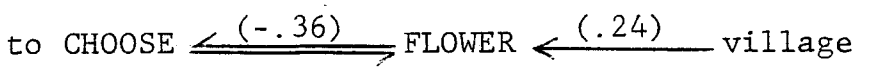

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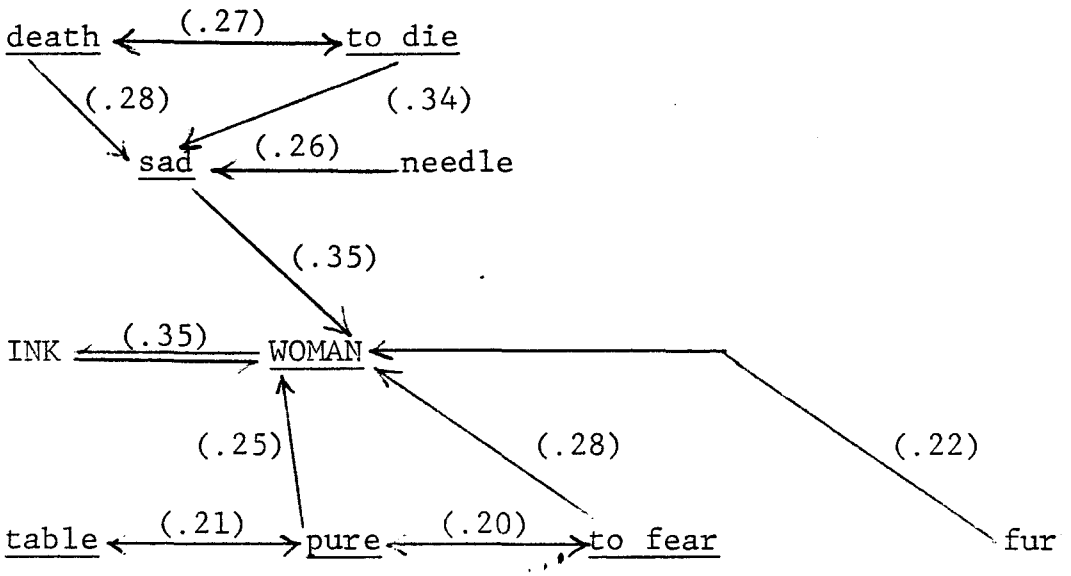

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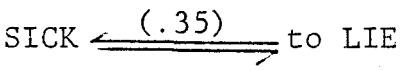

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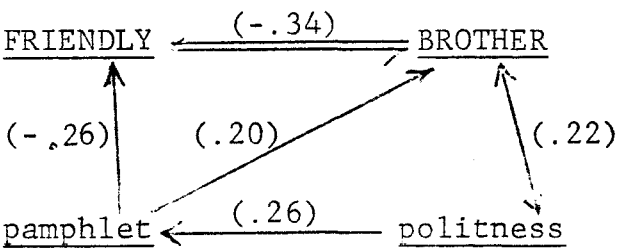

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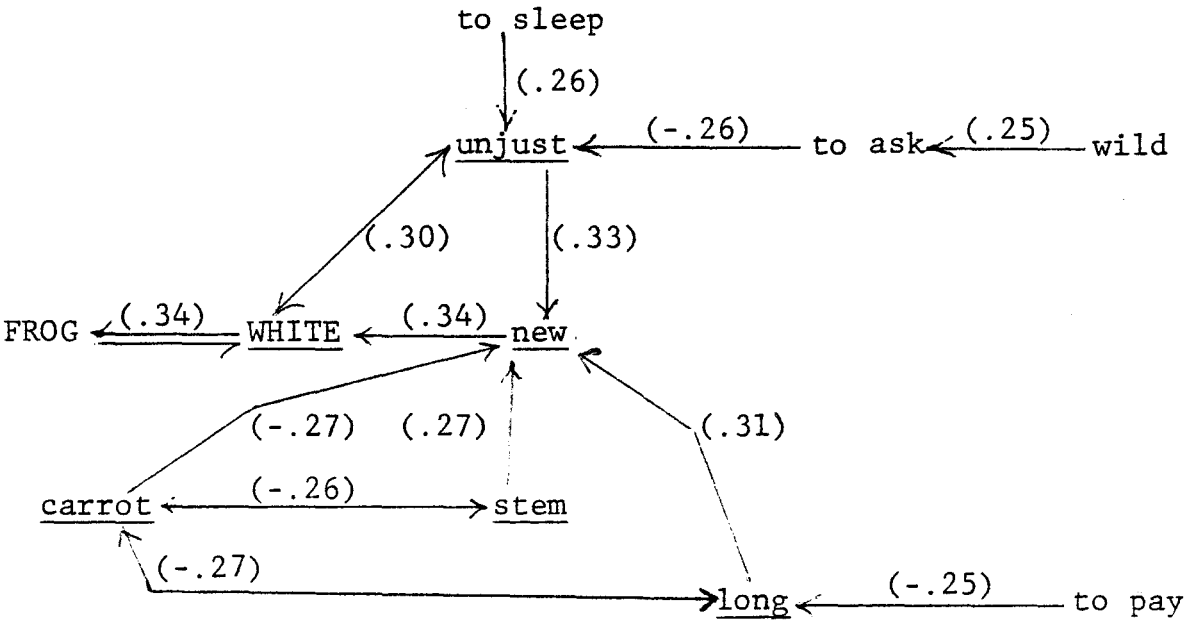

