KNOWLEDGE, CONSCIOUSNESS, AND LANGUAGE: SOME POSSIBLE SOURCES OF DISCOURSE PHENOMENA

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Our purpose in this paper is the explication of the way we have come to view the accomplishment of spoken discourse. More immediately, we describe the discourse sources of certain distinctions that we have found necessary in the description of lexological order in the German Satzfeld (Copeland and Davis Ms.). The theoretical model that serves as orienting framework for that work and also for this paper is that of Lamb's stratificational grammar, now known as cognitive linguistics. The initial appeal of the model is that it permits one to consider the language phenomena of content, i.e., semantics in its many interpretations, without immediately embroiling oneself in expression, i.e., syntax, morphology, and phonology; and it is that independence that is the base of our comments here.

It is, of course, impossible to prove any view of discourse to be correct, and we will be satisfied here if ours provides an intuitively reasonable characterization of that process. What we mean by "intuitively reasonable" is that the model should provide a place for discourse elements and, additionally, that it should be approximately congruent with the results of other approaches to those phenomena, e.g., cognitive psychology.[1] Even with this diluted goal, we shall be able only to outline a general framework and provide some indication of how it might function.

In "Discourse Portmanteaus" (Copeland and Davis Ms.) we found it necessary to distinguish between components of a sentence that were—in terms of the discourse—Given, Recoverable, or New. Motivation for at least these distinctions lay in the way event-participant elements are ordered within the German Satzfeld.[2] Our concern here is not with the evidence for these terms but with how they are represented on strata higher than the lexological. Semologically, these three reveal themselves to be partially alike, and this

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partial similarity results in their being treated as portmanteaus of more "elemental" terms.

A now standard characterization of semotactics is its identification as that portion of language that accounts for the linguistic expression of the conceptualization of happenings; that is, things happen, states exist, identifications occur, and this information is transmitted from one speaker to another. The description of the conceptualization of possible occurrence is the domain of semotactics. Propositions, the semotactic manifestation of occurrence, have been viewed as consisting of some event proper and one or more participant roles. Such a view is to be found in much recent work, e.g., Fillmore (1968 and 1971), Chafe (1970), and Lockwood (1972). A detailed examination of semotactic events—their classification and identification as Static, Active, Mutative, etc.—and semotactic roles—Agent, Patient, Beneficiary, etc.—and any further parameters the language may recognize in categorizing events, e.g., Control (see Thompson 1979), may constitute a semotactic description of the proposition. Yet this fails to include all the possible information an utterance may convey. Utterances do not occur in isolation—ever. And their place in some context, verbal and/or non-verbal, is generally what we intend by discourse.[3] The information an utterance conveys pertaining to its place among other utterances and the information conveyed by the semotactic structure, together, still fail to exhaust the possible content of an utterance. Such grammatical categories as non-indicative mood, choice among values of some linguistic variable (Labov 1972), or simply the fact of dialect (Hjelmslev's "linguistic physiognomy") illustrate the kinds of information that may be contained within an utterance in addition to propositional and discourse information. We believe these latter types may be heuristically separated from propositional and discourse meanings, and we shall set them aside.

Discourse information of an utterance is sensitive to the knowledge those who are conversing have accumulated prior to the time of speech. Propositional configurations then adapt themselves to and reflect that ever-changing state/condition of a discourse. Some aspects of the current state of discourse are these: The speaker makes an evaluation of what his interlocutor is thinking of, and this judgment will be influenced by what the verbal and non-verbal context is. If the two are sitting on a park bench at midday facing a busy street and a squirrel starts across in front of a car, the speaker may assume his companion to be aware of the same non-verbal, visual context and say:

(1) The squirrel's not going to make it.

The choice of *the* as opposed, say, to *a* or *some* conveys information about the context the speaker and addressee share—here, a non-verbal context. The speaker assumes the addressee to be conscious of the participant-squirrel and able to identify the particular one in question. This context-derived informa-

tion is what we summarize as Given. Now, if the two are strolling home at sundown and one comments to the other,

(2) I didn't think the squirrel was going to make it

again the choice *the* is possible. Yet, the context is now such that the speaker may have no reason to assume his interlocutor continues to be conscious of or thinking of the squirrel, but *the* is still an appropriate choice. The context signaled here by *the* is that the addressee is assumed to be able to recall and identify a particular squirrel. Here, 'squirrel' may be said to be Recoverable. The difference between the contexts of (1) and (2) is distinguishable in that the context of (1) also makes it possible to say

(3) He's not going to make it

whereas in the context of (2),

(4) I didn't think he was going to make it

may sound "out of the blue" unless the phrase *going to make it* enables the addressee to identify the referent of *he*. For example, the addition of *across the street* to (4) may be sufficient to allow the addressee to identify what the speaker has in mind (if the repetition of *make it* has not sufficed). Thus, *the squirrel* and *he . . . across the street* may both signal a Recoverable participant; and Recoverable does not necessarily have a single linguistic expression. Nevertheless, the *he* of (4) places a greater burden on the addressee than (2); it is less cooperative in the quantity of information necessary to achieve understanding (Grice 1975). Where the verbal and non-verbal context give the speaker no reason to conclude that his addressee can identify the particular one, this may be indicated by the choice *a* rather than *the*:

(5) A dog just ran off with your lunch.

Participants of this ilk will be called New.

The introduction of Given, Recoverable, and New has here been in terms of particulars: unique individuals or representatives; *the squirrel* in (1) is contextually unique within its discourse, but not all conversations pertain to uniques or particulars. Occasionally, a participant may be a class without regard to its instantiation,

(6) The squirrel is an odd animal

or the instantiation of the class may be completely or not at all determined:

(7) Any squirrel will do for our stew.

We call participants such as those in (6) and (7) Generic and Some, respectively. The semantic closeness between these distinctions and the previous three is reflected by the neutralization that exists; *the* functions as a realization of both

Given and Generic, and *a* marks both New and Some. See also the discussion of (8) below. Our immediate argument will proceed using the terms of Given-Recoverable-New, and we will return below to comment upon Generic and Some within the framework we shall derive in the course of the paper.

