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ABSTRACT

The author presents a summary of selected theoretical concepts and empirical evidence from the field of psychology, relating to the meaning of the term "meaning." He first summarizes experimental techniques for the investigation of meaning in terms of six approaches: conditioning methods, word association methods, word association/verbal learning methods, conditioning/word association methods, scaling methods, and conditioning with semantic differential methods. The author discusses in detail the theories and views developed by Arthur W. Staats, Charles E. Osgood, James Deese, and Benjamin Lee Whorf. It is the author's purpose to provide a basic foundation for the improved understanding of meaning which, in turn, may facilitate communication among individuals in this world of complexities. (RN)

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THEORETICAL CONCEPTIONS OF MEANING AND EXPERIMENTAL RESULTS

by

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INTRODUCTION

Philosophers and theologians have searched for the meaning of "meaning" for hundreds of years. During the past three decades, psychologists have also become interested in this area. Because psychologists have presented various theories of special interest to those concerned with meaning, it seems desirable to summarize certain theoretical conceptions and empirical evidence from psychology, insofar as it is relevant to the term "meaning."

Due to the lack of references from non-American scholars, the present study contains only those selected theories and research results from American sources. At a later date, however, this study will be revised and expanded to cover other findings from non-American publications.

The major purposes of this study are: 1) to apply all findings toward improving "communication" for those who are now living in a complex society and a rapidly changing world, and 2) to provide fundamental information for further research in this field.

DEFINITIONS OF MEANING: OVERVIEW

The early definitions of psychological meaning were conceptual rather than operational, and tended to focus upon the content of experience. They ranged from the notion of ideas and images to elaborations that added such concepts as context, relationship, purpose or direction, and reference points within the individual rather than the object (Creelman, 1966).

William James (1890) defined the dynamic meaning of words as the fringes of feelings of fitness to their contexts, and the static meaning of words as the sensory images awakened (in the case of concrete words) or the verbal associates (to abstract words). Pillsbury (1908) indicated: "--meaning is

practically everything. We always see meanings as we think, act in terms of meaning when we act. Apparently, we are never directly conscious of anything but meaning." Titchener's (1909) more general definition of meaning referred to the mental context of images and other derivatives of sensation in which a given content appears in consciousness. Drever (1921) went further and spoke of meaning as a relation, either of the situation to the self, or of the situation as a part of the whole, or as a part to other parts. In order for an object to have meaning, there must be a reference that is not in the object but in the individual. He insisted upon a distinction between primary and secondary meaning. Primary meaning (purely affective) is the feeling of relation between the object or situation and the impulse toward it (purpose, aim, or need). Secondary meaning (both affective and cognitive) is derived from primary meaning and arises through the future projection of present experiences. Watson (1924) asserted that meaning is simply the reaction evoked by a stimulus. He said that meaning is nothing but what an individual does. If one experimentally determines all the organized responses to given stimuli, one exhausts meaning. MacCurdy (1928) agreed that the study of meaning is the study of associated reaction patterns, but added that meanings may be expressed in behavior, in effect, or in the conscious knowledge of associated patterns. Bartlett (1932) described meaning in terms of that which is present when the significance of any part of an organized setting goes beyond its descriptive character and leads on to some other related part. To be understood, both organizations of motor responses or of psychological material and the relevant functioning of action tendencies must be considered. This reference to "action tendencies" foreshadows such contemporary concepts as mediators which are implicit or partial responses (Osgood, 1953).

Many years later, Pickford (1950) defined meaning as a specialized abstraction which refers to and explains the synthesis of appropriate subjec-

tive or physiological processes (impulse, idea, feeling) and outside objects and conditions--a synthesis which makes response possible. Staats (1963) and other learning theorists (Mowrer, 1954; Osgood, 1953) have described word meaning as an implicit response. Osgood has suggested that the meaning response comes under the control of the word stimulus through instrumental conditioning, whereas Staats and Mowrer have suggested that the principle involved is through classical conditioning. Laffal (1965) has explained meaning as a theory applied to a set of data (utterances or acts) which defines some point of view about the relatio of these phenomena to their users. Furthermore, Creelman (1966) treated meaning as a multidimensional concept. She said: "Meaning can refer to designation, denotation, connotation, signification, causation, intention, purpose, interpretation, evaluation, emotion, action or all of these." Staats, in a recent publication (1968), has also stressed a "pluralistic conception" of word meaning.

EXPERIMENTAL STUDIES AND RESULTS

1. Conditioning Methods

Experimental work has from the beginning been limited to the study of observable behavior, and largely confined to verbal phenomena. It began with the observation of a phenomenon called "semantic generalization" (Creelman, 1966).

Semantic generalization is a special case of a stimulus generalization. The latter occurs when a stimulus, through classical or operant conditioning, has come to elicit a certain response. This response will then be elicited by other stimuli to the degree to which they are similar to the original stimulus (Staats, 1963). In the case of semantic generalization, the similarity lies in the meaning rather than in the objective physical characteristics

of the eliciting stimuli.

Razran (1939) introduced the expression "semantic conditioning" in the same sense as "semantic generalization" to describe the work of some experimenters, and reported some of his own earlier work on this phenomenon. His approach in a 1939 experiment involved conditioning the salivary response to several different words. Subjects were then tested for transfer to homophones. This study clearly pointed out that the dimension of meaning can be more important (at least to some categories of subjects) than the visual or vocal dimension of the word in determining similarity. Razran's results were given support by the work of Riess (1940).

ofer and Foley (1942) reviewed the prior experimental literature in semantic generalization and set the stage for the development of verbal behavior and verbal learning. They classified previous studies under three major categories of research design: 1) those in which a conditioned response was established to a stimulus object, and a test made for generalization to its name; 2) those in which a conditioned response was established to a word (sign) and a test made for generalization to its object; and 3) those in which a conditioned response was established to a word (sign) and a test made for generalization to other semantically or phonetically related words (signs). One year later, Foley and Cofer (1943) also conducted their own experiment in an attempt to show the evolution of the learning and transfer experimental model. The Foley-Cofer model then became a highly popular one with American psychologists.