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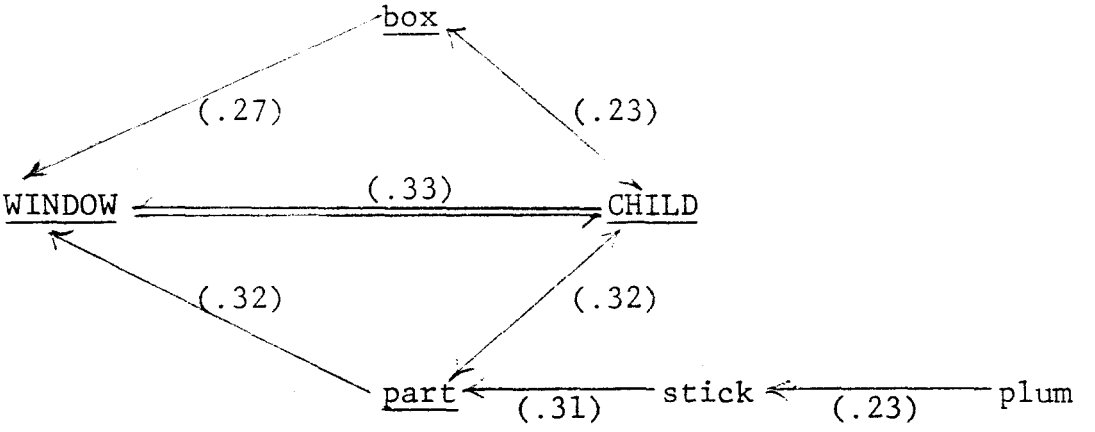

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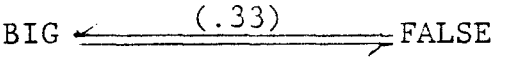


Matrix XII

money —(-.23)→ WATER ⇐(.32)⇒ ANXIETY ←(.29)— glass

Matrix XIII

ridicule —(.27)→ expensive —(.28)→ to TAKE CARE ⇐(.31)⇒ to INSULT ←(.24)— voyage

Matrix XIV

GREEN ⇐(.30)⇒ to DESPISE

Matrix XV

to wash —(.27)→ ANGRY ⇐(.30)⇒ to FALL

Matrix XVI

PITY ⇐(-.30)⇒ PRETTY

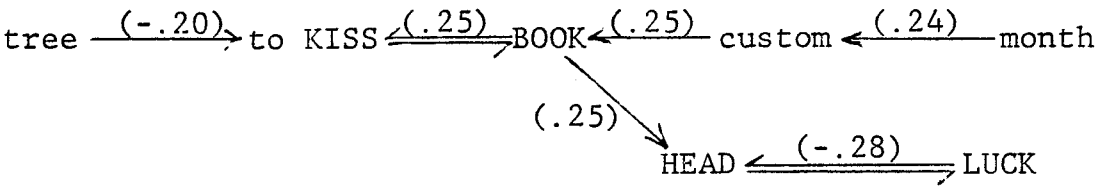
Matrix XVII

strange —(.24)→ HOUSE ⇐(.29)⇒ OLD

Matrix XVIII

to MARRY ⇐(-.28)⇒ to COOK

Matrix XIX



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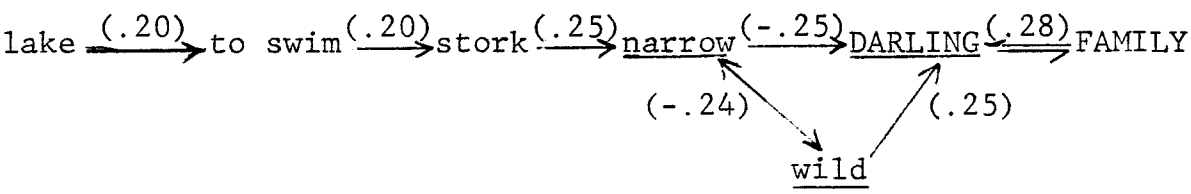

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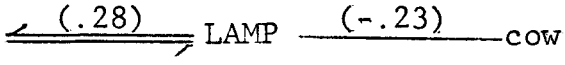

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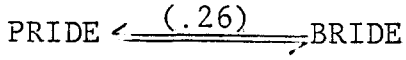
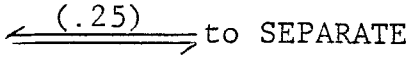


Matrix XXIII



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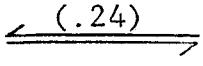

APPENDIX B

APPENDIX B

PERCENTAGES OF INCIDENCE OF DISTURBANCE ON STIMULUS WORDS

1.	head	18	46.	expensive	48
2.	green	18	47.	bird	42
3.	water	46	48.	to fall	51
4.	to sing	39	49.	book	36
5.	death	22	50.	unjust	48
6.	long	12	51.	frog	32
7.	ship	26	52.	to separate	57
8.	to pay	42	53.	hunger	35
9.	window	32	54.	white	11
10.	friendly	67	55.	child	36
11.	table	9	56.	to take care	70
12.	to ask	47	57.	pencil	6
13.	village	10	58.	sad	23
14.	cold	15	59.	plum	35
15.	stem	21	60.	to marry	52
16.	to dance	45	61.	house	45
17.	lake	37	62.	darling	47
18.	sick	53	63.	glass	41
19.	pride	66	64.	to quarrel	25
20.	to cook	32	65.	fur	24
21.	ink	9	66.	big	21
22.	angry	50	67.	carrot	54
23.	needle	17	68.	to paint	54
24.	swim	49	69.	part	73
25.	voyage	72	70.	old	17
26.	blue	25	71.	flower	35
27.	lamp	17	72.	to hit	46
28.	to sin	82	73.	box	46
29.	bread	22	74.	wild	34
30.	rich	6	75.	family	31
31.	tree	51	76.	to wash	16
32.	to stick	68	77.	cow	21
33.	pity	72	78.	strange	49
34.	yellow	39	79.	luck	47
35.	mountain	32	80.	to lie	46
36.	to die	39	81.	politeness	64
37.	salt	24	82.	narrow	19
38.	new	9	83.	brother	8
39.	custom	59	84.	to fear	64
40.	to pray	62	85.	stork	22
41.	money	60	86.	false	32
42.	foolish	54	87.	anxiety	46
43.	pamphlet	42	88.	to kiss	37
44.	to despise	23	89.	bride	35
45.	finger	25	90.	pure	55

91.	door	17
92.	to choose	41
93.	hay	49
94.	satisfied	68
95.	ridicule	59
96.	to sleep	39
97.	month	15
98.	pretty	41
99.	woman	28
100.	to insult	74

APPENDIX C

APPENDIX C

CONTENT RESPONSE NORMS

1. head

tail	24
toe(s)	21
foot (feet)	17
body	5
neck	5
hair	4
face	3
hat	2
nose	2

one each: (17)

arm, back, baseball, brain, chicken, coach, eyes, games, hand, hear, mouth, nine, person, shoe, shoulder, smart, tooth