The contextual information conveyed by the choice between *the* and *a* (and other choices) does not exhaust the relevant contextual, discourse information expressed by an utterance, and the remaining discriminations are more difficult to identify correctly. We may consider two sentences; first, sentence (5) above and (8):

(8) It was your lunch a dog just ran off with.

Both might be appropriate to describe the same token happening. They differ not in the propositional information conveyed but with respect to the context, that is, how the speaker assesses the addressee's consciousness and knowledge of the circumstance at that moment. The utterance of (8) is more constrained in this respect. The addressee's attention at the moment of utterance must be focused on the participant-role of possible things a dog may run off with, and he must be conscious of certain aspects of the propositional content of the utterance of (8). Notice, for example, that *a* in (8) must mark Some; since consciousness of certain elements of the event is necessarily signaled by such sentences, *a* cannot possibly indicate New here, and Some is its only possible alternative content. Sentence (5) is, by contrast, less constrained; it may come out of the blue, presupposing no particular focus of consciousness. The point of the comparison of (5) and (8) is this: The difference between them is a function of context and hence is a discourse one; and second, the parameters of this difference are distinct from the discourse information identified with Given, Recoverable, and New that we have described as varying from participant to participant. The contextual, informational differential of (5) versus (8) is a specific exemplification of a more general phenomenon, i.e., telling the addressee what the speaker assumes he didn't know, the traditional Theme-Rheme distinction.

Although the Theme-Rheme opposition is sometimes labeled Given-New (Chafe 1974; Clark and Haviland 1977), it is convenient to distinguish at least three oppositions that are similar in givenness versus newness, but all of which will require separate recognition. The first usage is the designation of participants contextually as we have done above. The second usage derives from the complex of information that the addressee is assumed not to know. When this is conveyed to the addressee, it constitutes the Rheme of the Theme-Rheme opposition. Failure to differentiate between these two aspects has resulted in confusion; for example, in a discussion of contrastiveness Chafe (1974:118) remarks, "One would like to make the generalization that only items conveying given information can be pronominalized," but then he notes that in sentences like

(9) He̋ killed Cock Robin

with contrastive stress on the pronoun, *he̋* appears to convey new information as well. It then becomes necessary to qualify the generalization to state that pronouns are possible with items of given information *or* with simultaneous new and contrastive information. One wonders what would happen to non-contrastive sentences like

(10) He did it

containing only pronouns. Either there is no "new" at all—which violates Clark and Haviland's (1977:15) claim that all assertions contain "given-new" (read "Theme-Rheme") distinctions—or Chafe's qualification fails again. Clark and Haviland (1977:12-13) themselves encounter a similar difficulty with definite articles in cleft sentences, as in (11):

(11) It was the judge who took the bribe.

The initial portion of such sentences (*It was the judge . . .*) is the Rheme (they note that *the judge* involves "identification"), but like Chafe they fail to distinguish the two parameters of Given-New versus Theme-Rheme and cannot establish the correct generalization, continuing to "write given and new in the less precise form with the understanding that it can be made precise." Recognition that contrastiveness in (9) and identification in (11) are varieties of Rheme, a dimension distinct from Given-New in our sense, resolves both problems. We consider the "inconsistencies" Chafe and Clark and Haviland have noted to be evidence for this distinction. The Theme-Rheme opposition clearly labels a collection of phenomena, e.g., the cleft usage in (8) and (11), the relational Rheme of Given participants and event in (10), etc., that all relate to discourse states. The third sense of givenness-newness is illustrated by the newness implied in such utterances as *I'm going to tell you what 'glumpf' is now.* This last is not a discourse phenomenon and will not concern us here.[4]

We turn now to how the range of Given-Recoverable-New phenomena may be interrelated and best approached. It is usual to assign or describe the tactics of the different strata in terms of a scope, e.g., the phonological word of phonotactics as opposed to the morphological word of morphotactics; and the scope of the semotactics is the "proposition" (Lockwood 1972:166). If this is the correct way of conceiving the problem, then several conclusions appear to follow. First, there will be conditioned choices within the semotactics, i.e., ordered ORs, and the conditioning factor will lie outside the proposition, i.e., outside the semotactics. A simple example is the choice between pronoun or noun (semologically, Index or Name, respectively. See Copeland and Davis Ms.); the selection of one or the other is not free. In the park context above, the presence of *squirrel* as against *he* is not random. The required selection implies a distinct "something" to which propositions are related so that the former may effect choices within the latter. Second, the patterning of

language does not cease with propositions. A higher pattern of broader scope exists. This is now a truism within linguistics (Hjelmslev 1961; Pike 1967). That something more inclusive is required has also been argued within the stratificational approach (Bennett 1968; Lockwood 1972), and it has often been labeled gnostology.

Gnostology has been invoked to describe two kinds of phenomena. The first description is that found in the work of Lamb (1970 and Ms.), in which gnostology recapitulates one aspect of cognitive anthropological studies: the taxonomic hierarchy. Lamb (1970:220) illustrates, for example, how one's knowledge of the animal kingdom may be represented by means of a stratificational arrangement of unordered ANDs and ORs. The second gnostological function is one suggested by Lockwood (1972:110), which incorporates a description of a "text" as a series of elements (ultimately utterances) sequenced by an ordered AND. We shall propose a way of reconciling these two kinds of gnostological information in a useful way.