Elkin (1955) conditioned subjects to give the finger withdrawal response to certain sentences. Generalization was then carried out by testing separate words of the sentence. The results showed that the greatest transfer occurred to the word or words carrying the meaning load of the sentence.

2. Word Association Methods

Early researchers with word association methods included Jung (1904; 1918), and Kent and Rosanoff (1910). The technique employed by Jung involved the presentation of a stimulus word to a subject who was instructed to respond with the first word that came to mind. His original list contained 100 words, among which were included: boat, death, friendly, many, sad, woman, window. The words obviously cover a broad spectrum of categories.

According to some of Jung's findings, adults tend to respond to the stimulus words with opposites, while children show tendencies to respond with a word that completes a phrase. Jung placed considerable emphasis on reaction time (RT) and conducted studies of typical RTs for various types of stimulus words, e.g., concrete nouns yield the shortest RT, with verbs next, and abstract words last. He found that: 1) women tend to have longer RTs than men; 2) educated or intelligent subjects produce shorter RTs than subjects with less education or lower I.Q.; 3) there are intrafamilial similarities in associational patterns as, for instance, between mother and daughter.

Later innovations which were introduced into the "free" association experiment of Jung included the methods of delayed repetition of the word list and the GSR measurement of associated affect.

Kent and Rosanoff (1910) conducted a study in which they obtained responses to a 100 common English words from over 1000 subjects. Certain responses proved to be very common: "home" to "house," "thread" to "needle," etc. However, not all of the associations to a word are controlled by a semantic relationship. Associations are not meanings, they can provide only one avenue of approach to the complexities of meaning.

A quantitative method for measuring meaningfulness (as distinct from meaning) was proposed by Noble (1952), who counted the number of associations

that individuals produced to a stimulus word during a 60 second period. This research was an extension of work done earlier by Glaze (1928), who determined the association value of nonsense syllables. Noble found that the more commonly used English words (e.g., "table") evoked more associations than did less frequently used words (e.g., "probate"). Words differ in their usefulness. Thus, we might expect a relationship between richness of meaning and the frequency with which a word is used. Meaningfulness is increased by higher frequency of usage to the extent that more occasions are provided on which new associations can be acquired to a given word. By the same token, a word that becomes useful will be employed more frequently and, therefore, may become more meaningful. "Pop" expressions and slang typify the latter process. Although their meanings are assigned arbitrarily, their rapid circulation in daily speech leads to a marked increase in probability of occurrence and growth of additional association.

3. Word Association and Verbal Learning Methods

The use of the learning process as a means of studying the phenomenon of meaning (or as a means of measuring meaning, or as a means of obtaining a definition of meaning), reflects rather recent developments in both interest and method.

Learning methods in the study of "meaning" have taken two major forms, one based upon and derived from the classical conditioning paradigm, the other based upon word association methods and derived from classical associationistic theory. Classical associationism adopted an activist notion of the acquisition of meaning (Ehrlich, 1964). In such a frame of reference, meaning might be defined as a structural set of associations elicited by the presentation of a word (Creelman, 1966, p. 129).

Association studies of meaning have focused primarily upon attempts to discover effective measures of word relatedness, or upon the effects of

associative bonds in the recall or recognition of learned material.

4. Conditioning and Word Association Methods

A method, using both conditioning and paired associate learning, has been illustrated by an experiment, conducted by Phillips (1958). She paired Turkish words with various shades of grey and then, using a loud tone as UCS, conditioned the GSR to a particular word (CS). She found that the GSR generalized to other words related to the CS by the previous pairing of the words with greys. The magnitude of the generalization effect was an inverse function of the grey associated with the CS and the grey associated with the test word. That is, the less the distance between the two greys (or the greater the similarity in "meaning" of the greys), the greater the generalization.

Another type of study combining conditioning and association methods was one designed by Bousfield and Cowan (1963). Bousfield and Cowan made the assumption that, according to the requirements of classical conditioning of a motor response, the sequential occurrence of a nonverbal CS and a nonverbal UCS should also establish connections between the verbal association responses elicited by the CS and the UCS, even when the subject observed the CS-UCS connection.

The conditioning procedure involved an apparatus which dropped a ball (UCS) on the subject's hand unless the subject withdrew it in response to a light flash signal(CS). Thus, a conditioned avoidance response was established to the flash of light. The verbal associates to the CS were "light," "flash," and "blink," and to the UCS "drop," "ball," and "fall." Each of these words was embedded in a list of neutral words, and each was used as the stimulus in a forced-choice association test of forward and backward associations. Three groups of subjects were used: the first was conditioned to the avoidance

response, the second observed the light flash followed by the ball's dropping in the apparatus, and the third (control) group never saw the apparatus, but was given the subsequent association task. For this test, each group was divided into two: half being tested for forward association (e.g., light → ball), and half for backward association (e.g., ball → light). The results showed parallel association connections between the family of verbal associates to the CS and the UCS as a result of both conditioning and observation; no difference was found between forward and backward associations.

5. Scaling Methods

In addition to the conditioning and word association methods, scaling techniques have been developed or adapted to the study of meaning. Bingham (1943) combined the use of a physiological measure (GSR) and a scaling technique when he had 50 subjects rate each of 72 words in terms of their Meaningfulness, Significance, and Importance (MSI); he then developed an MSI Index, and correlated this measure with the GSR of the subjects to each of the words. He found a high positive relationship between GSR and MSI index, suggesting the validity of the use of GSR as a possible measure of meaning.

A widely respected modern scaling method was developed by Osgood and his associates (1957), known as the Semantic Differential. By this method, subjects rated concepts, represented by word stimuli, on a standard set of bipolar descriptive scales. Osgood and his co-workers applied factor analytic techniques to their data and arrived at three independent dimensions which they believe can describe the connotative meaning of any concept. These three dimensions are: 1) evaluation (good-bad; pleasant-unpleasant; positive-negative), 2) potency (strong-weak; heavy-light; soft-hard), and 3) activity (fast-slow; active-passive; excitable-calm).