2. green

blue	53
red	18
yellow	11
black	5
grass	2

one each: (11)

brown, celery, color, eyes, Irish, leaf, purple, sleep, sleeve, tree, white

3. water

drink	13
ice	11
wet	6
sea	5
cold	4
land	4
ocean	4
cup	3
glass	3
sand	3
sun	3
ball	2
blue	2
dry	2
fire	2
fish	2
food	2
H_2O	2
river	2
running	2
swim	2
thirst	2

one each: (19)

air, beach, bland, boiling, bread, bucket, coke, dirt, earth, fluid, hot, lake, Michigan, sky, soap, solution, stone, stream, swimming pool

4. to sing

dance	28
song(s)	18
talk	7
shout	5
music	4
laugh	3
speak	3
voice	3
cry	2
loud	2
note(s)	2
opera	2
play	2

one each: (19)

be quiet, book, chant, fun, glee club, hear, Julie Andrews, listen, not to sing, open mouth, read, rock and roll, sang, stamp, tell, tooth paste, vocal, walk, yell

5. death

life	65
die (dying)	6
live (living)	5
birth	4

one each: (20)

alive, black, buried, calm, coffin, corpse, emptiness, end, father, fear, flower, grandfather, grave, hair, overcome, people, personal name, roommate, sorrow, wish

6. long

short	92
time	2

one each: (6)

cold, distance, hair, old, tree, trip

7. ship

boat	49
ocean	9
water	9
sail(s)	7
sea	6
sink(ing)	4
plane	3
wreck	3
battle	2
car	2

one each: (6)

battleship, captain, mate, sinking, toilet, wave

8. to pay

money	18
hair	9
receive	8
bug	5
wig	5
debt(s)	4
owe	4
work	4
cash	3
check	3
give	3
not to pay	3
receipt	3
bake	2
get	2
hat	2
rent	2
spent	2

one each: (18)

be in debt, bill, borrow, broke, change, collect, dearly, debit, due, earn, forego, gyp, head, hairpiece, loose, steal, touch, wages

9. window

pane	33
door	15
glass	13
sill	8
clear	4
close	2
outside	2
view	2

one each: (21)

air, bank teller, broken, building, clean, closet, floor, frame, grass, house, look, picture, scene, seal, Sears Tower, seat, see, sights, table, wall, wash

10. friendly

mean	13
nice	11
kind	8
unfriendly	8
angry	6
friend(s)	4
people	4
sad	4
smile	4
aggression	2
girl(s)	2
hateful	2
hostile	2
kind	2
lonesome	2
shy	2

one each: (24)

anger, bad, calm, cheerful, cold, congenial, dirty, enemy, evil, glad, happy, hate, hostile, joyful, lonely, mad, man, nasty, neighbor, observant, person, pleasant, sociable, warm

11. table

chair	82
cloth	4
desk	2
seat	2
top	2

one each: (8)

bridge, eat, food, meal, not able, plate, telephone, TV

12. to ask

question	32
receive	12
tell	7
beg	6
answer	5
give	5
get	4
please	4
reply	4
request	3
take	3
borrow	2
want	2

one each: (11)

a favor, know, pay up, plea, plead, question mark, say, seek, talk, teacher, think

13. village

town	55
people	30
house	6
city	4

one each: (5)

board, cars, community, country, Skokie

14. cold

hot	67
warm	20
flu	2
ice	2

one each: (9)

give, hands, roommate, short, silver, storm, temperature, touch, wet

15. stem

flower	20
tree	19
leaf (leaves)	16
plant	16
root	9
rose	5
branch	3

one each: (12)

banana, bark, foot, grass, growth, long, outlook, seeds, stalk, tail, trunk, weed

16. to dance

sing	44
disco	11
music	5
walk	5
fun	4
move	4
song	3
feet	2
jump	2
shoes	2
stand	2

one each: (16)

ballet, choose, choreography, clumsy, exercise, floor, jog, joy, live, movement, partner, short, sit, tap dance, try, waltz

17. lake

water	42
river	10
ocean	9
pond	8
Michigan	7
sand	2
sea	2

one each: (20)

blue, boat, breeze, early, fish, forest, frog, front, Geneva, girl, go, green, leaves, nice, Placid, stream, swim, tide, trees, Wisconsin

18. sick

well	26
ill	18
healthy	13
cold	6
dead	3
hospital	3
tired	3
cough	2
flu	2
stand	2

one each: (22)

bad, bed, child, death, disease, doctor, dog, down, dying, get up, good, hot, hurt, illness, life, normal, OK, old, sad, stones, throw up, vomit

19. pride

three rejections

joy	30
prejudice	7
honor	3
laugh(ed)	3
arrogance	2
be happy	2
ego	2
fear	2
honesty	2
humble	2
proud	2
sorrow	2

one each: (38)

and joy, anger, anxious, but, country, dignity, drum and bugle corps, eagle, greed, happiness, hope, humbleness, humiliated, humility, hurt, Indians, inner, jealous, job, jump, man, nosey, pain, person, punishment, self respect, short, song, sorry, stubbornness, time, top, unhappy, vanity, weeped, will power, yelled, yellow

20. to cook

eat	31
clean	15
food	15
sew	9
bake	7
burn	5
make	2
meal	2
stew	2

one each: (12)

chef, clean up, dinner, good, hot, housewife, kitchen, mother, pot, saute, soup, wash

21. ink

pen	55
blot(s)	19
pencil	5
black	4
blue	3
paper	3
blotter	2
spot	2
write	2

one each: (5)

dumb, react, spill, stain, water

22. angry

mad	42
sad	22
happy	18
mean	4

one each: (14)

fight, frustrated, glad, hostility, hurt, love, man, mother, pain, pleasant, polite, smile, temperature, upset

23. needle

thread	53
pin	20
point	8
sew	5
prick	2
shot	2
syringe	2

one each: (8)

doctor, drug, haystack, hypodermic, inject, injection, pain, stick

24. to swim

one rejection

water	22
drown	21
sink	9
float	7
dive	5
fish	4
lake	3
backstroke	2
bathing suit	2
exercise	2
ski	2

one each: (20)

bathe, dance, fast, free style, fun, have fun, kick, life saver, move, Olympics, row, sail, sport, stroke, survive, tread, walk, waves, well, work