We comment first on the taxonomy. The growth of cognitive anthropology (as represented in Tyler [1969]) was in part the result of linguists' failure to acknowledge that language was more than form, that it conveyed meaning. Anthropological linguists filled that vacuum, developing sophisticated formal ways of dealing with lexical domains. The primary results were two. Some form of a taxonomy was purported to describe a person's knowledge that *X is a Y; Y is a Z*, etc. Such chains of statements underlie the complex schemata that Lamb represents within gnostology. The second result was the employment of the matrix to represent a person's claim that *While P may not be a Q nor an R, it shares properties of both*. The parameters of the matrix are then defined by what P shares with Q and R and what it is that distinguishes them. Recent work suggests that both the taxonomic hierarchy and the matrix may make incorrect claims. There are indications that the elaborate taxonomies constructed by the anthropologist/linguist are not necessarily matched by the native informant. Randall (1976) shows that the transitivity one would expect from such a representation is not always present; *If X is a Y and Y is a Z, X is not necessarily a Z*. Others (e.g., Berlin 1972:59-65) have shown a continuous phenomenon not predicted by the taxonomic hierarchy alone: *If both A is a C and B is a C, sometimes A may be more a C than B is*. Finally Kintsch (1974) has argued that what is called "semantic" memory (as opposed to "episodic"), that is, the apparent, contextless knowledge underlying such statements as *Robins are birds*, is predicational in nature. The gist of this is that taxonomies exist as the anthropologist's/linguist's summation of a conversation with an informant. The irreducible element underlying this appears again to be something like a predication.

The use of components or features that characterize the matrix-knowledge of cognitive anthropology has also been popular within certain linguistic approaches (Katz and Fodor 1963; Dillon 1977). This, however, is unneces-

sary, committing one to pursuit of semantic features analogous to phonetic/
phonological ones and failing, finally, to deal adequately with certain semantic
problems, e.g., the "hedges" of Lakoff (1972). Others have noticed that the neat
oppositions expected in matrices are often absent, with distinctions within a
semantic domain being indicated uneconomically by many and varied criteria
(Bulmer 1970). This reflects the observation that each occurrence of a word in
novel semantic contexts isolates new features. Semantic multidimensionality of
terms is also a conclusion of psychological study (e.g., Mandler 1975b:510-511).
Kintsch (1974) and Mandler (1975b:510) suggest that it is sufficient to define
semantic units by their interrelationships to other semantic units. Mandler goes
on to adopt the familiar position of Lamb (taken from de Saussure and
Hjelmslev): that relationships, not items or entities, are primary.

Now, using stratificational notation we may begin by representing in figure 1
the knowledge that enables the utterance *Robins are birds*. This piece of
gnostology shows one way of representing information that is equivalent to
semantic (Kintsch 1974), long term (Baddeley 1976:100ff. *et passim*; Craik
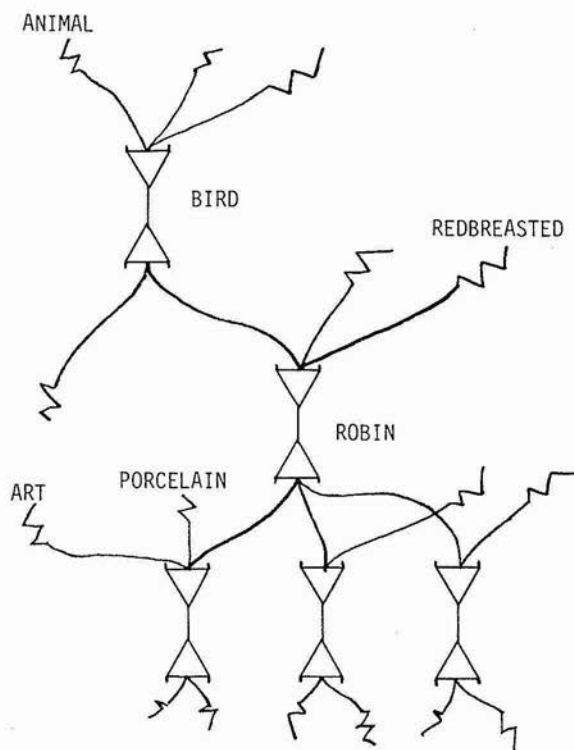and Lockhart 1972:671-673), secondary (William James, cited in Norman

FIG. 1.

[1969]) or deep memory (Chafe 1973). This contextless memory is the "knowledge" that is the subject of cognitive anthropological study. The basic unit of that representation is the nection (Lamb Ms.). The lines into the upward AND portion characterize the nection, and the lines leading out of the nection through the downward AND lead to other nections to characterize them. As many "features" define a nection as there are lines into its upward AND. These characterizing lines also capture the predicational property Kintsch has attributed to semantic memory.

One property of this notation that requires justification and explanation is the presence of the AND relation on both the upward and downward portions of the nection. We have several reasons for this. First, intuitively, it seems that all knowledge is simultaneously and continuously present. It is the manipulation and accession of this knowledge that shows selection or primacy. Second, study of what is commonly called attention has shown that while such a thing seems to exist and while it seems to have the effect of selecting, it is also true that non-attended, automatic stimuli are also recorded; they are not denied entry and filtered out. The activation of one portion of gnostology does not preclude the activation of any other portion. The relative presence of these non-attended stimuli (measured in terms of differential times in the performance of certain tasks, e.g., naming) varies as the stimulus's "relationship to the attended information" (Posner and Snyder 1975:61). Posner and Snyder discuss an array of experiments on automatic processing that is compatible with the proposal we are making here. This also allows Neisser's (1976) experiments with dual tasks, e.g., reading while transcribing an aurally presented list of unrelated words. There appears to be no "either-or" presence of such knowledge; it is all present all the time. Rather, it is or it is not accessed. The assertion of constant presence of knowledge (as equivalent to gnostological structure) leaves a problem; namely, one does not talk of all things, nor is one aware of all things simultaneously. Hence, the OR portion of each nection in figure 1. These are intended to convey the possibility of selective accession, e.g., recall, while not denying the presence of the remaining external lines of the nection. (The AND-OR node is taken from Reich [1968].) Some selective mechanism is now required to specify the utilization and nonce organization of that knowledge.

Chafe (1973 and 1974) has made some interesting remarks on this general topic. He has proposed a distinction between surface, shallow, and deep memory on the basis of certain linguistic usage, referring to the employment of temporal adverbs in these sentences (Chafe 1973:263):

(12) (a) Steve fell into the swimming pool
     (b) Steve fell into the swimming pool yesterday
     (c) Last Christmas Steve fell into the swimming pool.