6. Classical Conditioning and Semantic Differential Methods

The contemporary experimenters have combined classical conditioning and the semantic differential technique for investigating psychological meaning. Staats and Staats (1957) have hypothesized that if a nonsense syllable was presented and immediately followed by a meaningful word, it would be expected that the meaning response elicited by the word would be conditioned to the nonsense syllable. In order to eliminate the possibility of explaining generalization or transfer by simple association, and in the face of the unlikelihood that conditioning would take place in a single presentation, the nonsense syllable was paired at each presentation with a word different from all other stimulus words, but having the same semantic differential meaning components. No synonyms were used, but instead words were taken from the Semantic Atlas, whose meaning index (as determined by their position on the Semantic Differential Scale) was the same or similar. The nonsense syllables were presented visually, and the printed word was presented aurally immediately after the visual presentation of the syllable. The subjects were instructed to pay attention to the syllables on the screen, but at the same time to listen to the spoken word and to pronounce it to themselves immediately after hearing it. Following the conditioning trials, the subjects were asked to rate the nonsense syllables on the Semantic Differential Scale. UCS words with evaluative components, with activity-passivity components, and with potency components were used (each meaning type with a different experimental group). Results showed generalization to the nonsense syllables from words representing all three meaning components.

In a study which is an extension of the Staats' experiment, Pollio (1963) used three nonsense syllables as the conditioned stimuli (CS), each set of the three being paired with nine words as UCS. For one group of subjects,

the nine words had high evaluative meaning; for a second group the words had low evaluative (negative) meaning; and for a third (the control group) the words were neutral. The words for all groups were chosen so as to control for intralist meaning similarity. The CS was displayed on a screen for five seconds, and after one additional second, the experimenter read the UCS word and the subject repeated it after him. This procedure was followed until each of the nine words had been paired with each of the three syllables. Following the conditioning or training period, the subjects were asked for their word associations to the CS syllables. A different group rated the obtained associates on the good-bad scale of the Semantic Differential. About 50% of the associates given were from the original list of UCS words, but new associates were also found to have Semantic Differential ratings congruent with the UCS ratings.

Cohen (1964), however, in a replication of the Staats' study, found that when his subjects were classified as aware or unaware, there was no evidence of the conditioning of meaning without awareness. Hare (1964), using a similar method, also found transfer only in aware subjects who tended to rate the CS syllables in terms of their recalled relationships to the UCS words. He concluded that the subjects had regarded the experiment as a problem-solving task and therefore rated the syllables as they thought they were supposed to.

DiVesta and Stover (1962) went a step further. Using fifth-grade children as subjects, they demonstrated generalization of evaluative meaning over a three step process: 1) nonsense syllables were conditioned by pairing them with words with evaluative meaning; 2) nonsense figures were paired with the nonsense syllables which had acquired meaning; 3) generalization was obtained to the figures.

In a further elaboration, Staats and Staats (1958) conducted two experi-

ments to test the hypothesis that attitude responses elicited by a word can be conditioned to a continuously presented, socially significant verbal stimulus. In one experiment, two national names (Swedish and Dutch) were paired with words with positive and negative evaluative meaning, respectively. In another study, familiar masculine names (Tom, Bill) were used. Evaluative meaning of the national and masculine names was then tested for on the Semantic Differential Scale. The results showed that the meaning responses were conditioned to the names without the subjects' awareness. The replicating experiment of Berkowitz and Knurek (1969) also confirmed Staats' findings.

A most interesting experiment related to the question of whether or not the Semantic Differential can be regarded as a measure of meaning may well be reviewed here. Although it is not a conditioning experiment, its results raise some important questions regarding the interpretation of results from conditioning experiments that use the Semantic Differential to measure semantic generalization. Beier (1964) constructed three different "polar" scales comparable to the Semantic Differential Scales (except that one consisted of near opposites, one of non-opposite emotional words, and one of randomly selected nouns). He asked his subjects to rate such concepts as son, daughter, father, etc., on these three scales. The results indicated that the distance between such concepts as son-daughter, son-father stayed reliably alike without regard to the reference points against which the concepts were measured. From the results, he concluded that a subject rates a given distance into a random scale as into a good-bad scale, and that it is not unlikely that the rater is concerned with placing distance between the rated concepts rather than with the meaning of the reference points. One wonders what kind of "meaning" dimensions a factor analysis of scales such as these would yield.

SELECTED THEORIES AND VIEWS OF MEANING

American controversy about the definition and theory of psychological meaning is related to three facts: 1) the earliest studies were concerned with semantic generalization, as previously mentioned; 2) most of the subsequent experimental work has taken place in the context of learning theory, and interest in meaning has been primarily limited to its importance as a variable affecting the acquisition, retention, and recall of verbal material; 3) contemporary verbal learning experimentation and theory has one foot in simple association theory, the other foot in the classical conditioning paradigm, and its head in the clouds of Skinnerian behaviorism.

As a consequence of these mixed phenomena, Staats and Osgood attempted to reduce meaning to definable and measurable terms. Accordingly, both Staats' and Osgood's theories will be summarized. In addition, Deese's views (1970) as well as the Whorfian hypothesis and translatability (1956) will be briefly discussed.

1. Staats' Theory

As previously stated, Arthur W. Staats (1963; 1968) defines meaning in terms of an implicit response. He also views meaning as a "pluralistic" dimension instead of only a single phenomenon. Staats says: "the pluralistic approach is the common sense notion of word meaning, which implies a unitary process, actually covers a number of different S-R mechanisms, as well as the principles of both classical and instrumental conditioning."

Within his pluralistic framework, major types of meaning may be divided into four categories: 1) emotional meaning, 2) denotative meaning, 3) motor response meaning, and 4) word-associational meaning.

