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The Use of Word Association to Examine Conscious Attention

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ABSTRACT

This study applied statistical analysis to the word association method of psychological research to investigate the element of conscious attention, defined as those mental processes which deliver a word as a response to a stimulus word.

The subjects were 15 males and 15 females from a middle-class suburban community. They were tested individually with a 100-item word association test. Each subject participated in two testing sessions, and the word association test was administered twice during each session.

Two variables were measured, response time and response reproduction. These were used to classify each subject's reactions to the test stimulus words as being primary, secondary, or tertiary responses. Only the responses given in the second trial of each testing session were classified.

For each testing session, primary responses were those that were reproduced correctly and had response times equal to or less than a subject's mean response time for the first trial of the testing session. Secondary responses were (a) those that were reproduced correctly with response times greater than the subject's mean response time and (b) those that were reproduced incorrectly with response times equal to or less than the subject's mean response time. Tertiary

responses were those that were reproduced incorrectly with response times greater than the subject's mean response time.

The data were analyzed by means of correlated *t* tests. These were the major findings:

1. There was a significant reduction in the subjects' mean response times from the first to the second testing session.

2. There was a significant increase in the subjects' mean number of correct response reproductions from the first to the second testing session.

3. The mean number of primary responses did not change significantly from the first to the second testing session.

4. The mean number of secondary responses of the type involving timely but incorrect response reproductions significantly decreased from the first to the second testing session.

5. The mean number of secondary responses of the type involving correct but delayed response reproductions significantly increased from the first to the second testing session.

6. There was a significant decrease in the mean number of tertiary responses from the first to the second testing session.

In addition, the study identified for each subject specific stimulus words to which the subject had

tertiary responses in both testing sessions. The average number of such words per subject was approximately 3.

The results of the study indicated that the word association test can be used to identify areas of loss of conscious attention which represent inner conflict.

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To my dear husband David and my two daughters Sheila and Susan because I love them and have constantly used the support that they have so generously given.

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CHAPTER I

INTRODUCTION

Toward the end of the last century, when psychology began to emerge as a new science, there were only a few simple experimental techniques used. One of these techniques used was association. Association methods were employed in research studies to investigate and measure the characteristics of the abstract faculty called mind. Researchers using methods of association examined the mental processes involved in the imprinting and recall of nonsense syllables, single words, rhythmic verses, and organized phrases (Ebbinghaus, 1885/1913; Galton, 1883, 1892). The aim of these investigations was to determine the existence of associative structures within the mind, e.g., how the awareness of one thought triggers the emergence of another one. These investigations were based on the theory that learning was acquired through association and therefore was instrumental in constructing the storehouse of the mind called memory.

To test this theory the method of word-association was developed. Through the use of a technique focused upon stimulus and response words, the researchers who conducted word-association tests began to assume that there was a general connection of images, thoughts, and languages within the mind and they focused upon word association responses in an attempt to discover both common and unusual associations. Responses to stimulus

words provided information pointing to a variety of conditions within the process of thought, such as associative strength (response ability), associative domain (vocabulary), and categories of associations (personal or impersonal response).

Association theory is a viable field of study today with a variety of conditions yet to be understood and a vast number of variables to be studied by students interested in words and the implications provided by word messages.

Statement of Purpose

This study used the technique of word-association to investigate the associative processes of the mind. Associative responses were studied to examine response strength, the degree to which a response to a stimulus word is spontaneous or inhibited. This aspect of association, response strength, will be referred to in this study as the element of conscious attention or as the spontaneous mental process by which words and ideas are expressed.

The study, using the variables of response time and response reproduction to measure associative strength, attempted to determine whether these two variables are reliable measures of conscious attention and if these variables can be used to statistically determine a measure of conscious attention for each subject.

CHAPTER II

LITERATURE REVIEW

Historical Summary of Word-Association Research

Historically word-association has been used as a technique of psychological investigation to study human perception and human perceptual imagery. Word association research has particularly investigated the various patterns of perceptual imagery or models of thought that are present in the verbal behavior of individuals.

Early Experiments

The first studies using word association began over 100 years ago with the work of Galton (1883). Galton employed a technique of free-association which served to illustrate two primary laws active in association, contiguity and assimilation. Contiguity refers to the temporal succession of one thing after another in the flow of psychological processes. Assimilation refers to the phenomenon of naturally occurring associations within the psyche as opposed to those associations which occur within the grammatical structure of language.

Directly following Galton's work, Wundt (1883), using a paired-association technique, became the first investigator to specifically classify associations. Basic to his study was a simple experiment: The examiner called out a word to a test subject who then responded with the association that was immediately

called to mind by the stimulus word. Wundt's word-association experiment applied a mental stimulus, a word, to the mental system, the mind. As a result of his testing, Wundt began to see two distinct types of responses to stimulus words, external and internal associations. His classification of these two types of associations not only revealed the relational quality of spontaneous associative responses, but it also identified more clearly the occurrence of various types of associative responses.

Wundt (1883) defined what he termed an external associative response as a collectively known response. An external associative response given by an individual was said to be a response in which the mind is relating universal or collectively used associations of the world; for example, horse-animal. Wundt defined an internal association as a response which is a personal, subjective response. An internal associative response is a response in which the mind is relating specific associations dependent upon the particular experience of the individual, as in brother-fight. The classification of associations as external and internal was used in the experiments of many of Wundt's successors, such as Kraepelin, Aschaffenburg, and Cordes, who were all members of Wundt's school of structuralism (Jung & Riklin, 1904/1973).

Similar to Wundt's theory was the theory of introspection, which involves the concept of imageless

thought and the study of associations other than verbal reactions. Using this theory psychologists began the classification of associations into those with image and those without image (Deese, 1965).

As one of the first investigators of imageless thought, Ebbinghaus (1885/1913) conducted experiments which compared the memory of nonsense syllables with the memory of series of single words. Bleuler (1912), while investigating the structural patterns of schizophrenia, classified associations as being unusual, remote, or sound reactions. Out of the work of Ebbinghaus and Bleuler grew the concept of thought as the reflection of impressions or the recurrence of external events (Deese, 1965).

Analytic Investigation

In 1902, Jung and Riklin (1904/1973) explored the affective processes of association. These processes of thought were considered to be associations found outside of clear conscious reactions. The investigations of Jung and Riklin began the recognition of the self-activity or autonomy of the human mind within the psyche. Following the view that the mechanism of association was an "extraordinarily fleeting and variable process" (p. 4) subject to countless psychic events, they investigated the factor they felt exerted the most influence on the mechanism of association, namely attention.

Jung and Riklin (1904/1973) viewed attention as the factor not only directing the thought process toward the associative response, but as the factor most able to reveal the various modifications appearing in that response. Their consideration of the effects of attention on the process of association was to clarify how attention "links the association process with all other phenomena of the psychic and physical domain in consciousness." (p. 4)

In an investigation focused upon attention and external distraction, Jung and Riklin (1904/1973) found that as the individual's focus on an idea decreased, the external associations and sound reactions increased. This occurred at the expense of internal associations. It was their contention that one of the factors determining whether an individual reacted to a stimulus word with either an external or an internal association was the intensity of concentration, i.e., the degree of attention the individual devoted to the simulus word.

After focusing upon attention and external distraction, Jung and Riklin (1904/1973) turned to the element of response, the associative reaction to a stimulus word. Jung and Riklin described response as the action of stabilizing an idea. They saw this task of the association process as being due to a somatic connection--a type of physical echo or feeling tone which kept the idea in focus. Jung and Riklin defined

this feeling tone as a directional feeling or idea that promotes all of the ideas associated with the feeling tone while inhibiting all the ideas not associated with the feeling tone.