It is claimed that (12a), with no adverb of time, is appropriate only when the

occurrence of which it informs the addressee is in the consciousness or "very close to the surface of consciousness" (Chafe 1973:265). The speaker is either preoccupied with the occurrence or has retained it in his consciousness from the time he learned of it. Sentence (12b) is appropriate to the memory context of (12a) but also to what Chafe terms shallow memory. As he characterizes it, shallow memory seems to be the same memory Tulving (1972) terms "episodic." That is, a person (by either Chafe's or Tulving's description) can still recall "the sequence of events in an effortless way" (Chafe 1973:368), or he can recall "auto-biographical events . . . in terms of their perceptible dimensions or attributes and in terms of their temporal-spatial relations to other such events" (Tulving 1972:387). Episodic memory is opposed to semantic memory by the "differential nature of stored information," "denotative reference of input events," "retrieval," and "susceptibility to interference and erasure" (Tulving 1972:402). Semantic memory seems to be what Chafe intends with his deep memory, and it is retrieval from this type that Chafe sees as appropriate to the utterance of (12c). The possible correlations are given in (13):

(13)   Surface Memory   Shallow Memory   Deep Memory
          (12a) or (12b) or (12c)   (12b) or (12c)   (12c)

Additional evidence, e.g., the non-generic perfect, is adduced for the distinction of surface memory from some non-surface type.

The surface-shallow-deep distinction is potentially useful in determining the conduct of discourse. "Potential" because Chafe does not distinguish the three using the dyad of speaker-addressee, but with focus on what may preoccupy the speaker. (The distinction of episodic and semantic is also made without regard to its function within a social-cultural context.) The addressee, and hence discourse, is omitted. The discourse usage that we have called Recoverable provides a similar surface-like versus shallow-like distinction. Returning to the park context of sentence (1), let us assume the squirrel successfully crosses the street and our conversation flows on to other matters; then as we leave the park some time later, the speaker looks around and notices the same squirrel now attempting to go back across the street. His utterance is (14):

(14) Look! The squirrel is crossing the street.

Now, use of *a* in (14) indicating that the addressee should treat *squirrel* as a completely New participant is inappropriate; it simply says the wrong thing. Similarly, replacing the named participant with *he* or *it* may fail in that the addressee is now unable to determine who the *he* is. In Grice's (1975) terms, we would have failed to observe the maxim of quantity and to provide enough data to recall or identify what the information concerns. If, however, the squirrel were to remain in our—to use Chafe's term—surface memory, then an utterance like

(15) Look! He's crossing the street

is acceptable. Sentence (14) remains acceptable as well. Thus, analogous to (13)—defined independently of discourse context—we may construct (16):

(16)   I   II   III
            the or *he*   *the*   *a*

The question arises whether (13) and (16) are equivalent, and the answer is "Not quite." Chafe's illustrative sentences are uttered "out of the blue"(Chafe 1973:264), whereas ours are determined contextually. Chafe's sentences point more to a speaker-attitudinal distinction of surface-shallow-deep, whereas the three-way distinction of (16) is neutral in this respect; neutral as long as the boundaries between the distinctions of (16) are close enough for speaker and addressee in both principle and usage. We must all know people who "misuse" the II-*the* versus the III-*a* distinction and extend the II-*the* to inappropriate places referring to participants no longer within the consciousness of the addressee and identifiable only from a previous conversation. The fact of discourse implies shared experience and hence an episodic memory that is alike for both speaker and addressee (allowing, of course, for different points of view and so forth). Thus, II in (16) is the portion of the speaker's and addressee's individual episodic memories that is held in common; III will then include whatever portion of episodic memory of the interlocutors does not arise from shared discourse experience and also what Chafe labels as deep memory (what Tulving discusses as semantic memory). The term "misuse" means only that in specific instances the speaker has misjudged his addressee's shared episodic memory, and the addressee is incapable of identifying the particular participant indicated by *the*. Within English (and perhaps all languages), the boundary between II and III is not determinable with absolute temporal limits, nor, probably, is it quantifiable at all, even in something like experiential time. The boundary between II and III is recognizable only in contextual terms and appears to be one characterized by a very specific usage of Grice's (1975:45) maxim of quantity: "Make your contribution as informative as is required (for the purposes of the exchange)."

The first discourse-determined particularization of the gnostological structure (as outlined in figure 1) is then determined by combining a psychological aspect—episodic memory—with a cultural one. This specifies a type or usage of memory, i.e., recall, that would not necessarily be the subject of a purely psychologically oriented study. Where distinctions are made between types of memory (Tulving [1972:382] notes reference to approximately fifty "categories of memory"), the usual one is that between secondary and primary (Norman 1969:90-91), also apparently called long-term and short-term, respectively (Baddeley 1976). A third "type" is the episodic memory of Tulving, which must be somehow intercalated with secondary/long-term (or semantic) memory and primary/short-term memory. We ignore here sensory memory as not relevant to our immediate purpose. The binary opposition of II and III

that we have identified is not in itself sufficient to constrain figure 1 and determine all the necessary discourse contexts. As indicated in (16), another, more immediate distinction is required to account for I versus II.

We conclude above that a culturally relevant usage of memory was helpful in identifying the distinction between II and III; and we might approach the I-II distinction in an analogous way. We shall base this opposition on an adaptation of consciousness. In psychological discussion, consciousness is quite often used synonymously with attention on grounds that each is a "limited capacity mechanism" (Mandler 1975a:232-233); and for the same reason consciousness is also "closely related with" primary memory (Baddeley 1976:165).

