Affective vs. Semantic Processing: Toward a Teleological View of Language

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I. INTRODUCTION

The relationship of linguistics to cognitive psychology has been well drawn. Many have listed the development of modern structuralist linguistics as one of the major contributing factors to the rise of modern cognitive psychology (Reynolds & Flagg, 1977, for example). Some other important points should be reviewed here in order to be clear about the major argument of this paper.

In both of these disciplines the flow of information is traced through a system. In cognitive psychology information is traced through various stores and processors to the resultant behavior; in linguistics information is traced from essential meaning through the language system to a surface manifestation.

Both cognitive psychology and linguistics view behavior to be a function of rules and transformations. Information is transformed according to orderly processes and rules. There is, therefore, in both disciplines a belief in and emphasis on an underlying structure which determines surface manifestations of language acts and behavior.

These commonalities of cognitive psychology and linguistics come from a common heritage in modern structuralist philosophy. There is also a central problem for each field of study which has its roots in common with those of the problem in the other field. For cognitive psychologists, the problem is the image of human nature, and how best to represent it in terms of processes. For linguistics, the problem is what must be the structure of language in the human being. Both present their subjects—cognition and language acts—as results of rather complex but orderly processes deriving from some structure which comes with our nature. When we study/observe behavior, we infer about the cognitive structure from which it arose. When we study language behavior, we infer about the linguistic system from which it arose.

Here is where linguists become psychologists whether they want to or not. A model of language or language capacity rests upon and has implications for—a model of the human psyche. Language makes a statement and conveys meaning about human psychology, both on the level of competence and performance.

There are closer and more intimate relations between cognitive psychology and linguistics which we must introduce for purposes of the presentation. First, cognitive psychology and linguistics meet in the field of semantics and semantic processing. Semantics can be seen as the "bottom line" of linguistics manifested for example in the idea of a "deep structure" or basic unit of meaning. Semantics also seems to be
the "bottom line" of cognitive science. If information is going to stay around in the cognitive system and accessible for very long, it must be processed "semantically," or "to a semantic level." This is the basis of our permanent knowledge (along with Tulving's (1972) episodic memory, but even here there is a "semantic" or "meaning" component).

II. MODELS OF MEMORY

Semantics or semantic processing lies at the heart of one of the core constructs and also one of the core distinctions in the sciences of cognition--the memory system. For example, it was shown in Ebbinghaus' early work (1885) that meaningfulness is troublesome. Ebbinghaus found that the meaning of his learning material got in the way of his study of the "pure" process of learning. He devised the "nonsense syllable" or CVC trigram to obviate the problem.

The received view of human memory has been the "structural model" or "duplex model" or memory (see Reynolds & Flagg, 1977; Bourne, et al., 1979; Kintsch, 1977; Solso, 1979; or most any other current cognitive psychology book) in which there are two distinct "stores" (1) short term memory and (2) long term memory.

Short Term Memory is of brief duration and limited capacity. In this store material is processed acoustically, visually, etc., but only the most elementary if any semantic processing is carried out. Rehearsal is necessary to keep the material available because it is not processed into some permanent semantic structure. If it endures, it's because it got passed on to Long Term Memory.

Long Term Memory is of longer (unlimited) duration and greater (unlimited) size. In this store material is processed "semantically," i.e., to a level of meaning. Here material fits into the extant structure of knowledge of the individual. Out of Long Term Memory the cognitive processes operate. From here decisions about "pertinence" (Norman, 1976), or "allocation" (Kahneman, 1973) are made. From here behaviors, and ideas are generated. From here language operates because here exist the raw materials on which language processes can work.

Recently, Craik & Lockhart (1972) have offered a radical alternative to the duplex theory of memory—the "depth of processing" model. This is a "process" rather than a "structural" model. The idea of two separate memory stores is seen as arbitrary and unnecessarily complex and unparsimonious. In this model the strength of the memory trace is a function not of which structural processor the material in question happens to reside in, but rather, a function of the "depth" to which it has been processed. The depth of processing in turn is a function of (a) the nature of the material, and (b) the nature of the task at hand (what is being done to the material, and for what purpose). Deep processing in this model means "semantic" processing.

Research support for the Depth of Processing model has come from various sources, some of the most direct evidence has come from studies on "incidental learning." In this paradigm (Hyde & Jenkins, 1969, 1973;
Rosenberg & Schiller, 1971; Parkin, 1979) subjects are presented a list of words. Note that these are language materials. The first group is asked to learn the words intentionally. The second group is asked to deal with the words semantically by performing some semantic task—most commonly to rate the words for pleasantness on a pleasant (PL) to unpleasant (UPL) dimension. The third group is asked to perform a lower order task with the words, such as search for a particular letter or estimate the number of letters. This is a non-semantic task. These second and third tasks are called incidental tasks. A recall test is then given to all of the groups. The semantic and nonsemantic groups are not expecting it. Therefore, any learning they show would be incidental.