As Jung (1905/1973b) focused upon associative response, he began to observe various reactions to stimulus words. Many of the responses did not come with what he defined as an "equal smoothness" or instinctive reaction. Many responses displayed irregularities in speech and were often much slower in response time than others. As other irregularities such as several reaction words, the repetition of the stimulus-word, and slips of the tongue began to surface, they were considered by Jung to be signs of disturbance within the process of instinctive, spontaneous reaction. Jung contended that during such instances of disturbance or demonstrations of faulty attention, the concept relating to the stimulus word was not accessible or raised to a level of clarity. He described the cause of these defective perceptions as being due to the weakness of the emotional tone of the concept, a situation in which the echoing response is too distant to be heard or grasped by attention. Jung and Riklin (1904/1973) assert that when the emotional tone of the newly relating concept is unable to be grasped by attention, the directional tone becomes increasingly subject to interruptions by associations which have been formed through practice and are

habitual. This type of association, which is more mechanical, then becomes the associative response. Jung and Riklin (1904/1973) found that in some instances, the response was only a sound. Jung (1905/1973a) states that after early childhood, sound associations are not usually used, as they are useless in normal thought-processes. He contends that sounds usually remain repressed and outside of clear conscious reactions, but do become reactions, like slips of the tongue, or as mishearing when there is a disturbance to a higher level of association.

Such continued disturbances indicated to Jung and Riklin (1904/1973) that attention failures were essentially due to emotional inhibitors. By noting at which stimulus-words these disturbances occurred, Jung and Riklin (1904/1973) collected what they called the "symbolic" character of an individual. They found that the associations belonging to the "symbolic" character lacked a certain ability to directly disclose psychic material and were references to a "personal matter" of the individual. To these responses identified as "the sum of ideas referring to a particular feeling-toned event" (p. 72), Jung and Riklin gave the term "complex."

As a result of Jung and Riklin's (1904/1973) many observations of the various reactions of an individual during the association experiment, Jung (1905/1973b) organized a series of response indices. These indices

served not only as measures for the temporal relational quality of the responses, the external or internal value, but also as pointers to what Jung (1905/1973b) defined as an affective response to certain stimulus words. Jung referred to these affective responses as "complex-characteristics." Through the use of these response measures, Jung (1905/1973b) identified various emotional responses to stimulus words.

The first and most prominent index Jung (1905/1973b) used to indicate affective response was response reaction time to stimulus words. In their investigations on the associations of normal subjects, Jung and Riklin (1904/1973) established that abnormally long reaction times occurred when the stimulus word touched on a feeling-toned complex, i.e. a mass of images held together by a particular affect. In establishing an average response time for the list of words presented to a subject, Jung and Riklin (1904/1973) were able to detect prolonged reaction times to specific stimulus words. Any time was considered to be prolonged that took longer than the average time for the subject.

Another very prominent index that Jung (1905/1973b) used was the index of reproduction disturbance. Once a subject completed the first trial of approximately 100 associations, Jung asked the subject to repeat the original answers to the individual stimulus-word, in a second trial. The

stimulus word at which the subject's memory failed, in that the association from the first trial was not reproduced, was considered to be a word indicating an area of complexive behavior. In relating incorrect reproduction and prolonged reaction-time, Jung and Riklin (1904/1973) found that disturbances of reproduction chiefly occur with prolonged reaction times.

A third index used by Jung and Riklin (1904/1973) was perseveration. Perseveration was used to denote a continuation of disturbance, i.e. a situation in which "the preceding association conditions the next reaction" (p. 34). Through this index, they were able to observe the constellating effects of an underlying complex.

On occasion, other indices such as the repetition of the stimulus-word, the use of several words as a response to a stimulus-word, and the translation of the association to a foreign language were employed as adjunct observations to specific studies (Jung, 1904/1973b).

The early diagnostic studies of Jung and Riklin (1904/1973) were based on the belief that the content of the associative response and the emotional reaction accompanying the response would suggest a central problem bothering the person being examined. The material obtained by the experimenters provided evidence that "emotional factors," the presence of

which was indicated by the subject, had a marked influence on the association process.

Since the rationale of the Jung and Riklin (1904/1973) experiments was based in psychoanalytic theory, particularly on the concept of repression, their findings had an immediate effect on the growing interest in complex-indicators. Their work was significant in providing a shift from what was once the diagnosis of psychiatric categories to the diagnosis of individual emotional problems.

This innovative approach stimulated countless experiments, such as those of Kohs (1914) and later Hull and Lugoff (1921), which were searches for new complex indicators. Investigations like these recognized that feeling and emotion play a significant role in association mechanisms. It became increasingly clear to these researchers that "emotional factors" played a primary role in identifing significant individual differences. These individual differences were clarified enough to encourage Jung (1921/1971) to investigate personality types. In 1921, Jung went on to develop a theory of psychological types.

Competing Clinical Views

As the psychologists of the time became more involved in cognitive processes, the association experiment began to be used in the field of criminology. There, based on cognitive theory, Lipmann

(1907) developed the diagnostic experiment into a "fact-diagnostic experiment."

In a pronouncement that seemed directly opposite to Jung's position, Lipmann (1907) asserted that the experiences which were of concern to Jung and Riklin (1904/1973) were not emotional experiences but intellectual processes or interest tones. Out of Lipmann's work grew a concept of memory as traces and symptoms. It was Lipmann's contention that interest-toned experiences influenced the traces of experiences that were similar in thought but dissimilar in levels of emotion.

Ogden and Richards (1923) and Rapaport (1950) are investigators who, like Jung, stressed the psychological meaning of associations. Studies they conducted focused upon verbal stimulation response and also on the analysis of language as a behavior of the individual speaker. Like Jung, their investigations placed the focus of the meaning of associations within the individual user of language. They felt that to consider the relation between stimulus and response without considering the user of the language was to miss completely the psychological nature of language.

As a clinical investigator, Rapaport (1950) considered association as an emotional response system aroused by the stimulus and examined what associations occur most often. One of his assertions was that ego-strength filtered associations. For example, he

contended that lack of ego strength allowed affective influences to disrupt the intentions of an individual in conforming to the instructions of the association test. Therefore, on certain occasions, deviant responses were produced, i.e. responses not ordinarily given by normal individuals. Rapaport also found that, while the lack of ego strength failed to filter affective influences, high ego strength many times prevented the content of reactions from revealing affective difficulty.

Associative/Linguistic Theory

Traditional association theory and the laboratory techniques that were developed through the study of associative learning were based upon the principle of contiguity. The idea that elements of thought and language are formed together is what Deese (1965) called "contingencies in experience." These experiences imply that the organization or structure of mental events is determined by the organization of input conditions, and for the most part is, as Deese states, "acquired in bits and pieces." Thus, Deese provides us with an image for the theory of structural growth. He contends that, "structural cognitive relations grow out of experience that is, for the most part, piecemeal" (p. 162).

In recent years, a number of investigators (Hovland, 1952; Hunt, 1962; Laffal, 1965) have examined the properties of abstract structures both in language

and thought. Their approach was to investigate the associative meaning of paired contingency form (stimulus word and response together), as well as the interrelations of meaning in multiple paired contingency forms. Investigating the meaning of these paired contingency forms, they explored the principle of assimilation, the translation of these contingencies (linguistic forms) into other meanings, and the use of contingencies as a source of new creative ideas.

In his explanation of what he calls "the new laws of association," Deese (1965) states that,

> the acquisition of or an alternation in particular associative structures depends upon the structures existing for the individual at the time of learning and the relations between those structures and the organization in the information presented to the individual. (p. 163)

Deese (1965) contends that the behavior of an individual is largely determined by patterns of organization. And, as most association theorists have claimed, those patterns of organization come from the use of language.