One aspect of the concern with consciousness/attention is represented by studies of the act of sensory perception. The active nature of sensory perception and learning (and including language decoding, e.g., Bransford and McCarrell [1974]) is generally accepted (Baddeley 1976:13). The modeling of this process (see Neisser 1976) is based on schemata, a notion that has not, apparently, been made very precise (Neisser 1976:51-78 and Craik 1979:65). A schema appears to be a structural principle; it is "not a center in the brain" but an "active array of physiological structures and processes" (Neisser 1976:54). As a principle of nonce organization that forms long-term memory/knowledge, schemata are one aspect of consciousness. Neisser (1976:62) further suggests that schemata function in memory. (Memory studies are in fact the source of this notion in psychology. See Baddeley [1976:13-15].) As active organization of memory/knowledge, they constitute consciousness/attention as perception, and traces of their presence remain in the now modified-by-their-action long-term memory/knowledge as additional (and episodic) memory. "Thus schemata not only enable us to perceive present events but also to store information about past ones" (Neisser 1976:62; see also Craik and Lockhart 1972:671).

Consciousness may be hypothesized to be a possible state of the long-term memory/knowledge (Mandler 1975a:238). Consciousness is long-term memory/knowledge made active, and to have retrieved or recalled something is to have made an existing structure conscious. One might expect the possible sensory inputs to define differently structured states (see, e.g., Atkinson and Wescourt 1975:489); a visual schema may not be the same as an auditory one, yet they may nevertheless operate upon and activate the same portion of long-term memory/knowledge. Posner and Snyder (1975:66) note items that "share the same pathway"; and Piaget (1963:121) writes, "When an object can be simultaneously grasped and sucked or grasped, looked at and sucked, it becomes externalized in relation to the subject quite differently than if it could only be grasped." Coordination of schemata occurs, and the pivot of that coordination is the long-term memory/knowledge.

Many studies of consciousness/attention are concerned with its selective property as measured by various tasks. Such experiments are frequently

atypical in various ways. Miller's (1956) famous paper on seven, plus or minus two, reflects this, in that it is based on conclusions drawn from completely random occurrences of items and unlikely chores of discrimination. Miller quantifies his measurements by bits of information that constitute "equally likely alternatives" (1956:83) so that "7±2" will have some meaning, and he expects some confusion when the "channel capacity" is reached (1956:82). Such studies are analogous to a study of the ability to discriminate phonetic gradations in the voicing of dental stops. One may learn something of the possibilities of auditory discrimination, and the data may be replicable; but when we ask what we have learned about language from this, the answer must obviously be that we have gained very little. Specifically, it is a question of whether such data reflect normal functioning; and if so, how the connection between the atypical experimental context and the typical, non-experimental one is to be made.[5] (See Baddeley [1976, Chapter 1 et passim] for discussion, and Neisser [1976:33ff.] for a statement of this concern with respect to "ecological validity.") Kintsch (1975) attempts to counter this negative interpretation of atypical experiments.

One implication of this may be that there is no psychology that is culture-free, much of a person's cognitive capacity being formed by the relevant tasks of his culture. There may be parameters analogous to those of phonetics, e.g., absolute channel capacity (Miller 1956), that fix the bounds of the structure; but any meaningful study of the structures themselves (recall, perception, attention, and so forth) will require recognition that different cultures will have organized the biological possibilities in different ways. "The conditions of personal and social development determine what can and cannot be represented in consciousness. . . . different individuals, groups, and cultures will have different conscious contents" (Mandler 1975a:238). Briefly, it would be helpful to recognize here the equivalent of the etic/emic distinction of linguistics in all cognitive work. The argument is not that the first should be ignored—the atypical experiment has its place—but that the difference be recognized, and both—and their interrelationship—should receive equal attention. There exists already an enormous bibliography with this general focus (see Ember [1977] and Laboratory of Comparative Human Cognition [1979] for reviews). Nor is the concern a new one; the Sapir-Whorf hypothesis is one early manifestation of this emphasis (see, e.g., Brown and Lenneberg 1954).

Mandler (1975b:513) uses consciousness to cover a "wide variety of mental and cognitive functions," and in this spirit it does not seem unreasonable to postulate an additional schema, the semotactics, to define a further way that perception—the registration of information—is accomplished and consciousness/attention organized. In this way the semotactics defines an additional mode of consciousness, and from this perspective long-term memory/knowledge (and, now, also gnostological structure) is not purely linguistic. Memory/knowledge/

gnostological structure is seen to mediate informational inputs in that it may be made active from multiple sources of external stimuli. This allows, or even requires, the observation that non-verbal, as well as verbal, contexts function in discourse. Compare the context of (1) above. Such mediation may serve then as an explanation of experimental results in which sensory perception is improved when subjects are instructed prior to the presentation (Miller 1956:89). It provides a way of understanding Piaget's (1963) suggestion that intelligence, i.e., long-term memory/knowledge/gnostological structure, develops from certain sensorimotor performances, e.g., sucking and grasping. This allows language to develop upon the same base that is ontogenetically developed from a non-language consciousness. Phylogenetically, language may be seen as growing on the base of memory/knowledge present through the action of other, non-language sensory schemata, a memory/knowledge further specified and elaborated through the language schema of possible proposition into a gnostological structure of the type outlined in figure 1. (The possibility of a continuum across non-human species in the development of consciousness is discussed in Griffin [1976].)

Our original interest in consciousness was to identify some principle that might serve as an immediate constraint on gnostology and create the necessary context for discourse. In achieving this end we have taken the notion of consciousness/attention, observed the schema characteristics attributed to it, and then rendered it functional within language by identifying the semotactics —possible proposition—as one manifestation. We return now to consideration of its limiting function, and there are two aspects that are of primary concern: a capacity limit and a temporal one.

