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UNDERSTANDING METAPHOR

by

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Introduction: An Overview

Metaphor has been studied as a linguistic and a cognitive phemomenon for at least twenty-five hundred years. During that time, the use of metaphor has been lauded and it has been condemned. But, praised or damned, the examination continues until this moment.

I suppose this eternal preoccupation with metaphor gathers its strength, in part, from the sheer pervasiveness of those hard-to-define figures of speech. For me, metaphor has offered itself as a mysterious, inviting passage into the obscure world of human creacivity.

When I began this study, I was convinced that metaphors, to use Austin's phrase, are "parasitic on ordinary language." It seemed to me that there is a neatly marked boundary between metaphorical and literal language, and that metaphorical uses depend on some pyschological act of discovering first that the literal meaning of a sentence is not intended on this use of that sentence, and, then, on some unknown method of moving from that point to the intended, metaphorical meaning. In turn, these beliefs led

me inexorably to the conclusion that metaphors are, in some sense, psycholinguistically more complex than literal sentences.

Filled with the sort of confidence that is sometimes called narrow-mindedness, I began to review the enormous literature on metaphor--written, it seems, from as many points of view as there are way of seeing the world--and formulated a fairly straight-forward hypothesis: Metaphors are psycholinguistically more complex than literal expressions (literals). I began with two candidate measures of pyscholinguistic complexity, but I discovered, in a first experiment, that one of them, a reaction time measure, promised to be more sensitive than the other, a sentence completion measure. In fact, the results of this first experiment persuaded me that my hypothesis was correct, and encouraged me to design a second, more elaborate experiment. I hypothesized not only that metaphors would be more complex than literals, but that context would help to narrow the difference between those two types. However, since metaphors were parasitic on ordinary language, it seemed that the greater pyscholinguistic complexity of metaphors would never quite evaporate.

The results of the second experiment did much to return to me a sense of humility. The context effect was there, without doubt, but the metaphor effect was not so clearly there. Driven by desperation probably known only to the graduate student watching his ship go down, a new notion occurred to me. Perhaps there is some underlying factor which is to a large extent coextensive with metaphor. Closely examining my experimental materials, it seemed that "plausibility" might be the psychological correlate of the formal concept "metaphor". A third experiment was designed to discover whether response time was more strongly correlated with plausibility than with metaphoricity, and the results suggest that it is.

The series of experiments and the related analyses and discussions presented here, like all thinking, exist in an ideational context. For that reason--and because the historical context has motivated a great deal of the recent experimental investigation of metaphor--this dissertation begins with a selective review and discussion of the history of thinking on metaphor. For convenience, that review is organized into discussions of the philosophical, linguistic, and psychological studies of metaphor. But the reader is warned of what will probably become obvious soon enough: those categories might be a useful way of organizing the

material to be reviewed, but it is often not quite clear why one theory or analysis finds itself in one domain rather than another.

After a review of the literature, the series of experiments are described and discussed. Finally, an attempt is made to present a coherent explanation of the findings of these studies in light of a general theory of sentence processing.

A Note on Terminology

Because this dissertation is an inquiry into the nature of metaphor, and because it is an open question whether a motivated metaphor/literal distinction can be maintained, I am faced from the beginning with the problem of what to call these "things" I am writing about. And because people do not process sentences but utterances, it might be confusing for me to talk about metaphorical sentences, even though I am interested in the type rather than their tokens. It is not even clear whether one should speak of "metaphorical sentences" or "metaphors within sentences", nor whether we should speak of metaphor as being "in" the language or in the intentions of the speakers of the language.

It would be stultifyingly cumbersome to raise these qualifications each time I refer to the objects of my study. For the sake of style--and of my sanity--I will sometimes refer to "metaphors", sometimes "metaphorical sentences", sometimes "metaphorical uses" of sentences, and so on. In other words, I will use many expressions interchangeably, and no one should interpret the use of one term rather than another as constituting a theoretical conclusion.