25. voyage

trip	39
journey	16
sky	15
cruise	5
boat	3
travel	3
car	2
long	2
ocean	2
sea	2

one each: (11)

ahead, airplane, chair, distance, flowers, length of time, pen, sail, Spain, trek, void

26. blue

green	44
red	19
sky	12
water	5
yellow	5
black	3
color	2
purple	2
sea	2

one each: (6)

airplane, bottle, gold, ocean, orange, white

27. lamp

shade	44
light	38
table	5
desk	3
bulb	2
chair	2

one each: (6)

bright, goat, light bulb, mirror, road, bright

28. to sin

evil	11
God	9
wrong	6
confession	5
bad	4
forgive	4
repent	4
do wrong	3
lie	3
bad thing	2
bible	2
church	2
crime	2
forgiveness	2
guilty	2
mail	2
moral(s)	2
not to sin	2
sex	2

one each: (31)

act, be angry, break God's law, Christian, commandment, commit, confess, death, error, fear, get caught, go to church, hate, help, hurt, jail, misbehave, mistake, no good, penalty, praise, prayer, Purgatory, religion, repentance, resurrect, reward, saint, sinful, think, to be good

29. bread

water	46
butter	16
eat	7
wine	7
food	3
life	3
blue	2
meat	2
sandwich	2

one each: (12)

cake, cook, dough, fear, green, leaf, milk, money, orange, peanut butter, white, yellow

30. rich

poor	91
wealthy	3
money	2

one each: (4)

braces, man, mean, name

31. tree

leaves	21
leaf	10
flower(s)	9
green	9
grass	6
branches	4
bush	4
trunk	4
ground	3
shade	3
bark	2
grow	2
house	2
limb	2
nature	2
sap	2
stem	2

one each: (13)

acorn, apple, cat, forest, life, nest, pork, plant, push, raise, root, stump, wood.

32. to stick

two rejections

poke	13
needle(s)	9
hurt	8
pin	8
glue	7
hit	7
jab	5
stab	5
mud	3
prick	3
pinch	2
point	2
probe	2
punch	2
sharp	2

one each: (20)

attack, drum, fall off, fight, grab, hold, inject, injure, jump, mean, ouch, separate, shift, shove, stand, stem, stone, stop, tree, with

33. pity

one rejection

sorrow	32
sad	7
sorry	7
sympathy	5
poor	4
feel sorry for	3
shame	3
cat	2
empathy	2
envy	2
merry	2
poor	2
pride	2
sorrowful	2

one each: (24)

angry, apathy, calm, choosy, empathize, fear, feeling, give, happy, hate, have sorrow, kiss, laughing, laughter, merciful, nonsense, poky, poverty, self, self esteem, unfortunate, woe, worry, wrong

34. yellow

green	33
blue	23
red	10
sun	7
orange	6
black	3
brown	3
color	2
rose	2
white	2

one each: (9)

banana, bird, Electric Light Orchestra, gold, petal, purple, scream, slow, sunny

35. mountain

hill	25
top	12
valley	7
high	6
snow	6
sky	5
climb	4
Colorado	4
tree(s)	3
oyster(s)	2
river	2
Rocky	2
stream	2
tall	2

one each: (18)

Ararat, awesome, beautiful, canyon, green, height, lake, land, mountaintop, plain, pleasant, pretty, side, ski, skiing, small, town, Yosemite

36. to die

live	56
death	11
end	4
born	2
coffin	2
life	2
sad	2

one each: (21)

be born, begin, calm, cease, come to an end, funeral, go to heaven, grave, heaven, laugh, leave, mortuary, peaceful, risen, sick, sleep, sorrow, to God, transcend, voyage, young

37. salt

pepper	43
water	35
sugar	8
food	2
ocean	2
peter	2

one each: (8)

bitter, fish, french fries, harsh, kill, sweet, tablets

38. new

old	95

one each: (5)

beginning, clean, news, nice, water

39. custom

tradition	33
habit	6
made	5
trait(s)	5
culture	3
car	2
new	2
norm	2
officer	2
old	2
special	2
village	2
way	2

one each: (32)

accustom, agent, airport, always, anything, blue, built, change, dance, dress, fashioned frequently, friendly, healthy, heritage, inspection, low, learn, manner, more, past, pattern, procedure, shape, strange, traditional, unaccustomed, U.S., use, usual, usual way, value

40. to pray

one rejection

God	20
church	13
kneel	8
sin	7
ask	6
preach	3
religion	3
Catholic	2
mass	2
prayer	2
sing	2
speak	2
talk	2
think	2
workship	2

one each: (23)

answer, ask forgiveness, ask God, capture, Christian, crawl, dead, deep, fold, forgive, give thanks, give up, hope, intimate, knees, laugh, love, nothing, plead, relay, repent, tell, thank

41. money

one rejection

rich	21
wealth	14
gold	7
cash	6
coin(s)	6
dollar(s)	6
green	6
power	4
work	3
spend	2

one each: (24)

bills, bread, buy, change, check, clothes, credit card, danger, death, debt, fun, goods, happy, house, job, lots of it, needed, pay, poor, poverty, serious, success, value, wealthy

42. foolish

one rejection

stupid	22
dumb	14
silly	12
wise	7
pride	5
smart	4
crazy	3
pleasure	3
happy	2
intelligent	2
not foolish	2

one each: (23)

always, bright, dumb, dummy, foolhardy, fun, idiotic, ignorant, jester, joke, non-foolish, normal, people, person, ridiculous, sad, selfish, serious, sorrow, this experiment, unwise

43. pamphlet

booklet	20
book	18
paper	11
leaflet	8
propaganda	8
read	5
brochure	3
flyer	2
information	2
literature	2
notes	2

one each: (19)

anything, brief, campaign, communism, cult, document, handout, instructions, letter, Moses, outlook, political, questions, reading, schoolwork, sheet, tablet, three pages, to be read

44. to despise

hate	80
like	4
dislike	3
love	2

one each: (11)

admire, anger, enjoy, hatred, hurt, loathe, people, rip off, sin, take pride, warm

45. finger

hand(s)	31
thumb	23
toe(s)	17
nail	5
point	3
tip	3
touch	2

one each: (16)

arm, broken, digit, foot, hate, hit, leg, limb, look at, middle, mouth, pen, person, poke, print, thread