The capacity is identified as that limit to the number of items retained by short-term memory, either from immediate perception or recall from long-term memory/knowledge/gnostology; and that limit appears to hover about five (Mandler 1975b:501), i.e., Miller's seven, minus two. Mandler (1975b:510) hypothesizes that the limit results from the organization of long-term memory/knowledge/gnostology rather than a limit on the process of its activization. Craik and Lockhart (1972:672) identify it as a "limit on processing." The source of this limit is indeed interesting, but of more immediate concern is the capacity of consciousness/attention to comprehend, to render active, a relatively small number of items. Does this accord with the notion that semotactics may function as a schema of consciousness? The two appear to be not so disparate if we consider the possible elements of a semotactic proposition, the schema that, projected upon long-term memory/knowledge/gnostology, determines one mode of consciousness. Fillmore (1971:42) suggests that a proposition may universally consist of an event plus one or more of approximately eight participant roles. These, as always, are accompanied by the caveat of possible change. The total number of items that are then predicted as potentially included in consciousness is nine; but this is the maximum. Normal utterances

—perceptions of the world—do not include all this possible information. And some languages seem to deny even the possibility. In Bella Coola, for example, sentences that include Agent, Patient, Goal, and Instrument plus an event lie about at the upper boundary. Inclusion of Time and/or Place as well elicits headshakes and the comment that "You can't say that." But why? Although the grammar/lexology appears perfectly all right, such linguists' sentences are rejected, and this may in part explain why. We leave open the question of how such sentences in English may elude the constraint (literacy?). In any case, in practice or performance the limit suggested by Mandler and Miller does not seem very far off.

One query to this might be "Can we hold conversations only on topics of approximately five distinctions?" The answer is obviously "No"; we can greatly exceed that. The psychological construct that permits us to overcome that limitation is the principle of chunking. Miller (1956) has shown that the ability to recall can overcome the 7 ± 2 limit by recoding data exceeding the limit into fewer units that will then fall within the requisite constraints. It is then possible to recover, i.e., recall, terms "embedded" within the larger chunked pieces according to some general principle. It is of course tempting to see in this the source of linguistic embedding, e.g., complement sentences functioning in some role, complex noun phrases with relative clauses, etc. They would certainly seem to be closely related, although it is not *a priori* true that they must be.

All in all then, the capacity constraint does not appear to eliminate the semotactics—representation of possible happening—as a mode of consciousness, but rather to lend it some support.[6] The second constraint that is sometimes attributed to consciousness/attention is a temporal one. Mandler (1975a:237) characterizes consciousness as the "psychological present" and suggests that it is itself none of the memory types, that memory is the wrong characterization of consciousness: "memory *mechanisms* and the contents of consciousness are two very distinct kinds of mental events" (1976a:237). Consciousness is not a store of knowledge; it is a state of knowledge (see also Mandler 1975b:501). Still, something that is conscious does not remain forever so; it may be displaced. But if it is not displaced, what keeps it there; and if that act of maintenance is not performed, how long does it remain? The psychological maintenance mechanism is called rehearsal (Baddeley 1976:152 *et passim*; Mandler 1975b:512-513); and if it is not performed, items disappear from the conscious state (as calculated by the atypical task of trying to recall a random list when distracted from rehearsal by the performance of a second attention-occupying task) in approximately twenty to thirty seconds (Baddeley 1976:101).

Above, we approached the distinction of I-II in (16) from the appropriateness of anaphoric pronoun use. In determining the II-III boundary, it appeared that absolute time was not relevant, and it is not clear that the passage of time is here a relevant parameter of usage for such pronouns. The conduct of coherent

conversation must certainly function in the manner of rehearsal, serving to maintain certain particulars in consciousness, thus enabling one to refer to them via pronouns. The presence of anaphoric pronouns cannot be determined by any one principle as, for example, in Langacker (1969). One aspect of their use is the requisite consciousness of their referent and that itself has further aspects beyond the contextual, discourse one. There may exist constraints on pronominal usage that assure proper identifiability, thus avoiding ambiguity (see Davis and Saunders Ms.). Languages may develop differing resources to guarantee identifiability: for example, the switch reference of Yuman, the obviative of Algonkian, or the middle voice of Salishan, wherein the ambiguity of the English *He tied his shoes* is not possible. Some languages such as English simply exist with the ambiguity, but we would assume that *all* languages in some way recognize the discourse constraint of consciousness on anaphoric pronouns. In no language can a normal conversation begin with the equivalent of *He did it*. In any case, consciousness of the participant-referent is a requisite for pronominal usage, and consciousness can be maintained via the linguistic rehearsal mechanism of simple mention. If this is true, then there can be no absolute time content in I to separate it from II; time is completely contingent.

But what if the rehearsal-mention is absent? Or if the conversation mentions some particular once and then moves on from that individual, is there then a temporal boundary? Such questions can be reliably answered only from empirical observations. Thought experiments may reveal that in such circumstances it quickly becomes difficult to return to that particular via pronominal usage, and this time may accord with the relatively short span of short-term memory. The fact of replacement of items in consciousness by others should easily produce instances in which identifying a referent by anaphoric pronoun is impossible well within the twenty-to-thirty-second time limit.

It is clear that our usage of consciousness is not precisely the same as the purely psychological term, nor is it meant to be. Discourse-relevant consciousness cannot be the abrupt, pointillistically active state, but must be augmented to allow for the passage of arbitrary amounts of time, and it is rehearsal by mention that provides this leeway. Because rehearsal does not involve recall, but maintenance, this adapted consciousness, like Mandler's, is not a memory. The conscious state, formed by sensory schemata including the semotactics, but unmaintained by rehearsal-mention, requires to be distinguished from what we now call simply "consciousness"; and for this aspect we adopt Mandler's (1975a:237) term "focal attention."

"Memory" is ambiguous, referring both to what is in it (referred to as the store: Baddeley 1976:103; Craik and Lockhart 1972:672) and also to the process of recall (referred to as retrieval or memory, e.g., short-term memory). Here, we go against the terminological grain of psychology and call the first "memory" or, redundantly, "memory store," and the second either "recall" or

"retrieval." We have suggested that memory (also knowledge or gnostological structure) may very generally be represented as in figure 1.[7] Such an approach makes it difficult to distinguish between types of memory (or stores), and indeed one active, though not unchallenged, view among psychologists is that there is but one such representation; i.e., one memory store (Craik and Lockhart 1972). Differences in capacity and time in recall and possible coding or representation in memory result from processing; i.e., how information is acquired. Differentials in resulting presence of information in the memory and thus its recall are the artifacts of how, or to what degree, different sensory schemata are employed in gathering the information. This is Craik and Lockhart's "levels of processing." Our use of the opposition of episodic memory to a kind of memory distinct from that is not intended to imply a second memory, but to denote an addition to that single memory store—an addition that is distinguishable by its content from the matrix memory into which it is placed.