Theories of Metaphor

Many commentators follow the useful practice of considering theories of metaphor to be substitution, comparison, and interaction theories. Like many categories, these have fuzzy edges. While many of the theories I will review are not overtly psychological, they all have implications for the processing of metaphor, some of which are made explicit along the way.

The Substitution Theory

The substitution theory of metaphor views metaphors as stand-ins for equivalent literal expressions. So, in "Man is a wolf", "wolf" would be considered a concise substitute for some longer, literal expression; perhaps "vicious, solitary creature" (what matters is not the truth about wolves but what people think about them.)

Critics of the substitution theory ask: If metaphors are simply substitutes for other expressions, why do speakers bother to use them? The substitution theorists claim that they are used as decoration, and for the aesthetic pleasure their interpretation provides the reader. A further objection to this theory is that it is incomplete,

or primative. The substitution theory has not been developed to the point where it has a mechanism that can specify a list of features in a given metaphor. For that reason, the theory does not provide grounds for determining whether a metaphor adequately substitutes for a given expression, and it is for that reason itself inadequate.

The Comparison Theory

A classical view of metaphor, dating back to Aristotle, is that metaphor is a kind of implicit comparison. Hawkes (1972) comments that Aristotle's analysis is in terms of content rather than form, which I interpret as meaning a more abstract, less superficial analysis. For Aristotle, meaning or content in metaphor is the result of transference in one of four ways:

1. from genus to species ("here lies my ship": "Lying" is a genus, "lying at anchor" a species)
2. from species to genus ("Ten thousand good deeds": a specific number, used instead of the the genus "many")
3. from one species to another ("Drawing off the life with the bronze" used in place of "severing". Both are species of "taking away".)

4. a matter of analogy. (Hawkes, 1972, p.7)

I have, for convenience, placed Aristotle's theory under the rubric "Comparison Theory", but this conventional classification should not be allowed to obscure some important differences between the four classes of metaphor included. If one accepts the traditional definition of metaphor as implicit comparison, then a transfer from genus to species or from species to genus might be treated, as Roman Jakobson suggests (1960), as cases of synecdoche, the figural use of language where the part stands for the whole or the whole for the part. On the other hand, if one were to construe "comparison" loosely, part of the meaning of "here lies my ship" might rest with the comparison between the state of this ship and those other things which lie. Similarly, to understand "Ten thousands good deeds" requires an understanding of the relationship between "ten thousand" and "many".

Aristotle's third category of metaphor invites the reader/listener to recognize the similarity between "drawing off" and other kinds of "taking away", and the fourth category, analogy, is a clear case of expressing the comparative or proportional relation between two other relations.

In short, there is a loose connection between the four different kinds of "metaphor" which Aristotle identifies, but one can as easily see the important distinctions among them and understand why other thinkers have emphasized those differences.

The fourth category of metaphor, which Aristotle considers the most effective, needs further development: "metaphor by analogy means this: when B is to A as D is to C, then instead of B the poet will say D and B instead of D." (Hawkes, p.7)

For example, "old age is to life as evening is to day, so he will call evening day's old age..."(Hawkes, p.7) Or, the take Black's example:

> When Schopenhauer called geometrical proof a mousetrap, he was, according to such [a comparison] saying (though not explicitly): 'a geometrical proof is like a mousetrap, since both offer a delusive reward, entice their victims by degree, lead to disagreeable surprises, etc.' (1962, p.35)

Black points out that the Comparison Theory sees metaphor as a condensed or elliptical simile, and that the "comparison view is a special case of a substitution view. For it holds that the metaphorical statement might be

replaced by an equivalent literal comparison." (p.35) If Black is right, the objections to the substitution theory of metaphor are also objections to the comparison theory.

George A. Miller (1979) argues for "a version of the traditional view that a metaphor is an abbreviated simile, and that the thought provoked is the kind required to appreciate similarities and analogies." (p.202) He suggests resurrecting the nineteenth century mentalistic concept of "apperception" to characterize that kind of thought. "Apperception", for Herbart, [(1898)] was a general term used to refer to the process of relating new experience to an already established conceptual system. Miller applies the concept of apperception in turn to the problems of reading comprehension and the understanding of similes and metaphors. Although Miller is directly considering reading comprehension, he believes his analysis applies as well to the comprehension of spoken language.