In his approach for investigating the relationship between associative structure and grammatical structure, Laffal (1965) describes what he calls the "hierarchy of response." This idea of an actual word-association hierarchy was formulated using word-association techniques. This hierarchy is the "storehouse" out of which an individual, when stimulated, draws a response. It contains the multiple

factors which interact in the production of a response. Such factors include the emotional investment in the stimulus word, the personal dynamics of the subject, (i.e., needs and conflicts), the demands represented by the communicant, and intrusive stimuli. It is Laffal's contention that intrusions occur not as an accident but because the psychological state of the subject fosters a division of attention. He states that such intrusions are normally distractions attended to only by extremely disturbed individuals.

Laffal (1965) sees the needs and conflicts of an individual and the demands of the communicant as the two most significant factors in the production of a response from the response hierarchy. The communicant's role in the word-association experiment is essentially to provide the atmosphere in which the respondent activates his or her own speech cycle. Responses of an individual to a communicant then are evaluated for: (a) deviations from social norms, (b) comprehensibility, (c) external distortions in the environment, and (d) internal distortions (needs and conflicts) in the individual.

Laffal (1965) contends that the response selected for expression from the storehouse is determined by the "relative strength" of the various choices within the storehouse. Relative strength refers to a continuum of responses, ranging from the most dominant responses commonly given by the group of which the responder is a

member to those responses that are least common to the group and are more specific to the responder. These dominant responses are what Laffal describes as the "ideal linguistic possibility" (p. 12).

To these so-called possibilities, the French linguist Ferdinand de Saussure (1915) gave the term "la langue," which defines a cumulative consensually valid language. To the language used less commonly by the group and more particularly by an individual, Saussure gave the term "la parole." These definitions are not unlike those associations classified respectively by Wundt (1883) as external and internal associations.

Laffal (1965) states that la langue, the collective phenomenon which ultimately transcends the group from which it is produced, is not the focus of psychological study. To some extent psychological studies are not focused on la parole either, but on what linguists Hall (1951) and Ullman (1962) have called "idiolect"--a reference to the totality of the speech habits of a single person at a given time. The emphasis here is on time, since an idiolect is not inconsistent with la langue but, as Laffal (1965) states, shows a specific character unto itself as it deviates from la langue. As idiolect deviates from la langue, it breaks from the consensually accepted order as established in la langue. It is this divergence from the common language which is the behavior relevant to psychological study.

Since language exists perfectly only within the collective, word-association studies separate language from speaking in order to differentiate what is social and what is individual. Parallel to this differentiation, word-association studies also determine what is essential from that which is newly created through the process of assimilation.

In creating a theory of a "speech circuit" between two speakers, Saussure (1915) conducted one of the first investigations into the phenomenon of assimilation. By differentiating the psychological and nonpsychological aspects of speech, he outlined the dynamics at work in the speaking process.

The nonpsychological aspect of speech, which Saussure (1915) defined as the physiology of expression and audition, is the physical means of transmitting sound by vibration.

Saussure (1915) describes the psychological aspect of stimulating and selecting a response for utterance as a two-fold process, as it is represented by both an active and a passive state of mind. The active or executive state, the constellation of an association by a verbal stimulus, includes everything that goes from the associative centers of the speaker to expression. The focus is upon intention and motivation or the use of "la langue."

The passive or receptive state of the circuit, the preparation for an utterance of a response includes

everything from the ear to the associative center of the listener. The focus of verbal response is upon verbal structure or the use of "la parole."

In their studies of language, Ogden and Richards (1923) describe language as having two usages, referential and evocative. The referential use is reflective and definitive. In this intellectual use of language, the essential considerations are the correctness of the symbolization and the truth of the references. The evocative use of language is emotive and occurs most characteristically in poetry and music, where sounds, associations, and rhythm play an important role. The central focus of the evocative use of language is the attitude which is aroused.

As Saussure (1915) and Ogden and Richards (1923) investigated the intention and motivation of particular linguistic forms, many theorists began to consider the "associative meaning" of responses. Deese (1965) defined associative meaning as the response most often obtained in a collection of responses from a group of subjects using a free-association test. As Deese (1965) has explained, "the meaning of any form is not given by a single response or, indeed, by a collection of responses to that form" (p. 41).

Deese (1965) describes meaning as a relational concept. He states that there may be, at times, an interest in the absolute character of a distribution of responses to a given word, but most often theorists are

interested in the "nature of some relation between words and natural phenomena or between words and words" (p. 43).

Affective Theories

In their analysis of language and thought, modern association theorists began to concern themselves with relationships between response distributions of linguistic forms and stimuli. An example of such a study is Rapaport's (1950) investigation of the interrelationship of emotion and memory. As a result of an extensive examination of psychological, psychiatric, and psychoanalytical literature, Rapaport found two basic psychological dynamics underlying the process of association: memory organization and emotional experience.

The theorist that Rapaport (1950) thought came the closest to describing an organization of relationships among associations was Bartlett (1932), who found "attitude" to be the selecting force. Bartlett described the process of organization as a "matter of feeling, or affect" (p. 317). This led Rapaport into a study of experimental material which investigated affective tone. He found that, "the more personally relevant the material was, and the more individually its affective tone was determined in the experiment, the more consistent the results became" (p. 269). This study, revealing the consistency of results Rapaport needed, caused him to state that,

> the more intellectualized and conventionalized the nature of the emotional factor, and the more purely quantitative the method of experimentation employed, the more the intensity of the emotional factor was correlated with the influence exerted on memory; the more qualitative the methods and the more genuine the emotional experiences employed, the more obvious was the influence of the quality of the emotional factor. (p. 269)

With this idea of a hierarchy of emotion before him, Rapaport was able to declare that memory organization was attributable to emotional influence.

Rapaport (1950) found that emotional factors not only facilitated remembering but also inhibited remembering to the point of forgetting. Although he was not able to establish any kind of difference between these emotional factors, Rapaport suggested an existence of a hierarchy of emotional factors influencing memory, ranging from those which are genuine and deep-seated to those which are intellectualized and conventionalized. He states that while the hierarchy of emotional factors organizing memory would be the basic factors of personality, the manifestations of these basic organizing factors (in memory-functioning) would be the hierarchy of "emotional influences on memory" (p. 270). Rapaport indicates that what he defines as the basic psychological factors, which come to expression in the form of memory organization (attributed to emotional influences), are identical with the dynamics underlying the experience of emotions.

The view of emotion Rapaport (1950) drew from his study is that emotions are expressions or discharges of energy. He contends that even though these underlying dynamics are unconscious, conflicting strivings are to be looked upon as the preconditions of these emotions. He suggests that the discharge process of emotions is only one of many processes, but is the one most likely to occur in peripheral physiological changes, changes in routine or habitual behavior, and in the organization of thought and memory processes of a person.

In his study, Rapaport (1950) indicated the necessity to clarify terminology. Following MacCurdy's (1925) suggestion, he proposed that the psychological experience of emotion be termed "affect" and that the physiological manifestations be termed "emotions." In doing so, Rapaport supports MacCurdy's theory of emotion. MacCurdy's (1925) theory contends that if an organism responds to a stimulus immediately and adequately with instinctive behavior, no emotion will be engendered. But, if the instinctive reaction is delayed, and if the subject is somewhat self-conscious, emotion will appear. MacCurdy contends that when the inner tendency to activity is regarded as a constant, the urgency of the affect will be reduced, not merely by instinctive behavior, but also by emotional expression.

Word Association Test Formats

In a review of word association studies, Cramer (1968) states that there are generally two formats that are used for association tests, the free-association method and the controlled-association method.

Free Association Method

In the free-association test format, the subject is allowed to freely give a response from an unlimited domain of responses. In a survey of response procedures, Cramer (1968) found discrete associations and continued associations are the ones most often used in free-association experiments.

The discrete association procedure is the method generally used to establish normative data for word-association tests. This method was first established in the studies of Wundt (1883). In this method, the subject is given a single word and asked to respond as quickly as possible with the first single word which comes to mind.