1.1 Emotional Meaning

According to Staats: "emotional word meaning consists of responses that are classically conditioned to a word through the systematic pairing of the word with particular aspects of the environment in the natural language experience we receive." (Staats, 1968, p. 22). For example, by systematically pairing the word NO (^{c}S) with a spanking stimulus (^{uc}S) applied to Max the cat, the word NO elicits, after a number of trials, the withdrawal response. In common sense terms, it would be said that Max had learned the meaning of the word NO. This procedure may be diagrammed below:

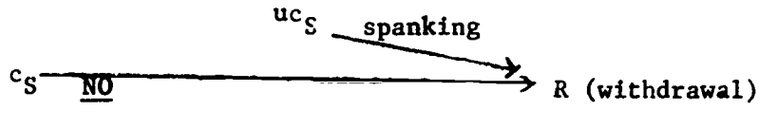

Diagram 1

From this basic S-R paradigm, Staats further explains emotional meaning on the basis of higher-order conditioning. To continue using the example from Max the cat, Staats has testified that after the word NO had become a ^{c}S, he only said NO to Max in order to stop her from doing undesirable actions (i.e., clawing the drapes, jumping on the table, etc.). In this case, the word NO would elicit the withdrawal response while the animal was looking at the drapes, or looking at the tables (^{c}S). After a few trials, the drapes (or the table) as a visual stimulus should come to elicit the withdrawal response.

This phenomenon is also similar to telling a child that a type of food tastes bitter. If the child has been conditioned to respond to the word with withdrawal (and other conditioned emotional responses), he will "withdraw" from the food that has been paired with the word. Moreover, it would be possible on the basis of higher-order conditioning to establish the meaning of new

words.

In order to test the hypothesis that emotional meaning can be established by classical conditioning, Staats conducted three experiments. In Experiment I, one nonsense syllable was paired with positive evaluative meaning and another was paired with negative evaluative meaning; in Experiment II, "active" meaning and "passive" meaning responses were conditioned; and in Experiment III, "strong" and "weak" meaning responses were conditioned. In each experiment there was significant evidence that meaning responses had been conditioned to the nonsense syllables.

Furthermore, Staats suggests that emotional meaning may involve the responses made to positive reinforcing stimuli or negative reinforcing stimuli. To him, positive reinforcing stimuli may be certain words like: fun, smile, joy, happy, sweet, etc., whereas negative reinforcing stimuli may be the words like: pain, sad, sick, suffer, and bitter, etc.

In addition, in Staats' theory, it is interesting to note that: 1) emotional meaning may be called "attitude," "affective," "evaluative meaning," or "connotative meaning," 2) all forms of emotional meaning are acquired on the basis of classical conditioning principles.

1.2 Denotative Meaning

This type of meaning refers to the hypothesis that: 1) sensory stimuli elicit sensory responses (or images) in the individual, and 2) these sensory responses can be classically conditioned in part to other stimuli or to words with which they are contiguous. For example, when the word BLUE (^{c}S) was paired with the blue light (^{uc}S), on the basis of classical conditioning, the word BLUE also came to elicit the conditionable parts of the blue sensory response in the subject. In other words, both the blue light and the word

BLUE elicited the same, or similar, response in the individual who has been so conditioned (see Diagram 2). Accordingly, the original pairing of the blue

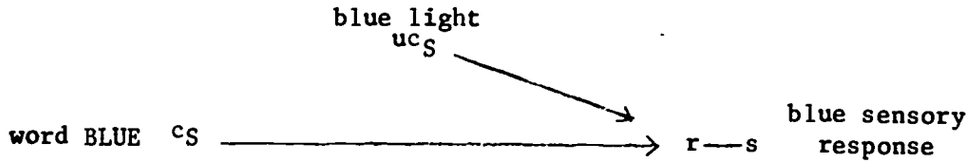

Diagram 2

light and the word BLUE made them functionally the same (eliciting the conditioned blue sensory response). Due to this previous conditioning, later, when the word BLUE alone was presented to the same subject, it still elicited the conditionable portion of the blue sensory response. Next, the word BLUE was paired with electric shock, the new stimulus (^{uc}S) which had elicited the heart rate response. On the same rationale as the original pairing, Staats testified that the word BLUE also came to elicit the conditioned heart rate response. This process is shown in Diagram 3.

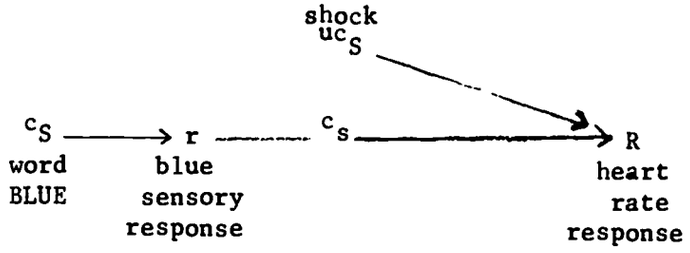

Diagram 3

Furthermore, since the blue light and the word BLUE already acquired the same function (as previously mentioned), the phenomenon in Diagram 3 would establish the circumstances for the blue light to elicit the heart rate response, although the blue light has never been paired with the electric shock (see Diagram 4 for illustration). In addition to his own experimental evidence, Staats' theory of denotative meaning has been supported by other

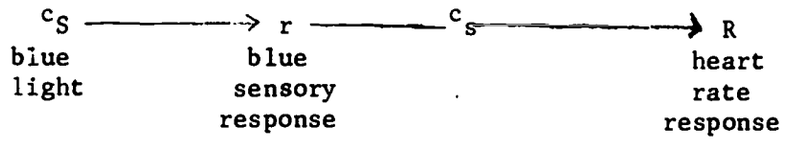

Diagram 4

experimenters, for instance: Cofer and Foley (1942), Osgood (1953), and Phillips (1958).

Staats further suggests the following points concerning the denotative meaning:

First, when a word eliciting a sensory meaning response is paired with another word, the second word should also come to elicit that sensory meaning response. Moreover, printed words may come to elicit conditioned sensory responses, for example, single words like bell, train, hot, etc., would seem to come to elicit the responses in reading training that the spoken words themselves have come to elicit.