First, Miller proposes that as one reads, one constructs a <u>memory image</u> of the passage:

> One way to characterize the change that occurs in reading...is to say that you construct an image as part of the process of understanding the passage, and that the image helps you to remember what you have read. (p.204)

He does not claim that the image is necessarily iconic but he does claim that it is necessarily vague.

A second possible method of reading would be selective rather than constructive. As the reader encounters more information, he uses it to narrow down possible states of affairs with which the information is compatible. This approach "results in a collection of possible states of affairs that correspond to the written passage only with respect to their shared features, but which differ from one another in all other respects." (p.206) The various compatible states of affairs Miller calls semantic models.

Miller sees the reader operating with both a memory image and a semantic model, with the former functioning as "a mental surrogate for the descriptive passage itself... The model, on the other hand, keeps the mind open to future possibilities."(p.207-8) This image/model that the reader develops, Miller calls the reader's concept of the passage, the product of what he calls the reader's synthesis of that concept. (p.209) Understanding a passage requires relating the textual concept to the reader's general knowledge and beliefs. Miller maintains that when we understand a passage, we "understand the conditions under which a person would use it." (p.210)

The reader, in understanding the passage, is not completely constrained by what he knows to be true in the real world, and therefore, a necessary distinction must be drawn between "true in fact" and "true in the model". This is obviously the case, for example, in understanding metaphors (which are always incongrous if not in fact false) as well as other literary texts. The reader, however, is under a "truth constraint":

> [W]e try to add the metaphorical information in such a way that its truth conflicts as little as possible with our conception of the real world. That is to say, we try to make the world the author is asking us to imagine resemble the real world (as we know it) in as many respects as possible. (p.213)

In processing passages of metaphorical materials, the reader does not translate what the author did say into something else that could be true. On Miller's view, the reader acts as if what the author said were true and tries to construct grounds under which it could be true.

Though logically two similar things are both equally similar to each other, comparison statements are asymmetrical. There is a directionality to comparison statements, and for an obvious reason: "New knowledge is assimilated apperceptively by being related to old knowledge." (p.217) Miller borrows from medieval logic the term <u>referent</u> to identify the concept being talked about, and

the term relatum for the concept to which the referent is being related. It is the referent, modified by the relatum that is assimilated to the memory image.

A comparison statement exists when a copula of similitude ("is", for example) joins a referent and relatum, and is either a literal comparison ("the grounds are obvious"), a simile ("the grounds...are not obvious") or an analogy (where four terms are compared on the arithmetic model, A:B::C:D:(p.218).

Because of the constraint that the textual concept be reconciled with general knowledge and belief, the reader's task is to discover resemblances between them. However, "[o]nce found and interpreted, the comparison is not added directly to the textual concept, but is used as a basis for imagining a minimally divergent state of affairs in which the metaphorical claim is true." (p.220)

Miller employs a formal symbolism to represent the psychological structure of similes and metaphors, and reconstruction formulae for reaching explicit forms from derivative or implicit forms.

Following one traditional route in conceiving of metaphor as an incomplete or eliptical comparison, he sees the reader's task as making explicit to himself the implicit assertion of similitude. Miller maintains that recognition, reconstruction, and interpretation are the three acts which the reader must commit in understanding a metaphor, "although in the simplest instances the processing may occur so rapidly that all three blend into a single mental act." (p.227) It is not quite clear what Miller means by "single mental act." Are the operations separate but simultaneous? Or is there only one act which is described or analyzed into three operations?

One possible mechanism which Miller considers would have the reader realizing that the textual concept does not fit naturally into general knowledge and beliefs, and that this observation amounts to the recognition of metaphor. "On this view, a reader recognizes something is false or unrelated to the preceding context, examines it, and decides to activate a mental subroutine for the interpretation of metaphors." (p.227) This, however, is not the only route to understanding, and Miller leans towards an alternative conception.