It is found (as in Hyde & Jenkins, 1969) that the group which performs the semantic task does about as well on the recall task as the group that intentionally learns. Both do better than the non-semantic task group. The notion is that the semantic task results in "deeper" processing and thus better memory (even without conscious effort).

The principle criticism of the depth of processing model has been the lack of an independent measure of "depth" as well as lack of an adequate theory of depth. Why for example, should "deeper" be "deeper," and/or why is "semantic" processing "deep" processing? (See Baddeley, 1978.) The only evidence for depth is better recall, but better recall is precisely what is predicted from depth. It is to this issue that the research described here is in large part addressed.

III. ISSUES OF THE PRESENT STUDY

In the incidental learning literature which has addressed this issue, the "semantic" task has most often been rating the words on a "PL-UPL" dimension. Only rarely have other kinds of semantic processing been employed (Parkin, 1979; Block & Reed, 1978; Hyde & Jenkins, 1973). The main effect (i.e., better memory) for semantic tasks has been well validated. The PL-UPL rating task is obviously a semantic task and calls for semantic level processing. However, it also calls for an affective evaluation. The difference between the effects of semantic and affective incidental tasks has not been widely investigated. It might be that affective processing involves different processes and produces different results than "semantic processing." If the superiority of affective processing could be demonstrated, a candidate for an independent measure and theory of depth would emerge.

There is some evidence for the relative superiority of affective over semantic processing. Evidence for the distinctiveness of affective processing comes from Toglia & Battig (1978). Ratings of PL over 2,854 words do not correlate highly with ratings on six other semantic dimensions: concreteness, imagery, categorizability, meaningfulness, familiarity, and number of attributes. Packman & Battig (1978) had subjects rate words on each of these six semantic dimensions as well as PL-UPL. Incidental recall and recognition scores showed subjects in the PL-UPL condition to have superior recall to that of the other groups and no difference among the other groups emerged.
These studies lead to the conclusion that affective processing is fundamentally different from other kinds of semantic processing, or, put another way (more linguistically), the processing of affective qualities of words (language material) is different from, and somehow superior to, the processing of other semantic qualities.

The research presented here extends and cross validates the findings of Packman & Battig in several important ways. We also attempted to replicate the findings of Hyde & Jenkins (1969). First, Packman & Battig used visual presentation. We used auditory presentation of words as a replication of Hyde & Jenkins (1969), and 24 words as opposed to 50 in the Packman and Battig study. Second, dichotomous ratings were made rather than ratings on an extend scale (this might inhibit full semantic processing). The present study included an intentional group as a control (as in Hyde and Jenkins). The words presented were highly related (Hyde and Jenkins). There were six non-antonymic first associates and six antonymic first associates, in the list. Finally, cluster scores were analyzed as Hyde and Jenkins did, but Packman and Battig did not.

It might be beneficial here to step outside this experimental paradigm to introduce another line of research. These variables, affective processing and antonymic association, were chosen for the present study for theoretically important reasons. The attempt is to unite two bodies of research and introduce a teleological, humanistic approach to the study of cognitive processing and hence, linguistics.

These two variables were taken from Rychlak's (1979) Logical Learning Theory (LLT). Rychlak proposes that behavior (including linguistic and cognitive behaviors) proceeds in a pro forma way, rather than in a reactive way. Instead of speaking of behavior as a response, Rychlak has introduced the notion of a teloresponse. The idea is that behavior is always telic—teleological—it is carried out "for the sake of" some conception or intention on the part of the person rather than in response to stimuli or conditions. Logical Learning Theory presents a teleological account of human behavior based on final causes. Behavior is always, therefore, purposive and intentional. Such a view is at odds with efficient-cause S-R psychology, structuralist, formal cause psychology, and other quasi-mechanistic systems.

Rychlak offers a modus operandi of human mentation which does not rely on material- or efficient-cause determinism nor an external natural teleology to account for human behavior. Intentional behavior, and thus human freedom, or agency are possible. Two concepts are important in this modus operandi. First, Rychlak proposes (and validates via empirical research) the operation and existence of a neo-Kantian category of the understanding called affective assessment. Human beings are born with the capacity to affectively assess and evaluate things with which they come into contact. Things favorably assessed tend to be selected for elaboration and made more meaningful, or, affirmed and selected to become the grounds "for the sake of which" behavior (overt or cognitive) takes place. This process is called meaning-extension. We tend to further meanings along a positive affective dimension. One thing this implies is that people should normally learn what they like
faster than what they dislike. This effect has been demonstrated in a series of studies carried out over the last 20 years with material ranging from words to nonsense syllables, to pictures, to names, to items on IQ tests, to psychology experiments themselves. It should be noted that it is also possible that people learn disliked negative items more readily than liked. Several pathological groups show this, as well as people who dislike the experiment to begin with.