Word-association experiments using the continued association procedure vary greatly. In a "continuous" method, the stimulus word is presented only once to the subject. The subject then responds with a chain of associative responses in which the first word only is directly related to the stimulus word.

In a second version of the continued association procedure, the same stimulus word is presented a number of times. Each time the word is presented, the subject

is asked to respond with a new response (Cramer, 1968).

A third variation of the continued association procedure is that of repeated trials. In the first trial, the examiner presents the stimulus words one at a time, and the subject responds to each stimulus with one word. When the entire list of words is completed, the procedure is repeated. In the second trial, the examiner presents the stimulus words one at a time, and the subject is asked to respond with the same response given to each stimulus word in the first trial of the examination. Once the second trial has been completed, the same procedure is repeated in a third trial of examination.

Cramer (1968) cites the work of Noble (1952) as exemplifying the method of continued association. In this work, a mean number of responses to a stimulus word was elicited during a 60-second trial as an index of the "meaningfulness" (m) of that stimulus. The results showed that the m values remained stable over a time and were consistent from one investigation to another.

Controlled Association

In the format of a controlled association test, the subject must choose a response from a limited domain of responses. Cramer (1968) found that there are two categories of the controlled association procedure, the semantic and the particular concept procedures.

Cramer (1965) cites the study of Hills (1958) as an example of the semantic procedure. In this study the subjects were restricted to responding with synonyms of the stimuli. The subjects were employed professional engineers (N = 667), and they were studied to determine factors related to job success. The subjects were presented with eight common words and were asked to respond, in writing, with as many synonyms as possible in a 12-minute period. Results showed that the number of responses and response commonality were related to job success, while uncommon responses were unrelated to success.

In testing for particular concepts, responses are limited to such things as names of foods, colors, etc. As an example of this type of study, Cramer (1968) noted that of Beck (1960) in which 1,000 teenage subjects were asked to respond with one of 11 colors to a 60-word association test. Beck found that only five of the stimulus words were not significantly associated with some color. In a retest after one week, no significant change from the previous week's results was apparent.

Stimuli Presentation Methods

The word-association format for stimulus presentation varies from experiment to experiment. Stimuli can be presented visually, usually printed on a piece of paper or projected on a screen, or orally with the experimenter pronouncing the stimulus word.

In a study of stimulus presentation methods, Palermo and Jenkins (1965) compared written responses to stimuli presented both visually and orally to grade-school subjects. They found the oral presentation method elicited a greater number of primary and contrast responses than the visual presentation method. A primary response is that response most often given to a stimulus word, while a contrast response is the antonym of the stimulus word.

Response Forms

Like stimulus presentation, responses to stimuli may be conveyed in either oral or written form. Written responses are most often used when the subject is tested in a group setting and when the stimulus is printed. Oral responses are most often used when the subject is tested individually and the stimuli are presented orally (Cramer, 1968).

Cramer (1968), comparing oral versus written responses, reported that the former mode results in more primary responses, more contrast responses, and greater response commonality.

Response Measures

Associative responses, elicited by any type of association test, are employed as response measures and used to describe the findings of word-association studies. In a review of associative responses, Cramer (1968) found that these measures are used by the association researchers in two specific ways--as

measures of quantitative characteristics and as measures of qualitative characteristics.

Quantitative Measures

Several quantitative measures have been used in association experiments to indicate associate-response strength. Cramer (1968) found "popular" or "primary" to be the type most frequently used. A primary response is defined as the response which occurs with the greatest frequency to any one stimulus. How strong or weak a particular primary response is depends on the proportion of subjects in the total sample who give that response. Some studies focus upon specific stimuli and assess the number of stimuli which do or do not elicit a primary response. In this sense, the stimuli are being measured for their associative strength. Once the associative strengths of the test stimuli have been determined, the stimuli may be arranged in a hierarchical order according to their level of associative strength.

Another measure of response strength is that of associative reaction time. This measure can be used only for individual testing. The measure of associative reaction time can be used in two ways: as an index measuring the reaction time of each response or as an index measuring the number of responses which exceed some standard time (Cramer, 1968).

The measure of response commonality in association research could be described as a close relative of

associative strength, since it is simply a measure of occurrence or nonoccurrence of the primary response to any given stimulus word (Cramer, 1968). Its role is to answer the question: Are the primary responses commonly or not commonly found among the responses of this particular group?

Cramer (1968) cites another type of response commonality measure which has been used. This is the frequency of a response occurrence among a group of responses.

In addition to the measures of response strength, there are measures used in association research which reflect not only the size of an associative domain but the consistency of the responses to any one stimulus. These, Cramer (1968) states, "reflect the organization of the associative domain" (p. 27).

Association researchers define "size of the associative domain" by the number of associative responses elicited by a stimuli. To find the "size of the associative domain," one must count all the different responses to one stimulus word (Cramer, 1968).

Size or "number of different responses" may also refer to the number of responses obtained across subjects. This reference is an indication of response heterogeneity (Cramer, 1968). In continued association tests, "number of different responses" can refer to the average number of associations elicited from each

subject during a time limit of 60 seconds per stimulus word. This reference is an indication of response availability. Cramer (1968) cites Noble's work (1963) as an example of a study which focused upon the elements of response availability.

Idiosyncratic responses, many times seen as analogous to heterogenetic responses, are also a measure of the associative domain. An idiosyncratic or "original response" is one which is given by only one subject. Idiosyncratic responses, correlated with heterogenetic responses, provide what is referred to in association research as the "associative meaning" or what has been termed "a response hierarchy," the breadth of meaning for a specific stimulus word (Cramer, 1968).

When compared with the number of idiosyncratic responses of the same word, the number of heterogenetic responses will always be larger. This comparative measure, known as a measure of response entropy, has been used to describe the "distribution" of associative responses to a stimulus word. Cramer (1968) cites Horvath (1963) as a researcher who has statistically investigated the shape of the associative response hierarchy of a given stimulus word.

Another measure of response consistency, introduced into word-association research by Jung (1905/1973a), is that of response reproduction. Response reproduction is a measure of the recall

abilities of an individual. To determine response reproduction, the stimuli are administered to the subject a second time, and the subject is requested to give the same responses she or he gave in the first administration. Thus, measures of response distribution can be applied to the distribution of response reproduction for each subject within a group.

Measures of response reproduction may also refer to the number of reproductions to a specific stimulus word for a group of subjects. Based on the minimum and maximum number of reproductions to any specific stimulus word, this measure establishes a "hierarchy of response"--a distribution of response reproduction and error for a particular group.

Therefore, measures of response reproduction may refer to either the distribution of response reproduction to a stimulus word for a group of subjects or to the distribution of response reproduction for each subject within a group.

Qualitative Measures

Several qualitative measures have been used in association experiments (Horvath, 1963) to investigate the different characteristics of associative responses in order to define at least some of the parameters of a specific domain or distribution. This is analogous to describing the characteristics of a single hockey player on a given team by the average characteristics of all hockey players in the league.

Responses have been measured in terms of the part of speech they represent (paradigmatic studies) or the different grammatical positions they occupy (syntagmatic studies). They may be analyzed in terms of being a synonym or an antonym. Responses may also be evaluated with regard to frequency of use by a particular subject or frequency of use across subjects. (Cramer, 1968).

Such qualitative response characteristics, such as emotionality (Rapaport, 1950), unusualness (Saussure, 1915) and degree of disturbance (Jung & Riklin, 1904/1973)) are generally determined from ratings made by the experimenter, the subject, or a group of subjects. A fairly large number of subcategories of response have been proposed. These include conceptual distance from the stimulus and the classification of supra-, sub-, or co-ordinate responses. The inconsistent and/or insignificant findings obtained when these subcategories have been used make it somewhat doubtful if their use merits the amount of additional scoring effort required (Cramer, 1968).