On the alternative view, there would be no special subroutime for processing metaphors. Subjects do not focus on the strangeness of the metaphorical expression,

> since they are bound by the nature of the task to take whatever they read as there in the replica of the author's concept they are synthesizing, and to assume that there is an internal coherence to the text..., so readers try to understand metaphors by relating them to something that could be true in the real world. (p.227)

Miller argues for Kintsch's (1974) position that metaphors are understood through the creation of a concept or comparison statement having the structure: SIM(F(x), G(y))(deciphered, this means that a relation of similarity holds in that F is related to (x) in the way that G is related to (y)). He does not say that the comparison statement is synonymous with the metaphor, "because...[they] will have different truth conditions, but...[the comparison statement] represents a possible situation in the real world that could provide a basis of the author's use of the metaphor." (p.228)

In understanding the archetypical metaphor--which Miller represents as a concept of the form BE(x,y) (less formally, x is a y, or "Man is a wolf"--the reader must determine the appropriate relation to assign BE. After assigning some value to the relation between the arguments, the reader can recognize the presence of a metaphor:

> It would not be necessary first to recognize that an expression is metaphorical and then resort to some special subroutine for processing it. Metaphorical expressions would be processed just as literal expressions are, up to the point where SIM must be introduced. (p.240)

The difference between Miller's alternative explanation and the subroutine explanation he rejects is not clear to me. He suggests that interpreters do not focus on the strangeness of metaphorical expressions, but how would the hearer recognize the "strangeness" until it were processed "literally" and he discovered that something with that logical form cannot exist in this actual world? In short, I fail to see why the reconstruction which Miller elaborates--the search for the ground which makes the metaphor possible--does not amount to the special subroutine which he claims is not necessary. But let us put aside these questions and continue with Miller's interesting proposal.

When one processes, say, "Man is a wolf," the first step would be to assign the reading of "wolf" to the reading of "man" (put loosely). Then a reconstruction rule--operating, perhaps, in parallel to some other rule--would transform the metaphor into an explicit comparison (or simile). The act of interpretation would then be necessary to understand the metaphor, for the operation of the reconstruction rule alone will not always produce the metaphor's meaning.

Consider Miller's example of Becket's metaphor, "waiting till my corpse is up to scratch":

> When I force 'my corpse is up to scratch' into a comparison statement, [Miller writes], the best that I can do is: 'A corpse that is ready for burial is like a body that is up to scratch.' What an odd relatum. (p.244)

And, as Miller concludes, this reconstruction fails to be a translation because (in Max Black's phrase) "it fails to give the insight that the metaphor did." (p.245)

Once the metaphor has been reconstructed into its underlying comparison statement, as I have said, it must be interpreted, and Miller's notion of how interpretation works seems to me very much the same as Levin's (to be discussed) in his discussion of poetic metaphor. The interpreter's job is to find

> a world in which the metaphor, however incongruous it might seem, is true. Readers try to be conservative in imagining different worlds, but the excercise cannot help but broaden their conception of what a world can be. (p.247)

While Miller may be on the right track in explaining how some metaphors are processed, I am convinced that he has not explained the processing of many others. For there is a large class of metaphors--for which "man is a wolf" may be taken as the archetype--which do not seem to compare anything

at all. For example, as Verbrugge and McCarrell (1977) report (See discussion, p. 98 below), subjects often seem to imagine entities, when understanding metaphors, which fuse the characteristics of the objects that are novelly brought together in metaphors. In this way, in response to the metaphor "Skyscrapers are the giraffes of the city," subjects may imagine hybrid creatures with building-like necks prowling the streets. Evidence like this suggests that metaphors convey more than a simple comparison statement.

Interaction Theories of Metaphor

Another group of theories are gathered together under the label "interaction theories of metaphor". I. A. Richard puts his version of the interactionist theory this way:

> In the simplest formulation, when we use a metaphor we have two thoughts of different things active together and supported by a single word, or phrase, whose meaning is a resultant of their interaction. (1936, p.63)

The "interaction" is between the "'tenor' (or... the underlying idea which the metaphor expresses) and the 'vehicle' (the basic analogy which is used to embody or carry the tenor)." (Hawkes, p.61)

One problem with this theory is that, while it is not false, it is not quite clear what "interaction" means beyond the claim that something "happens" between the two elements which produce the metaphorical meaning.