46. expensive

cheap	39
rich	11
money	10
clothes	5
costly	5
car	4
inexpensive	3
gift	2
jewelry	2
not expensive	2

one each: (17)

can't afford, extravagant, fast, field, food, gold, Gucci, lavish, long, lot of money, much, out of reach, paid, poor, quality, taste, wealth

47. bird

fly	15
feather(s)	12
tree	12
nest	7
robin	5
sky	5
cat	4
sing	4
sparrow	3
air	2
flower	2
parrot	2
plane	2
seed	2
song	2
wing	2
yellow	2

one each: (17)

canary, cardinal, chirp, dog, dove, egg, fish, flies, freedom, hawk, here, load, play, nature, shotgun, small, watch

48. to fall

hurt	28
trip	8
down	7
drop	6
get up	6
die	4
land	4
hit	3
stairs	3
stand	3
tumble	3
jump	2
pain	2
stand up	2

one each: (19)

accident, be caught, cliff, climb, clumsy, cry, depth, falter, heights, hurt yourself, in love, leap, rise, rise up, sit, slip, steps, stumble, yell

49. book

read	36
page(s)	9
paper	6
worm	5
table	4
cover	3
knowledge	3
pamphlet	3
reading	3
end	2
learning	2
novel	2
open	2
school	2
words	2

one each: (16)

biology, book end, book marker, case, learn, letters, library, magazine, note, pencil, sea, shelf, Silent Spring, story, work, writing

50. unjust

one rejection

unfair	29
just	18
fair	7
bad	5
justice	3
right	3
wrong	3
court(s)	2
crime(s)	2
criminal	2
mean	2
righteous	2

one each: (21)

angry, chemistry, court system, everyday life, fight, guilt, guilty, judge, law, lawful, lawyer, not right, oppressed, reasonable, rob, sinful, social, terrible, trial, unrighteous, unruly

51. frog

toad	14
leap	11
jump	10
green	9
pond	8
animal	6
dissect	4
hop	4
lake	3
leg(s)	3
amphibian	2
biology	2
croak	2
cut	2
Kermit	2
lily pad	2
tadpole	2
turtle	2

one each: (12)

biology lab, cat, gastricimus, lab, lizard, mouse, practical, swamp, swim, ugly, vein, water

52. to separate

one rejection

divide	15
part	8
divorce	6
join	5
put together	5
split	5
take apart	5
apart	4
distinguish	4
together	4
unite	4
bring together	2
cut	2
disjoin	2
stick	2

one each: (26)

break, break apart, break up, distance, distinct, division, fall apart, filter, fuse, loose leaf, make, make loose, marriage, move, move apart, muscle, natural, oil, omit, pain, people, pull apart, remove, split in two, tear, unhappiness, yolk

53. hunger

thirst	38
pain	26
food	13
pang(s)	3
poor	3
no food	2
starvation	2

one each: (13)

eat, famine, fear, feed, filled up, full, India, need, people, satisfied, starving, strike, too much

54. white

black	87
blue	5
red	2

one each: (6)

clean, people, person, shadow, virgin, yellow

55. child

adult	32
mother	14
kid	8
baby	5
parent	5
abuse	4
young	4
birth	3
boy	3
man	3
play	2
youth	2

one each: (15)

cat, children, hungry, husband, infant, innocent, love, loving, molest, mom, neighbor, person, pure, small, woman

56. to take care

one rejection

help	15
love	8
watch	6
neglect	5
care for	3
baby	2
babysit	2
careless	2
concern	2
fondle	2
mother	2
not take care	2
nurse	2
of	2
provide	2
responsibility	2

one each: (40)

abandon, adult, bring up, care, careful, caress, child, comfort, daycare center, deprive, diaper, feed, foster, harm, health, hope, hurt, ignore, infant, keep, kid, leave alone, live, look after, loose, loving, maternal, nurture, old, oversee, pamper, parent, physician, pride, provide for, relate, secure, sickness, watch over, young

57. pencil

pen	45
paper	37
write	7
book	2
lead	2

one each: (7)

carbon, crayon, ink, table, tip, writing, writing instrument

58. sad

happy	73
unhappy	5
glad	4
lonely	2
sorrow	2

one each: (14)

box, cry, death, depressed, dumb, grief, hurt, joy, loneliness, mad, poor, sorrowful, stone, tear

59. plum

fruit(s)	23
peach	15
pear	14
tree	11
apple	7
fat	4
purple	4
cherry	3
orange	3
pudding	3
finger	2
grape	2
prune	2

one each: (7)

bread, grove, grow, juicy, loco, pie, ripe

60. to marry

divorce	35
wed	10
love	9
engaged	7
happiness	3
happy	3
children	2
personal names	2
single	2
wife	2

one each: (25)

be connected, be single, child, church, confine, couple, covenant, devotion, forever, friend, get divorced, give, hate, husband, live, live with, nice, separate, sin, stay single, tied down, together, wedding, wedding ring, white

61. house

home	38
family	6
apartment	5
car(s)	4
garden	4
children	3
live	3
expensive	2
people	2
tree	2

one each: (31)

basement, boat, bought, building, buy, chimney, cottage, divided, dog, door, fence, farm, happy, hold, lawn, life line, live in, mansion, paint, payments, penthouse, place to live, possession, prairie, roof, room, single, street, wife, window, yard

62. darling

sweetheart	17
wife	14
honey	10
dear	9
love	7
loved one	4
lover	4
friend	3
girlfriend	3
baby	2
daughter	2
girl	2
personal names	2
sweet	2

one each: (19)

beloved, chair, Clementine, despicable, food, happy, horses, husband, lady, lend, little, mother, nice, people, returning, song, spouse, ugly, wretched

63. glass

window	22
water	16
house	9
break	6
cup	6
drink	4
pane	4
broken	2
clear	2
crystal	2
menagerie	2
mirror	2
see	2
see through	2
wood	2

one each: (17):

black, bottle, breakable, brick, champagne, horn, ice, jar, look, metal, plastic, Pyrex, sand, school, smile, steel, table