Hypotheses

Research has shown that contiguity and assimilation are two basic principles active within the psyche (Galton, 1883). As principles influencing human perception, contiguity and assimilation represent two root systems responsible for information being

processed within the psyche and the ability of consciousness to produce information.

Wundt (1883) has suggested that the information contained within the psyche has the possibility of two levels of thought expression, external (general) and internal (personal). Later Jung and Riklin (1904/1973) suggested that while this information displayed these two levels of thought expression, it also displayed various degrees of emotional tone. Saussure (1915) in his description of man's two uses of language, descriptive and emotive, also suggested the presence of emotional tone when he defined the literal and the esoteric value of words.

To reflect the various degrees of emotional tone accompanying thought, Jung (1905/1973) measured reaction time and response reproduction of subjects producing associations during a word-association test. Based upon those stimulus words for which the subject displayed extended reaction times and incorrect reproductions, Jung was able to identify where an emotional tone accompanied the response. These emotionally toned responses identified throughout the word association test indicated to Jung and Riklin (1904/1973) an effect on the ability of consciousness to produce information.

Analyses of these responses to stimulus words where the conscious intention of the subject was disturbed caused Jung and Riklin (1904/1973) to develop

the theory of the complex. Their theory of complex indicated that a collection of imaginings which they found to be relatively independent of the central control of consciousness was able and liable at any moment (due to emotional tone) to influence the conscious intentions of the individual.

Because Jung (1918) saw the intention of consciousness also as a complex, the ego complex, he studied the ego complex in parallel with other complexive behavior to determine their opposing effects upon the subject. He recognized that complexes exist in everyone and are subject to continual alterations. His main emphasis was upon fixed complexes and their ability to arrest the development and expression of the general personality. Jung continued to develop his theories without obtaining clear statistical data to verify his ideas.

It was the intention of the present study to statistically explore the element of conscious attention within the association process of individuals. A word-association test was administered twice to each subject on two separate occasions. Through the measurement of the subject's response time and response reproduction, the study examined the degree to which the lack of conscious attention of each subject remained constant with particular stimulus words.

Since familiarity plays a great role in reaction time, the first hypothesis of the study was that the mean response time for individual subjects would decrease significantly from the first testing session to the second testing session.

It is my contention that the subjects, between testing sessions, have the opportunity to think about their emotionally toned responses to stimulus words and resolve insignificant mental disturbances. Therefore, the second hypothesis of the study was that subjects' correct reproduction of responses to stimulus words would significantly increase from the first to the second testing sessions.

Based upon his study of reproduction disturbance, Jung (1905/1973b) contended that complexive behavior was indicated when a subject was unable to correctly reproduce responses in the second trial of the word association test. This lack of reproduction coupled with prolonged reaction time, indicated to Jung and Riklin (1905/1973) that the subject was demonstrating attention failure due to emotional inhibitors evoked by the stimulus word. This is what Jung defined as a complex.

Jung's theory that complexes remain constant and cannot be easily resolved was the basis for the third hypothesis of this study. This hypothesis was that even though the number of times an individual subject displayed lack of response (those instances in which

the response time to the stimulus word was greater than his/her mean response time and the response word was incorrectly reproduced) would decrease from the first testing session to the second, lack of response would remain constant in the case of specific stimulus words.

CHAPTER III

METHOD

Subjects

The 30 participants in the study, 15 females and 15 males from a middle class suburb of St. Louis, Missouri, were volunteers from a population consisting of friends, neighbors, and business associates of the experimenter. Every person who volunteered to participate completed the study. Each subject signed a consent form stating that he or she was willing to be a part of this experiment (see Appendix A).

To determine the demographics of the group, each subject completed a biographical information form (see Appendix B). The subjects' ages ranged from 13 to 51 years with an average age of 33 years. The average amount of formal education they had was 15 years. With regard to marital status, 11 subjects had never been married, 15 were married, and 4 were divorced. Twenty-nine subjects were Caucasian American and 1 was Hispanic American.

Test Administrator

The present investigator served as the test administrator for each subject taking the word association test.

Instrument

The instrument, the Word Association Test (WAT), was a list of 46 nouns, 30 adjectives, and 24 verbs. This list of stimulus words was obtained from Volume 2

of the Collected Works of Carl Jung (1973) and amended by the present investigator. The words were organized in a four-word sequence of noun, adjective, noun, and verb, and they were arranged to present an organized form of actions, situations, and things to each subject (Jung, 1909). The words were presented individually by a female voice on a tape recorder. The words and sequence of their presentation to each subject are displayed in Appendix C. The responses of the subject to each stimulus word were recorded by a tape recorder, and they were also written on paper by the test administrator.

Procedure

Each subject was tested individually. The setting for the testing was a quiet, comfortably furnished room with only the subject, the test administrator and the recording equipment present.

Before the testing began, each subject was given a set of instructions which was presented orally by the experimenter. The instructions were as follows:

> I have a task I want you to perform. It involves making responses to words that you will hear. In a moment I will turn on a tape recorder, and a recorded voice will present to you 100 different words. A brief pause will follow the presentation of each word. Your task is to make a one-word verbal response to each word you hear. For example, if you were presented with the word "cat," you might respond with the word "dog." If you were presented with the word "house," you might respond with the word "home." Give the first one-word response that comes to your mind. You will need to listen carefully to the recorded voice because the words presented by the voice will not be repeated. I will use a second tape

recorder, that I need you to hold in your hand to record your responses to the words you hear. Make yourself comfortable in your chair. I will now turn on the tape recorders. For each word you hear, respond with the first word that comes to your mind.

The test administrator administered the Word Association Test by playing the tape recording consisting of the list of 100 words. The tape recorder used to present the stimulus words was placed in front of the subject, while the tape recorder used to record the responses was held by the subject. During the testing procedure, the test administrator sat in a chair behind the subject and, as a backup to the sound recordings, collected the response words of the subject on the form found in Appendix C.

At the completion of the first administration of the Word Association Test, the subject was asked to relax in place for 10 minutes. After the allotted time, the subject was given the following second set of instructions to complete the reproduction portion of the test:

In a moment I will replay for you the same tape recording that you heard previously. Once again you will hear the recorded voice present 100 different words. This time, as you hear each word, your task is to recall and to verbally repeat the same response you made to that word when the word was presented to you before. For example, if the word "cat" were to be presented to you and your previous response to the word "cat" had been "dog," then this time your response to the word "cat" would also be "dog." If you cannot recall your previous response to a word, give the first one-word response that comes to your mind. Your responses will be recorded using the second

tape recorder. Make yourself comfortable in your chair. I will now turn on the tape recorders.

Each subject participated in two testing sessions. At various times in this report, the first testing session will be referred to as WAT I and the second testing session will be referred to as WAT II. The period of time between the first and second sessions varied from subject to subject and ranged from 31 to 49 days. The average length of the period between testings was 40 days. The same procedures were employed for all testing sessions.

Each testing session lasted approximately 1 hour, 26 minutes of which was taken up by the two taped presentations of the stimulus words.

Data

Three response measures were used in this study, association reaction time, response reproduction, and lack of response.

Association reaction time was the time that elapsed from the presentation of the stimulus word to the associative response provided by the subject. Reaction times were obtained for each response in the initial trial of the test in both of the testing sessions. Subsequent to the testing of each subject, the taped responses were timed using a stop watch and measured to the nearest 1/10 of a second. Using this data, two mean response times (one from the inital trial of WAT I and one from the inital trial of WAT II)

were calculated for each subject. Using the 30 subjects' individual mean response times, an average mean response time was calculated for the entire group of subjects for each of the two testing sessions.

Response reproduction refers to the ability of the subject to correctly reproduce, during the second trial or reproduction portion of the session, the associative response given to the stimulus word in the first trial of the test. Reproduction of the associative response was identified by listening to the tape recording and comparing the associative response to each stimulus word in the first trial of the test to that in the second trial. This procedure was repeated for the second administration of the test, WAT II.