In concluding our presentation, we consider how the structure of figure 1 may function within this framework. We base our discussion on figure 2, a possible portion of gnostological structure, and an example sentence discussed
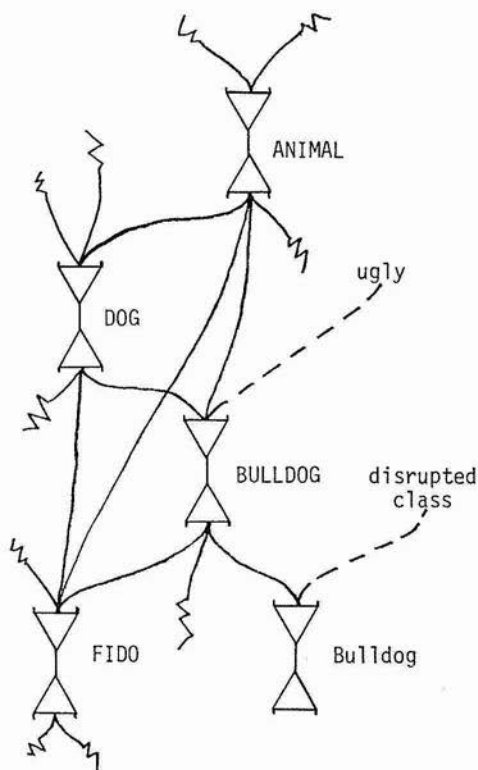

FIG. 2.

by Chafe (1974:125). Consider sentence (17) uttered at some point in a conversation:

(17) Yesterday I had my class interrupted by a bulldog.

Assuming that bulldogs have not been previously mentioned in the discourse, (17) may in part be seen as an instruction by the speaker to the addressee to "make conscious" the nection BULLDOG and to construct a nonce and unique, particular nection Bulldog characterized by the former; thus the presence of Bulldog connected to BULLDOG.[8] The Bulldog nection represents a New participant when it is introduced. Discourse-modified memory is indicated arbitrarily by broken lines, and we exclude from this immediate example the broken line leading to "ugly." If the utterance following (17) is within the bounds of temporally variable consciousness, that same particular may be referred to again and identified pronominally:

(18) I chased him out.

This Bulldog, once introduced, is a Given participant. Should, however, the conversation move from (17) to the content of the lecture, the nection will not be maintained in consciousness through rehearsal-mention, but will remain in the gnostological structure as part of the memory store of that discourse; i.e., in II. After completing a summary of the lecture, utterance (19), not (18), is appropriate:

(19) I chased the bulldog out.

Notice that it would also be appropriate to say (20) or (21):

(20) I chased the dog out
(21) I chased the animal out.

This raises the question of why (17) was phrased with BULLDOG in the first place rather than some other. Such choices are not completely free and are themselves frequently subject to the discourse context (see Brown 1958; and more recently Cruse 1977 and Nelson 1977). So long as there has been no mention in the conversation of other dogs, in the case of (20), or other animals, in the case of (21), so that (20) and (21), respectively, might fail to identify the one intended, either is appropriate; and the choice itself may convey information —not discourse or propositional information, but information of the speaker's attitude; i.e., modal information.[9] The correct identifications derive from the presence of Bulldog in the realm of II and require the addressee to use his long-term memory knowledge of III to identify Bulldog as the particular intended. In (20), for example, DOG, now conscious by virtue of the utterance of (20) and because it characterizes BULLDOG and by implication Bulldog as well, may render Bulldog conscious. This inference is an example of what Clark and Haviland (1977) have called "computability."

We turn now to a second aspect of figure 2, namely, the nection BULLDOG and the broken line labeled "ugly." For the discussion here we assume initially that the Bulldog nection is absent. Suppose again that at some point in the conversation sentence (23) were uttered:

(23) The bulldog is ugly

and that the Generic meaning is intended. This will again be interpreted as an instruction to make a nection active, here BULLDOG, but not any nections that it may in turn characterize. The Rheme information to be added (. . . *is ugly*) is indicated by the broken line above. Because that nection is now conscious, utterances like (24) are possible:

(24) I saw a nice one yesterday.

Sentence (24) creates a particular nection below the BULLDOG one, and because the latter is conscious, a pronominal identification is possible; but also because that particular nection was not present prior to (24), it also partakes of the New property. This is the Some introduced in (7) and (8). In the sentence sequence (23)-(24), the first can be replaced by (25)

(25) I'm gonna buy John's bulldog

to give the ordered pair (25)-(24). These sentence pairs are the basis of two conclusions. Let us assume first that (25) appears at a point in the conversation at which *John's bulldog* is not conscious—whether Recoverable or New is immaterial here. Either sentence (25) renders conscious a present, particular nection (analogous to Bulldog in figure 2) if Recoverable, or causes the construction of a particular nection under BULLDOG with a characterizing line *John's* (analogous to *disrupted class* in figure 2) if New. A matter passed over in formulating the encoding of *bulldog* in (17) was whether the construction of a nonce, particular nection implies that the nection that characterizes it (i.e., BULLDOG in the BULLDOG-Bulldog relationship) is also, by that fact, to be considered conscious. The sequence (25)-(24) indicates that it is; the construction of a New nection or making conscious a Recoverable one implies the characterizing nection is to be conscious as well. That is the first point. The reason for this conclusion is the second. If we accept that both the particular nection and the nection characterizing it are conscious, then the characterization of the Some category is relatively easily made, although the discourse category itself is complex. A Some discourse category occurs in, or is appropriate to, a context in which a particular nection is constructed and characterized by a nection that is *already* conscious. That is the second point. Sentence (25) constructs a nonce, particular nection characterized by BULLDOG, and the consciousness of the latter enables the construction of a second nonce, particular nection that may be referred to initially with a pronoun; i.e., *one* of (24). Both sentence pairs, (23)-(24) and (25)-(24), with *one* in the second

member, have the same explanation; the *one* is a Some. Because Some occurs in this constrained context it appears to partake both of Givenness and Newness. Further exemplification and justification of this category appears in Copeland and Davis (Ms.), wherein the characterizing nection is termed the semological Domain, and the characterized, the semological Particular. This discussion is summarized in table 1. Generic is now revealed to be not a discourse category in the way Given-Recoverable-New-Some are; if it has discourse constraints, they appear not to be formulated in terms of discourse-relevant adaptations of consciousness and memory.