64. to quarrel

fight	60
argue	24
love	3
make up	2

one each: (11)

angry, constructive, dislike, familiar, get angry, hate, lose, make amends, settlement, spill, wife

65. fur

coat	46
animal	12
mink	9
cat	4
jacket	2
rabbit	2
soft	2
tree	2

one each: (21)

bear, chinchilla, clothes, cotton, dead animals, dog, expensive, feather, fox, fuzzy, hairy, lining, money, pet, puppy, rich skin, smooth, thread, warm, water

66. big

small	46
little	29
large	5
house	3
elephant	2
tall	2

one each: (13)

animal, building, city, excavate, ditch, girl, hog, hole, immense, personal name, Sears Tower, snout, swine

67. carrot

vegetable	18
rabbit	14
orange	8
top	5
fruit	4
stick	4
bird	3
celery	3
beet	2
child	2
eye(s)	2
food	2
mother	2
pea(s)	2
plant	2
turnip	2

one each: (25)

adult, apple, bunny rabbit, cheese, diamond, good, green, head, help, horse, love, neglect, onion, parents, patch, peach, people, pie, potato, red, sorry, spinach, tomato, torn, worry

68. to paint

house	11
brush	7
color(s)	7
cover	7
draw	6
wall	6
artist	4
water	4
fix	3
picture	3
art	2
create	2
make new	2
mess up	2
polish	2
white	2

one each: (30)

a pain, blue, build, ceiling, clean, cover up, decorate, design, fence, make beautiful, make pretty, new, oil, painter, paintings, pull, red, rejuvenate, remodel, renew, scrape, see, siding, splatter, spray, stain, stroke, water color, work, yellow

69. part

one rejection

piece	15
separate	12
whole	11
hair	7
car(s)	4
middle	3
together	3
half	2
leave(s)	2
split	2
time	2

one each: (36)

all, auto, away, be away from, big, train, cardiac, clothes, come, come together, divide, diving, gear, inside, long, member, of gold, parcel, peaceful, pin, position, pre, put back together, quit, sea, section, side, small, some, sour, space, stop, sweet, take, unite, water

70. old

new	76
young	10
ancient	2

one each: (12)

anguish, antique, carry, grab, hot, man, person, release, senior citizen, touch, water, wrinkled

71. flower

pretty	12
rose	11
tree	11
stem	6
petal(s)	5
daisy	4
plant	4
bloom	3
bud(s)	3
child	3
garden	3
pot	3
stem	3
tulip	3
beautiful	2
blossom	2
leaf	2
red	2
spring	2
yellow	2

one each: (14)

antique, beauty, bed, bee, ceiling, grass, grow, living, lovely, patch, redbird, scent, seed, smell

72. to hit

hurt	23
strike	15
punch	10
bat	4
hard	4
slap	4
fight	3
smack	3
angry	2
bang	2
hate	2
pain	2
punish	2
receiver	2
spank	2

one each: (20)

abuse, aggression, anger, back, bath, beat up, face, harm, hit, home run, little child, miss, pair, play, score, scorn, screen, shove, swipe, violence

73. box

fight	13
square	12
cardboard	6
hit	4
punch	4
car	3
sport	3
wrestle	3
carton	2
container	2
open	2
room	2
top	2
violence	2

one each: (40)

Ali, aggression, beg, ball, beat, boxers, break, cage, camper, case, children, closed, conceal, cramped, crate, cube, for, gift, goods, groceries, house, hurt, jar, keep, lunch, match, never, pain, paper, present, recreation, rectangle, ring, score, shape, small, sock, spring, swing, wood

74. wild

crazy	28
tame(d)	17
animals	8
free	6
untame(d)	6
flowers	4
calm	3
angry	2
unruly	2
wooly	2

one each: (22)

aggression, banshi, beat, carefree, cheetah, frenzied, fun, furious, insane, kids, loose, mad, man, mild, night, rough, sane, silly, thing, unnew, violent, young

75. family

friends	17
home	12
happy	6
children	5
togetherness	4
love	4
affair	3
life	3
parent(s)	3
people	3
big	2
child	2
father	2
mother	2
person(s)	2
reunion	2
unit	2

one each: (26)

brothers, cat, daughter, eight, feud, fun, group, happiness, house, household, large, loved ones, me, mom, nice, personal name, plan, plenty, responsibility, rich, sister, three, together, tree, union, unity

76. to wash

clean	61
clothes	13
dry	11
cleanse	2
dirty	2

one each: (11)

be clean, do, get dirty, iron, laundry, necessary, self, soap, wear, wipe, your hair

77. cow

milk	48
horse	14
moo	7
animal	5
pasture	3
farm	2
herd	2
pig	2
why	2

one each: (15)

barn, beef, big, bull, calf, dairy, fat, goat, moon, peas, pie, rumen, shit, small, turkey

78. strange

weird	22
new	16
different	10
unusual	7
familiar	5
odd	4
bizarre	2
friendly	2
novel	2
unfamiliar	2
unknown	2

one each: (26)

abstract, animal, being, black, common, crazy, fate, frightening, happy, mother, mystery, nice, not strange, old, peculiar, person, queer, science fiction, stranger, unfriendly, unique, unlikely, unread, unstrange, wild, young

79. luck

good	19
chance	9
Irish	7
unlucky	7
money	5
fortune	4
skill	4
fate	3
gambling	3
bad	2
bad luck	2
dice	2
easy	2
happy	2
horses	2
lucky	2
no luck	2
win	2

one each: (21)

cards, close, clover, evil, fast, feathers, fortunate, four leaf clover, funny, glass, happening, happiness, help, lady's, never, old, priest, resourceful, rich, unfortunate, wish.