The total number of stimulus words to which there was a lack of response was determined for each subject in each testing session. This number was derived by totaling the number of responses to stimulus words that had a reaction time greater than the subject's mean time in the initial trial and were not reproduced correctly. To measure consistency of lack of response for each subject, the number of responses which met both of the previously stated conditions was identified in WAT II and compared to the number of responses meeting those conditions in WAT I.

Response times and reproductions were employed in the following manner to produce a uniform measure of response commonality. Each subject's responses were

categorized according to three levels of response strength. Primary responses (OO) were defined as those responses which were produced in an amount of time equal to or less than a subject's mean response time and which were reproduced correctly. Secondary responses (OX) were responses which were produced in a time equal to or less than a subject's mean response time but which were not reproduced correctly. Secondary responses (XO) also included responses that were reproduced correctly but which had reproduction times greater than a subject's mean response time. Tertiary responses (XX) were responses which had reproduction times greater than a subject's mean response time and which were not reproduced correctly.

CHAPTER IV

RESULTS

Using the procedure described in the previous section, data were obtained for each of the 30 subjects.

For the first trial in both the first administration of the word association test (WAT I) and the second administration of the word association test (WAT II), a mean response time was calculated for each subject by recording the time interval between the stimulus word and the response word (see Table 1).

Table 1 presents the WAT I mean response time, the WAT II mean response time, and the differences between these two mean response times for each subject and for all subjects. For all subjects, the WAT II average mean was .168 seconds lower than the WAT I average mean.

To evaluate the decrease in individual subjects' mean response times from WAT I to WAT II, a correlated t test was used and revealed a significant reduction in mean response times, t (29) = 4.89, $p < .05$. For 23 of the 30 subjects (76.7%), the WAT II mean response time decreased when compared to the WAT I mean response time. For the 7 subjects whose time increased, 5 (16.6%) had mean response time increases of less than 0.04 seconds while only 2 (6.7%) had increases of over 0.3 seconds.

Table 1

The WAT I and the WAT II Initial Trial Mean Response Times

Subject	WAT I MRT	WAT II MRT	MRTDiff
1	24.07	21.25	2.82
2	25.20	21.81	3.39
3	22.56	20.81	1.75
4	26.62	26.11	.51
5	29.33	25.49	3.84
6	23.58	23.70	-.12
7	16.20	19.56	-3.36
8	15.35	18.75	-3.40
9	21.13	16.32	4.81
10	20.17	20.18	-.01
11	17.95	15.62	2.33
12	21.25	17.92	3.33
13	23.26	23.61	-.35
14	26.73	22.23	4.50
15	20.62	18.59	2.03
16	19.58	19.66	-.08
17	22.46	22.56	-.10
18	17.29	16.95	.34
19	22.67	21.41	1.26
20	22.38	20.16	2.22
21	16.05	12.63	3.42
22	18.88	16.81	2.07
23	20.06	16.01	4.05
24	18.52	17.13	1.39
25	17.70	16.22	1.48
26	13.80	12.66	1.14
27	28.21	22.30	5.91
28	21.92	22.30	2.30
29	19.84	19.65	.19
30	21.23	18.48	2.75
Average Mean	21.15	19.47	1.68
S.D.	3.78	3.32	2.13

Note. WAT = Word Association Test; WAT I MRT = WAT I mean time measured in 0.1 seconds; WAT II MRT = WAT II mean time measured in 0.1 seconds; MRTDiff = difference between the WAT I and WAT II mean response times; Average Mean = average of all subjects' mean times. SD = standard deviation.

Response reproduction was determined for each subject by comparing the response word from the reproduction portion of the test to the response word of the initial trial of the test (see Table 2).

Table 2 presents, for each subject, the number of responses reproduced and the number of responses which lacked reproduction in the WAT I and the WAT II. The number of each subject's reproduced responses in the WAT I was compared with the number of reproduced responses in the WAT II. The mean number of reproduced responses in the WAT II (86.30) was 4.97 more than the mean number of reproduced responses in the WAT I (81.33). A correlated t test revealed a significant increase in response reproduction, $t(29) = 5.55$, $p < .05$. For 25 of the 30 subjects (83.3%), the number of responses in the WAT II increased when compared to the WAT I. One subject demonstrated no change while 4 decreased in the number of response reproductions.

To measure response strength, each subject's responses were categorized according to three levels of response strength--primary (OO), secondary (OX and XO), and tertiary (XX) (see Table 3). When comparing the WAT II to the WAT I, the mean number of primary responses (OO), those that were produced in an amount of time equal to or less than a subject's mean response time and which were reproduced correctly, increased from WAT I to WAT II. The mean number of primary

Table 2

Frequency of Reproduction and Frequency of Lack of Reproduction of Each Subject in the WAT I and the WAT II

	WAT I	WAT II	Difference
Subject	RR / LR	RR / LR	LR I minus LR II
1	83 / 17	90 / 10	7
2	82 / 28	73 / 27	1
3	84 / 16	85 / 15	1
4	61 / 39	70 / 30	9
5	73 / 27	85 / 15	12
6	75 / 25	78 / 22	3
7	84 / 16	86 / 14	2
8	84 / 16	86 / 14	2
9	93 / 7	91 / 9	-2
10	83 / 17	89 / 11	6
11	87 / 13	94 / 6	7
12	87 / 13	90 / 10	3
13	85 / 15	89 / 11	4
14	79 / 21	87 / 13	8
15	88 / 12	93 / 7	5
16	80 / 20	78 / 22	-2
17	71 / 29	85 / 15	14
18	92 / 8	91 / 9	-1
19	90 / 10	90 / 10	0
20	86 / 14	93 / 7	7
21	81 / 19	94 / 6	13
22	85 / 15	87 / 13	2
23	67 / 33	75 / 25	8
24	87 / 13	91 / 9	4
25	73 / 27	75 / 25	2
26	70 / 30	80 / 20	10
27	83 / 17	90 / 10	7
28	78 / 22	93 / 7	17
29	92 / 8	89 / 11	-3
30	87 / 13	92 / 8	5
Mean	81.33 / 18.67	86.30 / 13.70	5.03
S.D.	7.94 / 7.94	6.72 / 6.72	4.97

Note. RR = reproduced responses; LR = lack of reproduction; Difference = difference between lack of reproduction in the WAT I and lack of reproduction in the WAT II.

Table 3

Response Categories of Each Subject in the WAT I and the WAT II

	WAT I				WAT II			
	Primary	Secondary	Tertiary		Primary	Secondary	Tertiary	
Subject	(OO)	(OX)	(XO)	(XX)	(OO)	(OX)	(XO)	(XX)
1	61	8	22	9	60	2	30	8
2	46	12	26	16	42	10	31	17
3	57	6	27	10	54	4	31	11
4	47	14	14	25	45	12	25	18
5	58	6	15	21	58	7	27	8
6	58	8	17	17	63	7	15	15
7	74	4	10	12	63	5	23	9
8	51	7	33	9	50	5	36	9
9	71	1	22	6	62	5	29	4
10	53	6	30	11	59	7	30	4
11	57	6	30	7	60	2	34	4
12	68	4	19	9	69	3	21	7
13	56	4	29	11	46	5	43	6
14	54	2	25	19	60	1	27	12
15	59	3	29	9	68	1	25	6
16	61	5	19	15	62	8	16	14
17	55	14	16	15	61	3	24	12
18	70	0	22	8	63	1	28	8
19	54	2	36	8	62	0	28	10
20	51	9	35	5	55	3	38	4
21	56	6	25	13	61	0	33	6
22	61	5	24	10	64	2	23	11
23	57	12	10	21	52	3	23	22
24	52	8	35	5	62	4	29	5
25	56	11	17	16	61	9	14	16
26	43	13	27	17	54	6	26	14
27	60	8	23	9	63	5	27	5
28	59	10	19	12	67	2	26	5
29	68	2	24	6	59	1	30	10
30	63	2	24	11	66	0	26	8
Mean	57.87	6.60	23.47	12.07	59.03	4.10	27.27	9.60
S.D.	7.27	3.95	7.02	5.13	6.66	3.11	6.29	4.73

Note. OO = number of responses given at or under mean time and reproduced correctly; OX = number of responses given at or under mean time but not reproduced correctly; XO = numbe of responses not given at or under mean time but reproduced correctly; XX = number of responses not given at or under mean time and not reproduced correctly.

reponses (59.03) in the WAT II was 1.21 higher than the mean number of primary responses (57.87) in the WAT I. However, a correlated *t* test did not indicate a significant increase of primary responses, $t(29) = .9626$, $p > .05$.