It is important to note that this affective assessment of material has been shown to be (a) independent of the associative value of the material (i.e., past experience, frequency, etc.), and, (b) idiographic in nature (i.e., it must be assessed individually and it varies from person to person); it is not a normative process.

The second important principle from Logical Learning Theory is that human beings are endowed with the capacity to think and reason dialectically (i.e., in terms of opposites or, more broadly, in terms of alternatives). This capacity for dialectical, creative, and potentially arbitrary thought is, for Rychlak, the basis of human freedom. One need not be determined by previous input if he or she has the capacity to generate alternatives and thus call into question his or her own mentation. It is noted here, therefore, that any theory which does not have place for dialectical reasoning, relying instead on unipolar demonstrative principles, must miss the human essence of human nature and must degenerate into quasi-mechanistic determinism.

These two concepts then, affective assessment, and the dialectic were chosen for investigation because they are difficult for behavioristic approaches or cybernetic approaches to account for. Indeed, in a cognitive system any processor which can affectively evaluate or reason dialectically must possess all the characteristics and capacities of a real, intact human being. The alternative to this conception of free affective evaluation is that thinking is only unipolar and logical and that affect is a product of past association. Such would be a behavioristic explanation which most cognitive psychologists and linguists are motivated to avoid. For these reasons, then, affective assessment and oppositional association were chosen for inclusion in the present study.

V. METHOD AND RESULTS

Four groups of subjects (randomly assigned) participated in the study. Each was given a different task to perform relative to a group of words as follows: 1) The Intentional group was instructed to remember as many words as they could; 2) The Like-Dislike group was instructed to rate words indicating whether they liked or disliked them; 3) The Concrete-Abstract group was instructed to decide whether each word brought to mind a concrete image or an abstract idea on a dichotomous scale; 4) The Letter Task group was instructed to estimate the number of letters in each word by means of a dichotomous, more than five letters or less than five letters scale.
The words were common words taken from the Palermo & Jenkins (1964) word association norms. Six were non-antonym first associate pairs, six were antonym first associates. The order of presentation was randomized. The words were presented on a tape recorder at the rate of one word every two seconds. All groups were then asked to recall all the words they could, in any order in a free recall format.

An analysis of variance of the total recall scores (see Table I) showed a significant main effect for groups ($F(3,41)=11.329$, $p<.0001$). The Like-Dislike group performed better than the Concrete-Abstract group which performed better than the Intentional group which performed better than the Letter Task group. A Newman-Keuls analysis showed only the recall of the Like-Dislike group to be better than the rest ($p < .05$).

Table I

Mean Recall Scores for Intentional Group and Three Incidental Groups

<table>
<thead>
<tr>
<th>GROUPS</th>
<th>LIKE-DISLIKE</th>
<th>CONCRETE-ABSTRACT</th>
<th>LETTER TASK</th>
<th>INTENTIONAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>MEAN RECALL</td>
<td>16.75*</td>
<td>12.33</td>
<td>11.08</td>
<td>10.83</td>
</tr>
</tbody>
</table>

* This mean is significantly different from the other group means according to Newman-Keuls procedures at .05 probability level.

Since the words were associated we can assess the amount of clustering which took place during recall. Cluster ratios were computed for each subject in all groups (see Table II). A cluster ratio is defined as the number of clusters divided by opportunities to cluster. Analysis of variance showed a main effect for group ($F(3,41)=4.808$, $p<.006$). Newman-Keuls analyses showed the Intentional group clustered less than the other groups. This might reflect a bad learning strategy for that group.
Table II
Mean Cluster Scores* for Intentional Group
and Three Incidental Groups

<table>
<thead>
<tr>
<th>GROUPS</th>
<th>CONCRETE-ABSTRACT</th>
<th>LIKE-DISLIKE</th>
<th>LETTER TASK</th>
<th>INTENTIONAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>MEAN CLUSTER SCORE</td>
<td>.411</td>
<td>.390</td>
<td>.329</td>
<td>.169**</td>
</tr>
</tbody>
</table>

*A cluster score is defined as clustering/opportunity to cluster.

**This mean is significantly different from the other group means according to Newman-Keuls procedure at .05 probability level.