An interaction is a mutual effect. But of what kind? Do we have two new meanings? Are some features of both lost? In short, "interaction" suffers from an unfortunate (even if understandable) vagueness; "interaction" insufficiently identifies the nature of the reciprocal influence of tenor and vehicle.

Some of the vagueness of the term "interaction" is removed by Black (1979). In his essay "More About Metaphor," Black has elaborated upon and refined his ideas presented earlier in his now classic "Metaphor" (1962). In addition to some changes in terminology, he has attempted to transform some of this more metaphorical language of the earlier essay into a more literal explanation:

> I shall try here to amplify my original formulation by explicating the grounds of the metaphors of "interaction," "filtering," and "screening," which I used in trying to understand how metaphorical statements work. (p.19)

Because the changes he makes in this newer presentation are more in the way of refinement of the original than of repudiation, I will refer to his points in the more recent essay without, for the most part, treating the two expositions as separate, and I will reproduce here excerpts from his recent summary of this theory with some of his comments. In this way, I hope to present Black's theory as it is now while helping the reader to understand the critical references to his earlier work found in this review.

Black summarizes his theory thus:

1. A metaphorical statement has two distinct subjects, to be identified as the "primary" subject and the 'secondary' one.

   In 'Metaphor', I spoke instead of the 'principle' and 'subsidiary' subjects. The duality of reference is marked by the contrast between the metaphorical statement's focus (the word or words used nonliterally) and the surrounding literal frame.

2. The secondary subject is to be regarded as a system rather than an individual thing.

   Thus, I think of Wallace Stevens's remark that 'Society is a sea' as being not so much about the sea (considered as a thing) as about a system of relationship (the 'implicative complex' discussed below) signaled by the presence of the word 'sea' in the sentence in question...[Black also thinks that while he suggested in an earlier article 'that the primary subject, also be taken as a system,' he no longer thinks there is much value in such a move].

3. The metaphorical utterance works by "projecting upon 'the primary subject a set of 'associated implications'" comprised in the implicative complex, that are predicable of the secondary subject....

4. The maker of a metaphorical statement selects, emphasizes, suppresses, and organizes features of the primary subject by applying to it statements isomorphic with the members of the secondary subject's implicative complex...

5. In the context of a particular metaphorical statement, the two subjects 'interact' in the following ways: (a) the presence of the primary subject incites the hearer to select some of the secondary subject's properties; and (b) invites him to construct a parallel implication-complex that can fit the primary subject and (c) reciprocally induces parallel changes in the secondary subject. (p.28-29)

Black's points (1) and (2) are essentially definitions of terms, but it is really points (3), (4), and (5) which are directed toward "How metaphorical statements work."

The term "projection" carries a large proportion of the burden of explaining how interaction works. On Black's view, that "implication complex" projected on the primary subject includes general beliefs about the secondary subject, so his theory clearly rejects any explanation of metaphor expressed exclusively in terms of the the linguistic meaning of the secondary subject. Furthermore, when he writes, "But I also emphasized, as I certainly wish to do now, that a metaphor producer may introduce a novel and nonplatitudinous

'implication complex,'"(p.29) it is clear that even an encyclopedic notion of meaning will not allow a full explication of all metaphors.

The crucial value of the notion of an "implication complex" is that it allows the projection not only of the "associated commonplaces" that his earlier essay saw, but "associated implications" as well--that is, all those things implied by the speaker or inferred by the hearer through the primary and secondary subjects. This move, it would seem, allows Black's theory to account for many more metaphors than otherwise, particularly those that call upon the reader/hearer to discover entirely fresh connections. As a consequence, it implies something important about the process of comprehension: the working out of a selection of appropriate implications for projection, it seems to me, is identified as the essential creative act of metaphor comprehension.