Comparing the mean for all subjects, the number of secondary responses (OX), those that were at or under mean time but were not reproduced correctly, was lower in WAT II when compared to WAT I. The mean number of this type of secondary response (4.10) in the WAT II was 2.50 lower than the mean number of this type of secondary response (6.60) in the WAT I. A correlated *t* test showed this to be a statistically significant reduction, $t(29) = -2.10$, $p, < .05$. Of the 30 subjects, 24 (80.0%) reduced their reproduction failures. For the 6 subjects (20.0%) whose reproduction failures increased, 5 (16.6%) had increases in the number of this type of secondary response of only 1, while 1 subject (3.4%) had an increase in the number of this type of secondary response of 4.

Again comparing the mean for all subjects, the number of secondary responses (XO), those which took longer than a subject's mean response time but which were reproduced correctly, increased from WAT I to WAT II. The mean number of these secondary responses (27.27) in the WAT II was 3.80 higher than the mean number of these secondary responses (23.47) in the WAT

I. A correlated t test showed this to be a statistically significant increase, $t(29) = -2.10$, $p < .05$. Of the 30 subjects, 21 (70.0%) had increases in their number of these secondary responses from WAT I to WAT II. For the 9 (30.0%) subjects whose number of this type of secondary response did not increase from WAT I to WAT II, one had the same number, 6 had decreases of 4 or less, one had a decrease of 6, and one had a decrease of 8.

Comparing the mean number of combined secondary responses (OX and XO) in the WAT II (31.37) to the mean number of combined secondary responses (OX and XO) in the WAT I (30.07) indicated an increase of 1.30. A correlated t test revealed that the increase of secondary responses from WAT I to WAT II was not significant, $t(29) = 1.320$, $p > .05$.

The mean number of tertiary responses (XX), those responses given over mean time and not reproduced correctly in the WAT II, was compared with the mean number of tertiary responses (XX) in the WAT I. The mean number of the WAT II tertiary responses (9.60) was 2.47 lower than the mean number of the tertiary responses (12.07) in the WAT I. A correlated t test revealed this reduction to be statistically significant, $t(29) = 3.81$, $p < .05$.

For each subject, a comparison of tertiary responses (XX) was made between the WAT I and the WAT II to determine the number of common stimulus words for

which there was a lack of response in both testing sessions (see Table 4). One subject had tertiary responses to the same 9 stimulus words in both testing sessions while 4 subjects showed no tertiary responses which remained constant with the same stimulus words in both sessions. The average number of tertiary responses common to both sessions was 3.03 per subject. Thus, approximately 32% of the stimulus words producing tertiary responses in WAT II were associated with tertiary responses in WAT I as well. When this percent is compared with the percent of words producing tertiary responses in WAT I (12%), the difference is statistically reliable, $t(29) = 6.13$, $p < .001$. Thus, words that caused response problems initially were much more likely to cause response problems later on than one would expect from the base rate of tertiary responding evidenced in WAT I. Moreover, the persistence of tertiary responding appears to have been a function of persons rather than particular words, since no stimulus word produced a constant tertiary response. These outcomes are consistent with the third hypothesis.

Table 4

Common Stimulus Words in the WAT I and the WAT II for which the Responses were Over Mean Time and Reproduced Incorrectly

Subject	WAT I	WAT II	Common Words
1	9	8	3
2	16	17	6
3	10	11	2
4	25	18	7
5	21	8	4
6	17	15	8
7	12	9	2
8	9	9	0
9	6	4	1
10	11	4	0
11	7	4	0
12	9	7	1
13	11	6	3
14	19	12	3
15	9	6	2
16	15	14	5
17	15	12	7
18	8	8	3
19	8	10	1
20	5	4	0
21	13	6	2
22	10	11	1
23	21	22	9
24	5	5	1
25	16	16	6
26	17	14	5
27	9	5	2
28	12	5	4
29	6	10	1
30	11	8	2
Mean	12.07	9.60	3.03
S.D.	5.13	4.73	2.54

Note: WAT I = number of stimulus words for which a response was given over mean time and reproduced incorrectly in the first administration of the test; WAT II = number of stimulus words for which a response was given over mean time and reproduced incorrectly in the second administration of the test; Common words = number of stimulus words for which a response was given over mean time and reproduced incorrrectly that remained constant in the WAT I and the WAT II.

CHAPTER V

DISCUSSION

This study applied statistical analysis to an old method of psychological research, word association. The study involved administering a word association test to a group of subjects and measuring and statistically analyzing two variables, response time and response reproduction. The assumption of the study was that response time and response reproduction associated with word association are indicators of an individual's level of conscious attention. For this study, conscious attention was defined as the mental processes which deliver a word as a response to a stimulus word.

Based upon response time and response reproduction, the study identified and categorized three types of responses which occurred for each subject. For each category of response, a frequency of response was determined for each subject.

Response Time

The results relating to response time supported the hypothesis that reaction time in the second testing session would decrease when compared to the first testing session.

One factor which may have influenced the subjects' reduction in response time was the subjects' familiarity with the Word Association Test in the second testing session. In the second testing session,

this familiarity may have resulted in a reduction of the subjects' anxiety associated with psychological testing since the testing instructions and procedures were identical to the first session.

Another factor which may have influenced the subjects' reduction in response time in the second testing session was their reflection upon their response time performance during the first testing session.

After the first testing session, the subjects often reported that they became aware of their mental distractions which produced longer reaction times to stimulus words.

I think that the subjects' reflection upon response time performance allowed them to recognize their mental processes which distracted conscious attention. These distracting mental processes may have been the subjects' attempts to resolve unconscious conflicts involving issues and values. I believe that once the subjects became aware of these conflicts, they were able to think about and resolve many of them, thus allowing them to eliminate the distracting mental processes and respond to stimulus words faster in the second testing session.

Response Reproduction

Data from this study relating to response reproduction support the hypothesis that the subjects' correct reproduction of responses to stimulus words

would increase from the first to the second testing session.

Again, familiarity with the Word Association Test resulting from the factors previously stated may have influenced improved reproduction. However, I believe, based upon comments made by many of the subjects prior to the second testing session, that a more important element contributing to improved reproduction was what the subjects did during the time between testing sessions. The subjects reported that during this time they became aware of and reflected upon their mental activity which occurred during the first testing session, particularly the moments in which they experienced either unconscious responses or competing mental images in response to specific stimulus words. That the subjects' reflective activity was followed by improved reproduction in the second testing session is consistent with a theory that has been proposed by MacCurdy (1925). According to MacCurdy, when a person becomes aware of his/her mental activity, the tendency to have an affective response great enough to cause lack of reproduction will be reduced. Therefore, lack of reproduction may have been reduced by the subjects' awareness of their own mental activity.

Lack of Response

Data from this study support the hypothesis that even though the number of times an individual subject displayed lack of response (those instances in which

the response time to the stimulus word was greater than his/her mean response time and the response word was incorrectly reproduced) would decrease from the first testing session to the second, lack of response would remain constant in the case of specific stimulus words.