We have not detailed in a very formal way how these suggestions may be implemented within the notation of cognitive linguistics, and clearly the relation of semology to both gnostology and lexology becomes in this view much more problematic than before. One formal suggestion may be to use Johannesson's (1976:132-133) diamond node on the internal line of a nection to express the interrelationship of gnostology and semology. The notion of Theme-Rheme that we distinguished from Given-New has its separate place within this frame: the instruction to add lines between nections in the gnostology. It is then in part the function of semotactics to project that connection. We would expect this view to provide a useful framework for discussion of the principles of cohesion (Halliday and Hasan 1976) or relevancy (Grice 1975). Other phenomena termed discourse ("narrative" structure and so forth; see note 3) may also be amenable to interpretation as schemata, perhaps analogous to those that have been labeled cognitive maps (Neisser 1976:108-127). In short, the approach seems productive.

Discourse is not static; both discourse and consciousness flow. "The normal form is the flow" (Mandler 1975a:249), and the principles of that flow are relevancy and Theme-Rheme. Discourse may then be restated as the coordination of multiple, inter-personal conscious flows, and we would expect then that the concerns of cognitive psychology, linguistics, and anthropology will be congruent, as we have attempted to show.

TABLE 1

Characterizing Nection \ Characterized Nection	Conscious	Not Conscious
Conscious	Given	Some
Not Conscious	Does not occur	New or Recoverable

NOTES

1. Such rapprochement is a generally accepted desideratum. Lamb (1971) has rechristened his approach to language "cognitive linguistics"; Chomsky (1968) has viewed linguistics as a subfield of cognitive psychology; and psychologists (e.g., Clark and Haviland 1974) have concurred. This consensus is, however, fragmented in pursuit of the goal. Some (e.g., Derwing and Baker 1978) have begun the melding of the experimental paradigm of psychology to a focus on language with the idea of discovering what language is, rather than justifying a preconceived theory, e.g., the search for psychological data to justify syntactic constructs (see Fodor, Bever, and Garrett 1974).

2. In German sentences containing two discontinuous verbal components, the Satzfeld is that position between them: the blank in the formula SV_____V, e.g., *Er hat* mein Buch einem Dummkopf *gegeben.*

3. Discourse is narrowly taken here as one aspect of face-to-face interaction (Goffman 1963) and not written language, literature, nor more formal oral structures that have been studied elsewhere (e.g., Lord [1964] and Propp [1968]. See Longacre [1979] for a review of discourse, primarily "narrative," studies from the tagmemic perspective). These undoubtedly employ many of the structures of face-to-face discourse, but in their own defining manner. See also Tyler (1978).

4. The Theme-Rheme distinction extends beyond the relatively narrow discourse focus of this paper and appears in other aspects of usage, such as the sociolinguistic. In a classic paper on pronominal choice, Brown and Gilman (1960) have shown that choice of a second person pronoun (their T and V forms) may signal sociolinguistic, Rheme-like information.

5. Miller (1956:89) notes one example of the kind of relevance we intend in his discussion of discriminations where multiple dimensions are present. The number of distinctive features ("about eight or ten dimensions") within the phonological systems and the number of discriminable phonemes they enable provide "quite a different picture of speech perception than we might otherwise obtain from our studies . . . of the ear's ability to discriminate relative differences among pure tones." Piaget's naturalistic observations of his children are a consistent exception to the complaint of atypicality, as is F. C. Bartlett's work on memory (Baddeley 1976:9-15).

6. Certainly there is no logical reason that the universe should be perceived and understood with just the small number of distinctions that appear in fact to occur. Why not understand and talk about a car accident using thirty parameters? To reply "That's nonsense" is to reiterate simply that we do not; it does not answer the question "Why not?"

7. The general shape of figure 1 (and figure 2 below) is certainly not precise enough, but this problem goes far beyond the immediate concern of this paper. The structure of long-term memory/ knowledge is a frequent topic within psychology. The model we present here has certain properties in common with that outlined in Rumelhart, Lindsay, and Norman (1972).

8. The instruction format seems to correspond to the psychological process of "encoding," a terminology that is approximately the reverse of the use of "encoding : decoding" within linguistics. See Tulving (1972:397-399). This interpretation of New as the construction of a nection is similar to a view discussed in Craik (1979:87). Rumelhart, Lindsay, and Norman (1972) appear to recognize a similar distinction with their primary (the characterizing) and secondary (the characterized, nonce) nodes. Notice also that New and Recoverable are similar, differing only in that New contains instructions to construct a conscious nection, not previously present, whereas Recoverable contains instructions to render conscious a nection already present. The former is comparable to (sensory) comprehension/recognition and the latter to retrieval/recall. The implication is that the two processes are closely related, a conclusion noted in Craik (1979:94).

9. Cruse's (1977) discussion proceeds in terms of inherently versus contextually neutral specificity and marked versus unmarked (neutral). The marked may correspond to our "modal"

information; the contextual frame is clearly our discourse context. It is tempting to see in Cruse's inherent, i.e., context free, specificity a reflection of Berlin, Breedlove, and Raven's (1973) "generic" level in their discussion of universal properties of taxonomic structures.

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