80. to lie

cheat	36
sin	11
tell truth	7
truth	6
deceit	4
steal	4
wrong	4
deceive	3
fib	3
bad	2
honest	2
hurt	2
not to tell truth	2

one each: (14)

a lot, be untruthful, deceitful, fight, give away, injustice, liar, pain, reject, stab, test, truthful, unfaithful, untruth

81. politeness

nice	14
kindness	7
niceness	6
kind	5
manners	5
rudeness	5
courteous	3
friendly	3
mean	3
consideration	2
courtesy	2
good	2
goodness	2
happiness	2
neatness	2
rude	2
sincere	2
unpoliteness	2

one each: (31)

abruptness, aggressiveness, anger, congenial, customs, deceit, difference, dirty, educated, etiquette, fake, friend, friendliness, generous, gentle, gesture, greedy, happy, helpful, honesty, hostile, hostility, impolite, mannerly, needed, person, pleasantness, proper, superficial, very nice, women's lib

82. narrow

wide	33
thin	19
straight	11
minded	8
small	8
short	5
broad	2
not wide	2

one each: (12)

bridge, channel, closed in, friendly, large, long, road, skinny, slim, thought, uneducated, width

83. brother

sister	80
friend	7
love	3
personal name	2

one each: (8)

blond, boy, brotherhood, child, four, nun, pain, young

84. to fear

one rejection

afraid	17
hate	15
scared	9
angry	3
anxiety	3
be afraid	3
dark	2
death	2
despise	2
frighten	2
God	2
hide	2
hurt	2

one each: (34)

anger, anxious, avoid, be brave, be happy, be scared, cats, challenge, dead, dislike, fear, fear look, fight, fireball, fright, frightened, gold, hatred, have, hunger, insecurity, natural, no fear, not like, overcome, person, phobia, pity, scary, shy, sorrow, unknowing, water, worry

85. stork

one rejection

baby (babies)	51
bird(s)	24
crane	3
tall	3
children	2
pelican	2
tree	2

one each: (12)

child, fairy tales, fiction, flies, handkerchief, horse, large, long, nose, ostrich, pigeon, unable

86. false

true	60
untrue	11
lie	6
alarm	3
wrong	3
liar	2
teeth	2
truth	2

one each: (11)

barrier, face, identity, inaccurate, incorrect, not the truth, not true, tax, testable, testimony, witness

87. anxiety

fear	24
tension	10
nervousness	5
nervous	4
anxious	3
depression	3
happy	3
pain	3
test	3
anger	2
hate	2
pressure	2
school	2
stress	2
tense	2
wish	2
worry	2

one each: (26)

attack, calm, clinic, fresh, frustrated, frustration, fun, great, happiness, hatred, headache, hurt, life, mischievous, nerves, overcome, passion, pleasure, sad, science, scream, solicitude, tenseness, upset, want, wrong

88. to kiss

love	40
hug	11
lips	4
like	3
make love	3
make up	3
embrace	2
feeling(s)	2
hold	2
make out	2
pleasant	2
pleasure	2
smooch	2
tender	2
touch	2

one each: (18)

be happy, caress, enjoy, French, girlfriend, girls, good, goodbye, good night, happy, hate, joy, natural, personal name, smack, soft, sweet, tell

89. bride

groom	62
wife	8
husband	4
wedding	3
cheat	2
love	2
marry	2
marriage	2
white	2
woman	2

one each: (11)

cruise, Frankenstein, girlfriend, gown, horse, pay, personal name, sex, up, want, 'yuck'

90. pure

white	18
simple	13
clean	9
innocent	6
virgin	5
holy	4
unpure	4
impure	3
cancer	2
chaste	2
heal	2
not pure	2
sweet	2
untouched	2

one each: (26)

bribery, cleanse, cry, divine, fresh, gently, gold, group, help, ill, illness, medicine, present, purity, sick, sinful, soft, soiled, solid, unchaste, unclean, unsaturated, virginity, water, wife, will

91. door

knob	36
window	17
open	9
handle	7
house	5
close	3
chair	2
hinge	2
mat	2
wood	2

one each: (15)

bedroom, bell, brown, exit, jamb, keeper, latch, like, lock, music, nail, opening, room, threshold, way

92. to choose

pick	44
decide	10
choice(s)	9
select	4
freedom	3
separate	2
take	2

one each: (26)

accept, alternative, ameliorate, ask, bad, be given, between, borrow, enjoy, find, free, free will, friend, justify, make choice, mix, not to choose, option, partner, picky, pride, question, right, school, want, wife

93. hay

horse(s)	25
cow(s)	7
straw	7
stack	6
farm	5
fever	4
money	4
wheat	4
barn	3
grass	3
needle	3
you	3
bale	2
barrel	2
cash	2
owe	2

one each: (18)

bee, burner, cat, check, dearly, fields, food, loft, maker, oats, pain, service, sneeze, there, wagon, what, work, yellow

94. satisfied

two rejections

happy	27
unsatisfied	8
content	7
fulfilled	3
gratified	3
help	3
pleased	3
complete	2
delighted	2
dissatisfied	2
full	2
good	2
need	2
not satisfied	2

one each: (30)

A, at ease, blissful, comfortable, completely, confused, contented, degenerate, desire, desirous, easy, enough, fine, food, give, glad, grateful, greedy, green, immensely, just, let, like, nourished, pleasant, test, understand, unhappy, want, yes

95. ridicule

make fun (of)	23
joke(s)	5
laugh	5
mock	5
tease	5
criticize	4
hate	4
persecute	4
bad	3
chastise	2
hurt	2
pain	2
sarcastic	2
unhappy	2

one each: (32)

anger, argue, blame, chase, cheat, condemn, cruel, cut down, despise, disgust, fear, foolish, funny, fun of, hostility, humiliate, hurtful, mean, mockery, not like, object, obnoxious, people, pick, praise, rejection, shame, sorrow, sound, torment, unjust, wrong

96. to sleep

rest	21
dream	9
awake	6
bed	5
eat	4
wake	4
awaken	3
lived	3
wake up	3
be awake	2
good	2
nap	2
night	2
place	2
relax	2
tired	2

one each: (28)

close your eyes, comfortable, content, dormant, dormir, doze, drink, ecstasy, enjoy, eyes, get up, happily, lie, live, love, necessary, no doze, pacify, peaceful, pillow, pleasure, restful, sick, slumber, snore, sound, soundly, stupor

97. month

year	43
day(s)	31
May	6
weeks	4
January	3
July	3
February	2

one each: (8)

April, August, December, March, November, once, priest, thirty days

98. pretty

ugly	39
beautiful	15
nice	8
give	6
cute	5
sad	5
good	3
good looking	2
lovely	2

one each: (15)

aesthetic, attractive, baby, blue, face, false, fear, fine, flower, girlfriend, glamorous, gorgeous, happy, nature, woman