When the type of semantic relationship is taken into account (see Table III), once again there was a significant main effect for the group factor ($F(3, 41) = 11.059, p < .001$). Also there was a significant main effect for the semantic relationship of the words; antonym pairs were recalled more than non-antonym pairs. Tests of simple main effects showed antonyms were recalled better than non-antonyms only for the Like-Dislike and Concrete-Abstract groups ($F(1, 41) = 22.958, p < .001$).

Table III
Mean Recall Scores of...
First-Associate and Antonym Pairs for
Intentional Group and Three Incidental Groups

<table>
<thead>
<tr>
<th>GROUPS</th>
<th>LIKE-DISLIKE</th>
<th>CONCRETE-ABSTRACT</th>
<th>LETTER TASK</th>
<th>INTENTIONAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>FIRST ASSOCIATE PAIRS</td>
<td>2.90*</td>
<td>1.36*</td>
<td>1.55</td>
<td>1.46</td>
</tr>
<tr>
<td>ANTONYM PAIRS</td>
<td>4.46*</td>
<td>3.46*</td>
<td>2.18</td>
<td>1.64</td>
</tr>
</tbody>
</table>

* Means for first-associate pairs and antonym pairs are significantly different for these groups according to tests of simple effects.

There was thus a significant interaction of group with semantic relationship. It can be seen that only the Like-Dislike and Concrete-Abstract groups seemed to benefit from semantic relations in
the stimulus words and that (significantly) antonymic relationship was more conducive to recall than non-antonymic relation. This is graphically represented in Figure I.

**Figure I**

Mean Recall Scores of First-Associate and Antonym Pairs by Intentional Group and Three Incidental Groups

VI. Discussion

There are several important implications of the above findings for both cognitive psychology and linguistic theory. From this research and that of Battig and his colleagues, a possible independent measure of depth has emerged. Deep processing is affective processing. Affective assessment is, therefore, a measure of depth of processing. Rychlak's work has previously demonstrated that affect has a unique effect on learning. Packman & Battig (1978) suggest that it is not affect per se which accounts for superior memory, but the distinctiveness of the affective processing task as compared to the other semantic tasks. This is an alternative which can be empirically investigated. Present research is being addressed to this question.

Cognitive theory has difficulty accounting for affective evaluation and preference. Either it has been largely left alone in the literature or there has been posited an "affective processing box" in the model which takes care of affect (usually this processor has all the properties of a real person). Other theories maintain that affective assessment comes out of Long Term Memory as a product of past association history. Cognitive theory insofar as it embraces this explanation is not far
removed from behaviorism. Rychlak's work seems to argue against this type of explanation.

There is in linguistic theory (as we have studied it) a parallel difficulty: how can the present results be accounted for by linguistic theory? Affect has been largely left alone by linguistic theories as well. We might ask, why should "affective assessment" make a difference in the processing and remembering of linguistic material? Specifically, why should affect make more of a difference than other "semantic" processes? There seem to be two ways of accounting for affect: (a) teleologically as suggested here, or (b) on the basis of past history and experience, not far removed from behavioristic psychology. It would appear also that affect doesn't behave like other semantic features and cannot, therefore, be dealt with as a feature among others. It appears difficult to account for the effect of affect with a "feature analysis" approach.

How can linguistic theory account for the relative efficacy of antonymic association over non-antonymic association? The most obvious answer is that antonym associations are stronger than other kinds. The larger question is still why that should be the case. How can we accommodate these dialectical processes in our linguistic theory?

The concept of affective assessment and its influence on learning and language (and also the concept of the dialectical nature of language) seem to argue in favor of a teleological, intentional, creative theory of language and cognition. Language and cognition can be more profitably seen as products of a creative purposive person rather than some suprapersonal and thus impersonal linguistic or cognitive "system"—which can (for purposes of study) be "abstracted from its occasional bearer" (Schrag 1975). Furthermore, the effects of affect (through the works of Rychlak) are shown to be idioGraphic and unique rather than nomothetic or normative. Linguistic theory, by its very self-definition seems to be pursuing the discovery and exploration of normative and nomothetic principles which account for language behavior. The results presented here would suggest that linguistic theory must account for idiosyncratic affective processing.

When the type of teleological model being discussed here is applied to linguistics and language acquisition, a picture of the language act as more creative, more affectively toned, and more projective emerges. Language is thus seen as a creative endeavor rather than the end product of the operation of cognitive processes or laws associated with an innate structure of language. Usage of language is to be understood in terms of its affectively toned meaningfulness to the user, and in terms of the goal or intention toward which it is directed. Language can or ought to be approached as the product and project of an intentional human being, rather than as product and project of itself. The study of behavior should yield as much insight into the "behaVer" as it does into the cognitive structure from which it comes. The study of language behavior should yield as much insight into the language user as it does into the linguistic system from which it arises.
REFERENCES