Second, written passages consisting of words with denotative meaning may be expected to elicit sensory responses that may come to constitute a larger, elaborate, sensory response. In other words, the same word in different sets (of words) would be expected to elicit a different conditioned sensory response, for example, the words in the first set are: hot, path, grass, stream, trees; and those in the second one are: cold, path, snow, stream, trees. In this case, Staats comments that the word trees in the first set would elicit a different scene from the word trees in the second set (at least for individuals who have lived in climates where trees change in summer and winter).

Third, words which elicit conditioned sensory responses can be arranged in written material as well as in spoken material to produce composite sensory responses of a more complex nature. These word stimuli, through the

conditioned meaning responses they elicit, are the building blocks for verbal descriptions.

Fourth, the composite sensory response a set of words elicits may have reinforcing properties that each of the words by itself does not have. Thus, path, grass, stream, and trees may have as individual words relatively little reinforcement for a person. However, when put into a message that elicits a composite sensory image of a country scene, the words may have much greater reinforcement properties. The reinforcement properties are elicited by the composite sensory image, not the words themselves.

Fifth, although certain words in isolation may have negative reinforcing properties, in combination with other words, this negative reinforcing value may not be elicited. For example, when presenting alone, the word BAD elicits a negative evaluative meaning response. However, when it is combined with NOT, and becomes NOT BAD, this expression then no longer elicits a negative reinforcing response. This would be expected according to the principles of classical conditioning since the words NOT BAD are usually paired with more positive reinforcing stimuli than is the word BAD alone.

Sixth, in a similar fashion, composite sensory images that have positive reinforcing properties may be created by combining words with negative evaluative meaning. Thus, the words: fear, suffer, lost, hurt, starving, and cold, while each has negative reinforcing meaning, could easily be put in a passage like "a lost hunting party," which would have the positive reinforcing value of a story.

1.3 Motor Response Meaning

Staats indicates that many words are meaningful because they come to control motor responses through the principle of instrumental discrimination learning. In this case, the words are discriminative stimuli (^{D}S) for motor

responses. (Many verbs would have this type of "motor" word meaning). In fact, one important aspect of the child's basic behavioral repertoire involves the acquisition of a large number of responses under the control of word stimuli.

Additionally, the discriminative control of motor responses could be "transfered" on the basis of contiguity. That is, if one discriminative stimulus controls a motor response, the motor response will come under the control of other stimuli with which the discriminative stimulus is paired. For example: 1) the auditory presented word stimulus "close" has come to control the "closing" motor response. 2) After the child has learned to read the word "close," he will say CLOSE when that word is presented.

As was the case for other types of word meaning, it would be expected that each time the child said CLOSE while looking at the word, the discriminative control of the motor response would be transfered to the visual stimulus "close." After sufficient training, it would be expected that the printed word would also come to have the same kind of discriminative stimulus control over the motor response. For example, if the child has never seen the word SHUT, this word may be "meaningless" to him. However, after he is told, "SHUT means CLOSE," then the word SHUT comes to control the response which CLOSE already controls. In the future, if the child is told "Shut the door," he will perform the response of closing the door; this process may be diagrammed below:

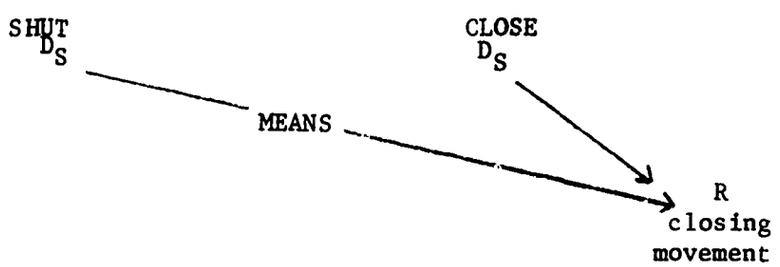

Diagram 5

From the diagram, the new word SHUT becomes a ^{D}S for a child's closing response through being paired with CLOSE in the sentence "Shut means close." On the same basis, if the teacher writes "Open the book to page 14" on the board, students will be expected to perform appropriate motor responses under the control of those written stimuli.

1.4 Word-Associational Meaning

Based on instrumental discrimination learning, many words also come to control other word responses, and may be considered to have meaning because of their word association. Staats explains the formation of word association in terms of serial verbal learning and paired associate learning (Staats, 1968, pp. 81-84).

In paired associate learning, the procedure involves the presentation of the verbal stimuli in pairs. The subject's task is to respond to each verbal stimulus that is presented. This process may be diagrammed as follows:

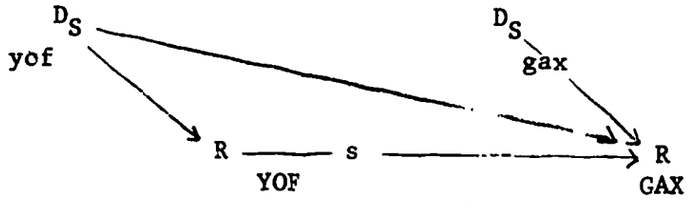

Diagram 6

The diagram indicates that the first printed word yof, as a discriminative stimulus, elicits the first vocal response YOF. This vocal response (YOF) will also produce the word stimulus (R-s). Then the subject looks at the second word (gax), and this elicits the second word response (GAX). As a consequence of this process, two types of conditioning would be expected to occur: 1) the second word response GAX should come under the control of the stimulus produced by the first word response YOF. That is, the response YOF

should become a discriminative stimulus and tend to elicit the response GAX, 2) since the word response GAX has also occurred following the printed word yof, it would be expected that yof would also become a discriminative stimulus which would tend to elicit the word response GAX. This, then, becomes an example of a word association.

As a result of this conditioning, it would be expected later that if the S was presented with the printed word yof and asked to say the first word that came to mind, he would tend to say GAX.

One interesting point here is that in the procedure of paired associate learning, the S is given no reinforcement (although instrumental conditioning has been described to include reinforcement following the S-R occurrences). This is so, mainly because instrumental conditioning can take place without reinforcement in the case where there is already a strong discriminative stimulus that controls the response.