To determine the number of these stimulus words, a system was constructed which arranged the subject's responses from each testing session into three categories. These categories of primary, secondary, and tertiary responses were of prime importance to this study. They made it possible to categorize each participant's responses according to Jung and Riklin's (1904/1973) response-classification system.

Using the data from the two testing sessions of each subject, an individual affect-response hierarchy was determined. This affect-response hierarchy ranged from those responses indicating conscious attention to those responses indicating a loss of conscious attention.

Responses in the primary category are those that come with relative ease. A quick reproduction response to a stimulus word is an indication of conscious attention, i.e., a state in which there is no internal conflict involved in providing a response. Hence, conscious attention is active in producing primary responses.

Secondary responses are those reactionary responses that indicate areas of minor conflict. These

areas require more time both to process information to and from the psyche and to express that information verbally. Therefore, an increase in affect is demonstrated by a secondary response. Although secondary responses indicate either slow reaction time or lack of reproduction, they were not of prime importance to this study as indicators of response consistency.

Tertiary responses, associated with the third hypothesis of this study, are those responses which have longer reaction times than a subject's mean response time and which are reproduced incorrectly. Tertiary responses are reactionary responses which indicate areas of excessive conflict for a subject. In these areas extreme affect occurs and conscious attention is lost. When these tertiary responses remain constantly associated with the same stimulus word in both testing sessions, they represent the subject's difficulty in resolving inner conflicts which are incompatible to the conscious mind. Jung (1921/1971) defined this incompatibility as complexive behavior.

When comparing the number of stimulus words producing tertiary responses in the second session of the Word Association Test to the number in the first session, I found that the persistence of tertiary responding was a function of individuals rather than specific words. This finding would indicate that an

emotional reaction would occur for an individual around specific stimulus words and cause a tertiary response. This is consistent with Jung and Riklin's (1904/1973) theory that emotional factors had a marked influence on the associative response to particular stimulus words for an individual.

Viewing conscious attention as an active process occurring within an individual during word association, one may use the procedures described in this study to identify areas of inner conflict and thus, loss of conscious attention. Assessing the impact of these particular areas upon an individual's psychological functioning is yet to be determined by further investigations.

Other Observations

At the conclusion of each testing session, each subject informally discussed his/her performance and mental state. Based upon these discussions it occurred to me that what I had witnessed during the administration of the Word Association Test to 30 subjects (120 trials) were three distinct states of mind: a state of waiting to perform, a state of performance, and a state of being aware of performance.

As each subject received directions and prepared to participate in the word association task, a mental state of readiness was established and the associative capacity of the subject's mind seemed to be waiting to perform.

As the testing started, the subject began to perform according to the directions given. He/she dutifully followed instructions and responded to the stimulus words without hesitation in this state of mental performance until he/she experienced a lack of response or heard what he/she considered to be an unusual response.

Once this state of performance was interrupted, the subject seemed to become aware of the associative capacity of the mind, as if observing or listening to this mental performance for the first time. This I thought to be a mental state of mind observing its own performance, i.e., the subject observing his/her own mental functioning or the lack thereof.

Thus, I think the mind can be experienced in three ways: (a) as waiting, (b) as performing, and (c) as observing.

The image of the interaction of these states that comes to mind is that of a learning loop, a type of Mobius strip, upon which action and experience are recorded and observed by one's action and experience. Here, the particular experience of importance is not so much the specific associations to stimulus words discharged by the associative capacity of the mind, but the experience of mind becoming aware of its own actions. What seemed to be of particular importance to the subjects, based upon the discussions after the completion of a testing session, was their own

observation of their lack of response to particular stimulus words. Thus, based upon the experience of their own performance of the word association task, the subjects seemed to be more aware of their associative function.

Limitations of the Study

As has been noted earlier, what seems to have been supported by this study is that the two variables of response time and response reproduction can be used as response failure indicators. There are, however, some problems in the methodology of this study that should be noted as future research concerns.

The size of the study (N = 30) certainly restricts its importance as a definitive study of conscious attention in the task of word association. Another factor is the socio-cultural background of the subject group. The subjects were predominately Caucasian Americans from a small suburban community. Future research will need to test a larger group of subjects from a broader range of cultural backgrounds.

It should be noted that the mean level of education of the study's subjects was 15 years. Since this equates to an average educational level of 3 years of college, the results of the study may have been affected by the educational level of the subjects.

Another limitation of this study may have been the number, particular set, or sequencing of the stimulus words. A larger or smaller number of stimulus words,

the use of a different set of words, or a resequencing of the words could have affected the results of the study.

Suggestions for Future Research

An area for future research to consider is the relationship of conscious attention failures to specific topics. The investigation of such topics, possibly addressed by specially designed word lists, may identify topics that consistently provoke response reproduction or reaction failures. Investigating such topics may expand the ten specific complexes indicated by Jung's (1905) study.

Other areas for future research would be a replication of this study comparing the results of a sample whose subjects have been diagnosed as having a psychological disorder, i.e. alcoholism or depression, with a sample of subjects drawn from the general population. These tests may provide a clearer picture of how psychological disorders affect conscious attention.

One more area of future research would be to conduct a word association study comparing a group of males with a group of females. This may provide information on how or if conscious attention is affected by gender.

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APPENDIX A:

VERIFICATION OF INFORMED CONSENT FORM

VERIFICATION OF INFORMED CONSENT

I, _____(Please Print Full Name), voluntarily give my consent to serve as a participant in the study titled: An Investigation Into Linguistic Reactions.

I have received a satisfactory explanation of the general purpose of the project, as well a description of what I will be asked to do and the conditions that I will be exposed to.

I realize that it may not be possible for the researchers to explain all aspects of the study to me until after I have completed my participation.

It is my further understanding that I may terminate my participation in this study at any time, and that any data obtained will be confidential.

_____ _____

Signature of Participant Researcher

_____ _____

Date Signature of Researcher

APPENDIX B:

BIOGRAPHICAL INFORMATION FORM

BIOGRAPHICAL INFORMATION

Circle one indicator in each of the following categories;

AGE: 10-20, 21-30, 31-40, 41-50, 51-60, 61-UP.

SEX: Male, Female.

EDUCATION: Junior High, High School, Some College, Baccalaureate, Graduate School.

RACE: Black American, Caucasian American, Hispanic American, Asian American, Foreign.

MARITAL STATUS: Never Married, Married, Divorced, Separated, Widowed.

APPENDIX C:

STIMULUS WORDS

STIMULUS WORDS

NAME:_____ DATE_____

1. head	26. blue	51. frog	76. wash
2. green	27. lamp	52. separate	77. cow
3. water	28. sin	53. hunger	78. strange
4. sing	29. bread	54. white	79. luck
5. death	30. rich	55. child	80. lie
6. long	31. tree	56. caution	81. proper
7. ship	32. prick	57. pencil	82. narrow
8. count	33. pity	58. sad	83. brother
9. window	34. yellow	59. plum	84. fear
10. friendly	35. mountain	60. marry	85. stork
11. cake	36. die	61. house	86. false
12. ask	37. salt	62. dear	87. anxiety
13. village	38. new	63. glass	88. kiss
14. cold	39. custom	64. quarrel	89. bride
15. stalk	40. pray	65. fur	90. pure
16. dance	41. money	66. big	91. door
17. lake	42. dumb	67. carrot	92. chose
18. sick	43. notebook	68. paint	93. hay
19. pride	44. despise	69. part	94. content
20. cook	45. finger	70. old	95. insult
21. ink	46. expensive	71. flower	96. sleep
22. angry	47. bird	72. hit	97. mouth
23. needle	48. fall	73. box	98. beautiful
24. swim	49. book	74. wild	99. woman
25. trip	50. unjust	75. family	100. curse