99. woman

man	51
girl	13
beautiful	3
female	3
wife	3
beauty	2
child	2
lady	2
nice	2
soft	2

one each: (17)

adult, controller, desire, feminine, flower, friends, girlfriend, hair, love, lovely, mom, mother, old age, personal name, power, pretty, sister

100. to insult

hurt	12
ridicule	10
hate	8
hit	4
make fun of	4
bad	3
compliment	3
criticize	3
mean	3
praise	3
attack	2
degrade	2
harm	2
put down	2
tease	2

one each: (37)

accept, anger, appreciate,
argue, arrogant, be mean,
cause, complain, cruel, despise,
embarrass, female, fight, flatter,
fun of, get back, give up,
guilt, hatred, honor, ignorant,
injury, jealous, joke, knife,
laugh, lie, mockery, not nice,
pain, persecute, person, poke,
police, praise, rude, unhappy

APPENDIX D

WORD ASSOCIATION EXPERIMENT C. G. Jung (1908)
(trans. T. Lavin)

Subject_____Date_____Admin._____

Sex____Occupation_____D.O.B.____Ed._____S. M. W. D.

xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx

#	stimulus	?/5th.	reaction	X/reproduction	
1.	head				
2.	green				
3.	water				
4.	to sing				
5.	death				
6.	long				
7.	ship				
8.	to pay				
9.	window				
10.	friendly				
11.	table				
12.	to ask				
13.	village				
14.	cold				
15.	stem				
16.	to dance				
17.	lake				
18.	sick				
19.	pride				
20.	to cook				
21.	ink				
22.	angry				

p. 2 Word Association Experiment Subject_____Date_____

#	stimulus	?/5th.	reaction	X/reproduction	
23.	needle	_____	_____	_____	_____
24.	to swim	_____	_____	_____	_____
25.	voyage	_____	_____	_____	_____
26.	blue	_____	_____	_____	_____
27.	lamp	_____	_____	_____	_____
28.	to sin	_____	_____	_____	_____
29.	bread	_____	_____	_____	_____
30.	rich	_____	_____	_____	_____
31.	tree	_____	_____	_____	_____
32.	to stick	_____	_____	_____	_____
33.	pity	_____	_____	_____	_____
34.	yellow	_____	_____	_____	_____
35.	mountain	_____	_____	_____	_____
36.	to die	_____	_____	_____	_____
37.	salt	_____	_____	_____	_____
38.	new	_____	_____	_____	_____
39.	custom	_____	_____	_____	_____
40.	to pray	_____	_____	_____	_____
41.	money	_____	_____	_____	_____
42.	foolish	_____	_____	_____	_____
43.	pamphlet	_____	_____	_____	_____
44.	to despise	_____	_____	_____	_____
45.	finger	_____	_____	_____	_____
46.	expensive	_____	_____	_____	_____
47.	bird	_____	_____	_____	_____

p. 3 Word Association Experiment Subject_____Date_____

#	stimulus	?/5th.	reaction	X/reproduction	
48.	to fall	_____	_____	_____	_____
49.	book	_____	_____	_____	_____
50.	unjust	_____	_____	_____	_____
51.	frog	_____	_____	_____	_____
52.	to separate	_____	_____	_____	_____
53.	hunger	_____	_____	_____	_____
54.	white	_____	_____	_____	_____
55.	child	_____	_____	_____	_____
56.	to take care	_____	_____	_____	_____
57.	pencil	_____	_____	_____	_____
58.	sad	_____	_____	_____	_____
59.	plum	_____	_____	_____	_____
60.	to marry	_____	_____	_____	_____
61.	house	_____	_____	_____	_____
62.	darling	_____	_____	_____	_____
63.	glass	_____	_____	_____	_____
64.	to quarrel	_____	_____	_____	_____
65.	fur	_____	_____	_____	_____
66.	big	_____	_____	_____	_____
67.	carrot	_____	_____	_____	_____
68.	to paint	_____	_____	_____	_____
69.	part	_____	_____	_____	_____
70.	old	_____	_____	_____	_____
71.	flower	_____	_____	_____	_____
72.	to hit	_____	_____	_____	_____

p. 4 Word Association Experiment Subject_____Date_____

#	stimulus	?/5th.	reaction	X/reproduction	
73.	box	_____	_____	_____	_____
74.	wild	_____	_____	_____	_____
75.	family	_____	_____	_____	_____
76.	to wash	_____	_____	_____	_____
77.	cow	_____	_____	_____	_____
78.	strange	_____	_____	_____	_____
79.	luck	_____	_____	_____	_____
80.	to lie	_____	_____	_____	_____
81.	politeness	_____	_____	_____	_____
82.	narrow	_____	_____	_____	_____
83.	brother	_____	_____	_____	_____
84.	to fear	_____	_____	_____	_____
85.	stork	_____	_____	_____	_____
86.	false	_____	_____	_____	_____
87.	anxiety	_____	_____	_____	_____
88.	to kiss	_____	_____	_____	_____
89.	bride	_____	_____	_____	_____
90.	pure	_____	_____	_____	_____
91.	door	_____	_____	_____	_____
92.	to choose	_____	_____	_____	_____
93.	hay	_____	_____	_____	_____
94.	satisfied	_____	_____	_____	_____
95.	ridicule	_____	_____	_____	_____
96.	to sleep	_____	_____	_____	_____
97.	month	_____	_____	_____	_____

p. 5 Word Association Experiment Subject_____Date_____

#	stimulus	?/5th.	reaction	X/reproduction	
98.	pretty	_____	_____	_____	_____
99.	woman	_____	_____	_____	_____
100.	to insult	_____	_____	_____	_____

1-50 median_____ 51-100 median_____

APPROVAL SHEET

The thesis submitted by Ross E. Keiser has now been read and approved by the following committee:

Dr. Frank J. Kobler, Director
Professor, Psychology, Loyola

Dr. Alan S. DeWolfe
Professor, Psychology, Loyola

The final copies have been examined by the director of the thesis and the signature which appears below verifies the fact that any necessary changes have been incorporated and that the thesis is now given final approval by the Committee with reference to content and form.

The thesis is therefore accepted in partial fulfillment of the requirements for the degree of Master of Arts.

August 27, 1980
Date

Frank Kobler
Director's Signature