Concerning serial verbal learning, the procedure involves the presentation of the verbal stimuli in series. On the first presentation, the S simply reads the list of words or nonsense syllables. On later trials, upon seeing one syllable, the S must correctly say the next before it is presented. This procedure is continued until the whole list is correctly anticipated. For instance: six nonsense syllables are presented in the following series: YOF, GAX, LEC, XEM, LUJ, JID. When the stimulus YOF is presented, the correct response is GAX; when GAX is shown the correct response is LEC, and so on. This process is shown below.

A.

Stimuli	S_1	S_2	S_3
	YOF	GAX	LEC
Responses	R YOF	R GAX	R LEC

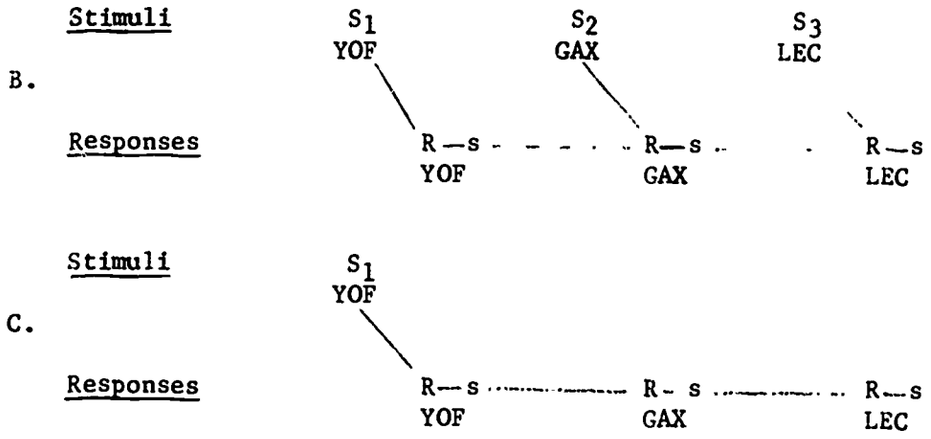

Diagram 7

In Part A of the diagram, the syllables are individually presented, and the S reads them aloud. Part B indicates the learning that takes place. Each response produces its characteristic stimuli (such as auditory stimuli, produced by the vocal motor responses) that come to elicit the next response. Part C depicts a smooth serial chain of verbal responses after a sufficient number of trials.

Both paired associate and serial learning principles would also involve meaning in terms of grammatical structures of the language. This is due to the fact that some words appear to have a primary function (or meaning), because of their word associations and thus they influence the order in which language units are emitted. For example, articles such as "the" come to be elicited by a large number of words and also come to elicit a large number of other words. These associations help dictate the order in which the various words will be emitted. Thus, in the group of words, "The daughter of Abraham went to the well," the association structures of "The" and "of", for example, dictate that the order of emission will not be "The of Abraham daughter" or "The of daughter Abraham" or some other order. That is, there are certain associations in this case which are dominant and which direct the order of

speech. Therefore, words such as articles are meaningful because of the associations they have that affect the grammatical order of speech.

2. Osgood's Theory

Charles E. Osgood explains "meaning" in terms of a representational mediation process. He indicates: "Whenever some originally neutral stimulus (sign-to-be) -- is repeatedly contiguous with another stimulus (significate) -- which regularly and reliably elicits a particular pattern of total behavior -- the neutral stimulus will become associated with some portion -- of this total behavior as a representational mediation process" (Osgood, 1963, p. 740).

Based on this theoretical framework, Osgood suggests that words come to acquire their meaning in two ways: 1) sign learning, and 2) assign learning.

2.1 Sign Learning

This is the most primitive level of meaning. It is simply that words represent objects because they produce some replica of the actual behavior toward those objects (Osgood, 1953). Stated somewhat more formally, a sign develops when a "minimal but distinctive portion of the total behavior originally elicited by an object comes to be elicited by another pattern of stimulation as a representational mediation process, the self-stimulation from which operates to mediate various instrumental sequences." (This representational mediation process is the meaning of the sign). We can see this relationship a bit more clearly from the diagram below:

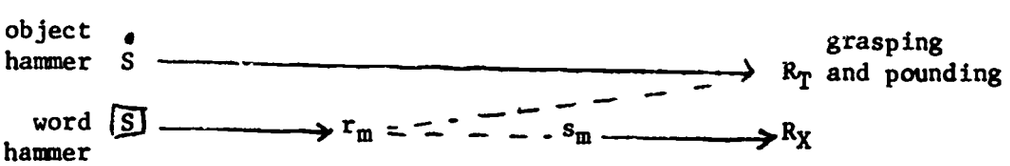

Diagram 8

From the diagram, R_T represents the total responses originally elicited by a stimulus object which Osgood called "significate" ($\dot{S}$), r_m is the representational mediation process which becomes conditioned to the sign of the object ($\boxed{S}$). This r_m also produces self-stimulation (s_m) which in turn mediates various instrumental responses (R_X). The mediation process (r_m) is the meaning of the sign.

As an example, Osgood takes a hammer as the stimulus-object, and the word "hammer" as the stimulus-sign. According to the mediation hypothesis, anticipatory portions of the grasping and pounding behavior become "short-circuited" to the word "hammer." He notes that a young child may actually be observed to clench his hand and make pounding motions when asked for a hammer.

The problem with this example, however, is that the hammering motion could just as easily be interpreted as a form of feedback. That is, the child might be effecting a check on communication, the way an adult might resort to gesture in the event of a communication difficulty. The child need not be manifesting the "self-stimulation" involved in a representational mediation process.

2.2 Assign Learning

In addition to sign learning, Osgood postulates that words often acquire their meaning by association with other signs whose meaning is already known. He named this process assign learning. For example, Osgood (1953) points out that a child can understand the word "ZEBRA" without ever having had contact with the actual animal. Instead, he may only seen pictures of zebras (symbols), or has been told that zebras have stripes (signs) and run like horses (signs). In this case, the word "ZEBRA" is designated an assign which implies that its meaning has been assigned through association.

According to the assign view, the meanings which different individuals have for the same signs, will vary to the extent that their behaviors toward the things signified have varied. It is so, because the composition of the representational process (which is the meaning of the sign) is entirely dependent upon the nature of the total behavior occurring while the sign is being established. Therefore, variation in meaning should be particularly characteristic of assigns; since their representational processes depend entirely upon the samples of other signs with which they occur.

In brief, Osgood's theory seems to consist of two stages of S-R framework: Stage 1: we may call "decoding" because it is the association of signs with representational mediators, i.e., "interpretation." Stage 2: we may call "encoding" because it is the association of mediated self-stimulation with overt instrumental sequences, i.e., "expression of ideas."

It seems that Osgood's theory is quite vague in specifying the content and scope of so-called "mediating responses," since many of them may occur at a physiological or neurological level. Consequently, it has thus far been impossible to investigate the meaning process through direct observation. In order to deal quantitatively with this problem, Osgood and his associates therefore developed a method for measuring meaning known as the "semantic differential" (SD), as already mentioned in the previous section on experimental studies.

3. Deese's Views

James Deese (1970) classifies "meaning" into two major aspects: 1) linguistic meaning and 2) psychological meaning.

3.1 Linguistic Meaning

Deese says: "The study of meaning in language is generally known as semantics, . . . The concern of semantics is really with the meaningful relations between words, sentences, and other linguistic entities." He tends to classify linguistic meaning into semantic and syntactic components.

3.1.1 Semantic Component

This component deals with the meaning of individual words, including /s/ and /z/ which indicate the plural meaning. In traditional linguistic analysis, the smallest unit of language said to have meaning is the morpheme. Some morphemes are words, e.g., hat, nephew, or apricot. Others, such as saw (verb) and fungicide consist of two or more morphemes. Saw, for example, consists of the verb see together with a marker for past tense (the vowel change).

3.1.2 Syntactic Component

This component deals with the meaning of the sentence (or sets of words). Some sentences in English are ambiguous, for example:

a) They are flying planes.

b) They are hanging curtains.

Depending on whether the pronoun "they" in both examples refers to things or persons: "flying" and "hanging" are adjectives modifying the following nouns or are verbs taking the following nouns as objects.

3.1.3 Techniques for the Study of Linguistic Meaning

According to Deese, the following techniques are used to describe linguistic meaning.

A. Branching Tree

A Possible Branching Tree for Some Concepts Described by Ordinary English Words

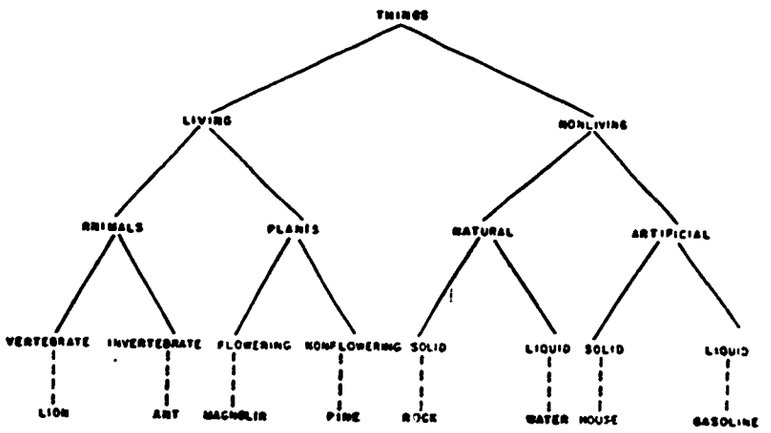

Figure 1.

A Possible Branching Tree for the Sentence "The lion roared and the ant entered the house."

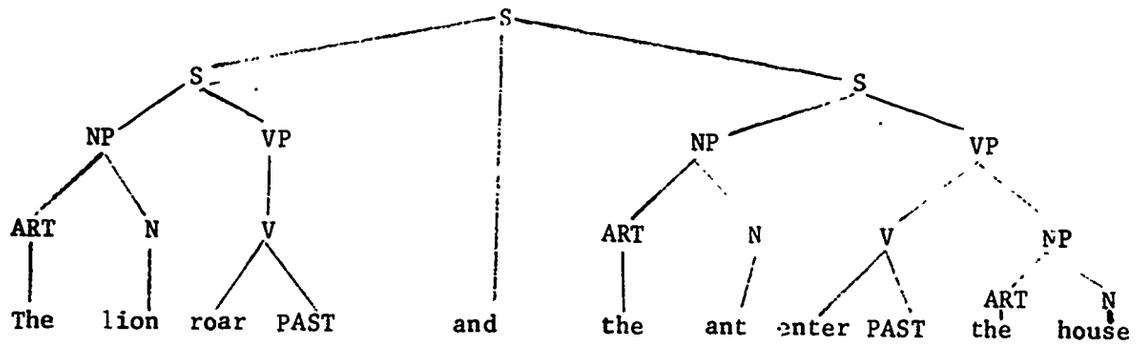

Figure 2.

A Distinctive Feature Table for the Concepts Presented in Tree Form in Figure 1.

+	−	LION	ANT	MAGNOLIA	PINE	ROCK	WATER	HOUSE	GASOLINE
LIVING	NONLIVING	+	+	+	+	−	−	−	−
ANIMALS	PLANTS	+	+	−	−				
VERTEBRATE	INVERTEBRATE	+	−						
FLOWERING	NONFLOWERING			+	−				
NATURAL	ARTIFICIAL					+	+	−	−
SOLID	LIQUID					+	−	+	−

Figure 3.

This technique shows the relation between a whole collection of concepts. It can be used to explain meaning in both semantic and syntactic components. (See figures 1 and 2). The branches of the trees in the figures are labelled nodes or markers. Ordinarily, any node is composed of the attributes named by all the labelled nodes above it. Therefore, based on this technique the term "lion" may be seen as "vertebrate, animal, and living thing" (see Figure 1).

B. Distinctive Feature Table

This technique consists of a matrix form in which rows are semantic markers, attributes, features, or labels, and columns are concepts or words to be defined (see Figure 3). In the third figure, each pair of markers is entered as + or - value on some attribute or feature, while the items to be defined are entered in the column. (The data in Figure 3 are the same as those in Figure 1).

Both branching trees and distinctive feature tables contain a weakness, because: 1) there is no complete and well-organized tree or table that could be invented to cover the entire meaning of any language; and 2) there are literally endless ways of classifying the meaning of everything in the universe.

3.2 Psychological Meaning

Deese remarks: "The basic problem in the psychology of semantics is how we understand segments of language. . . . Understanding is not a linguistic concept, it is psychological." He also indicates that the function of understanding is to signal the potential for interpretation. Part of the ability to interpret is provided by the kind of syntactic elements of the language, but some of that ability goes deeper. For example: There are nonlinguistic

aspects to interpretation, of which the most obvious is imagery.

Deese further suggests that the relation between understanding and interpretation is a loose one. For instance: Sometimes we read or hear something that we think we do not understand, and yet, we may produce an acceptable paraphrase of it. On the other hand, sometimes we may think that we understand something, but stumble when we have to interpret it.

However, according to Deese, "Whatever the process that occurs when we understand, it is essential to meaning."

4. Whorfian Hypothesis and Translatability

Benjamin Lee Whorf and his teacher, Edward Sapir, formulated a theory known as the "linguistic relativity hypothesis," or the "Whorf-Sapir hypothesis," or simply the "Whorfian hypothesis." The Whorfian hypothesis suggests that the language one speaks influences the way the speaker sees the world.

Let us now briefly examine the Whorfian hypothesis in relation to the problem of cross-cultural translation. Generally speaking, according to Whorf, different languages seem to have different ways of expressing the meaning of the same phenomena. For example:

1) English has separate words for "pilot," "airplane," and "fly (n)," but Hopi has only one.

2) Eskimo has many separate words for snow, whereas English must describe the differences in snow by combinations of other words (dry snow, powdered snow, wet snow, etc.).

3) English has separate terms for "blue" and "green" but only one term for "black," whereas Navaho does not have separate words for "blue" and "green," but does have two terms for different kinds of "black."

4) English has such words as "speed," and "rapid," whereas Hopi has no

real equivalents for these words and normally renders them by "very" or "intense" plus a verb of motion.

As a result, it is much easier to refer to certain phenomena in certain languages than in others. In other words, it would appear that the categories of one language are sometimes "untranslatable" into another language. This is then related to the question of translatability and to "what gets lost" in translation from one language to another (Niyekawa-Howard, 1972).

Based on observations like these, Whorf concluded: "All observers are not led by the same physical evidence to the same picture of the universe, unless their linguistic backgrounds are similar, or can in some way be calibrated" (Whorf, 1956, p. 214).

In other words, Whorf's principles may be restated as follows: 1) If one language contains terms which will mediate certain behaviors, but the other language does not contain those terms, then it might be said that these two languages will produce different behaviors in their users. 2) All higher levels of thinking are dependent on language. 3) The grammatical structure as well as the semantic structure of the language which each individual speaks influences the manner in which he understands his environment. (The picture of the universe shifts from language to language).

CONCLUSIONS AND COMMENTS

The definitions of meaning from the discipline of psychology are broad and varied, depending upon the purposes and techniques of each individual psychologist. In general, psychologists tend to define "meaning" in the following ways:

1) The meaning of anything (stimulus) can be described in terms of the response to it.

2) Meaning can be understood in terms of simple associative connection between stimulus and response.

3) Meaning can best be conceptualized as a hypothetical construct or as an intervening variable -- a mediating process which is essentially unobservable, but contains some properties that may serve as stimuli for other overt responses.

4) Meaning may be regarded as a complex interconnected response system, including visceral, sensory, and cognitive elements.

Osgood's theory has created and stressed the third definition (meaning as an intervening variable or as representational mediation), whereas Staats' pluralistic theory seems to cover all areas mentioned in the definitions above.

Unlike Osgood's and Staats' theories, Deese's views on meaning are more restricted to the linguistic phenomena rather than to those of the S-R framework. According to Deese, meaning may be defined as the meaningful relations between words, sentences, and other linguistic elements. However, Deese seems to agree with Osgood on the point that certain psychological factors (e.g., shared frame of reference or other intervening variable) may also help us understand certain aspects of linguistic meaning.

Whorf, on the other hand, derived the explanation of "meaning" from an anthropological context. He emphasized the differences in the semantic and syntactic structures in various languages (especially non-European languages), and how language is a very influential factor upon each of us, because it tends to determine our thought to some degree. Although the Whorfian hypothesis is rather hard to test, it has been supported to a certain extent by a number of experimental studies (e.g., Brown and Lenneberg, 1954; Carroll and Casagrande, 1958; Landar, Ervin, and Horowitz, 1960; Ervin, 1962; and Niyekawa-

Howard, 1968).

Psychologists have employed various experimental techniques for their investigation of meaning. The following techniques have been surveyed in this study: 1) conditioning methods, 2) word association methods, 3) word association in combination with verbal learning methods 4) conditioning in combination with word association methods, 5) scaling methods, and 6) classical conditioning with semantic differential methods.

Deese introduces two analytical techniques for the study of meaning: 1) branching trees, and 2) distinctive feature tables. (Both techniques have been briefly discussed in this study).

At this time, it might be appropriate to suggest that different theories and views of meaning should not be the source of quarrels and conflicts, but rather should be a "stepping-stone" for us toward further research in this area in order to bridge the gaps in previous findings.

Since the problems of "meaning" are implicit in various areas of concern to human beings, other types of meaning should be quite interesting to investigate, also. For instance: contextual meaning, synesthetic meaning, oxymoron, and puns (Heinberg, 1956).

In addition, the study of meaning on computer symbols, research on different aspects of meaning across cultures, and the scientific study of "synergistic process" in relation to meaning ($1 + 1 > 2$) should be further encouraged.

It is hoped that this study may provide a basic foundation for the improved understanding of meaning which, in turn, may facilitate communication among individuals in this world of complexities.

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