The reader will recall that Miller (1979) envisions a stage--reconstruction, he calls it--at which an explicit comparison is produced. But, as Miller points out, this reconstruction may not produce the meaning of the metaphor. In an additional stage, the reader/hearer must interpret the reconstruction, a process Miller sees as requiring the reader to imagine a world in which "incongruous" statements might be

true. Black's notion of "projection" seems to be an attempt to explain how this "interpretation" stage might work. Some of the secondary subject's properties are selected and through them the reader "construct[s] a parallel implication-complex that can fit the primary subject; and...reciprocally induces parallel changes in the secondary subject." (p.29) This process works under the truth constraint principle that Miller proposes: "Readers try to be conservative in imaging such different worlds, but the exercise cannot help but broaden their conception of what a world can be."(1979,p.247) I think that as Black has reduced some of the vagueness in the term "interaction", the difference between the comparison and interaction theories has been narrowed.

Monroe C. Beardsley(1962) has proposed a form of interaction theory sometimes called the "Verbal-Opposition Theory" of metaphor. On this theory, words have both "central" and "marginal" meanings, both of which play a role in the meaning of a metaphorical statement:

> (1) the central meaning, or meanings--what is called designation or (in Mill's sense) connotation, and may be recorded in a dictionary as standard; and (2) the marginal meaning, consisting of those properties that the word suggests or connotes (in the literary critic's sense of this term) (Beardsley, 1967).

The "verbal opposition" enters through the conflict between the central or literal meanings of the key terms in the metaphor. However, in metaphor we have more than mere verbal opposition, since the marginal meanings of the modifier "that can sensibly be attributed to the subject-things" (p.286)--that is, the thing named or designated by the nonmetaphorical term in the metaphor--are predicated of it, as is "the nonconflicting part of the central meaning." (p.286) Beardsley(1967), acknowledges some of the criticism of his theory as it was originally proposed. For example, some metaphors draw their tension not internally, from a clash between domains, but externally, through falsehood; that is, some metaphorical uses of language involve language which in itself would ordinarily be considered literal but which occurs in a linguistic or nonlinguistic context in which their literal meaning is not its intended meaning. Furthermore,

> A more fundamental objection (best made by Henle) is that metaphorical meanings cannot be limited to already known connotations of a modifier, because metaphor creates novel senses of words. (p.286)

This last admission is of considerable importance for the psychology of metaphor. If the psychological correlate of the Verbal-Opposition theory turns out to play a role in the processing of metaphor, then it is clear that no simple procedure of raising or lowering the saliency of features of

a word can completely account for the understanding of metaphor, since some metaphors (at least) will have meanings not reducible to those pre-existing in the ranges of the subjects and predicates. So either two (or more) modes of metaphor processing must be postulated, or only one that does not depend on some pre-existing set of features. (Something of this sort is proposed by Verbrugge and McCarrell (1977) and will be discussed below in the review of the pschological literature).

Primarily, attacks upon the interactionist theories take the form of complaints that the terminology is hopelessly vague when not sheerly unintelligible. Reinhart (1976), for example, finds an exegesis of Black's terminology "fraught with difficulty." (p.386) Reinhart adopts Margolith's "rescue" (p.386) of Black's theory:

> "Given a metaphoric (non-literal) expression F_i $[E_i]$, E_i is the focus, if it is possible to substitute E_j for E_i, so that F_i $[E_i]$ is 'similar in meaning' to F_i $[E_j]$." (p.386) The focus is the "eliminable" part of the metaphor. The frame is "F [ ]" into which "E" slips.

For a definition of principle subject, Reinhart reluctantly accepts Black's statement that it is "roughly what F[E] is really about." (p.387) But, as Reinhart points out in a footnote (p.387), this loose definition is

misleading since it suggests that the principal subject is the meaning of the metaphor. What Black really meant, Reinhart argues, is that the principal subject is the frame, that which the focus modifies. On the other hand, Black writes that "the subsidiary subject is: 'roughly what F [E] would be about if read literally'." (p.388) Reinhart objects to this explication of subsidiary subject on the grounds that, if taken literally, the sentence is about nothing. That is because nothing exists (at least in many cases of metaphor) which has the quality attributed or the class membership predicated. In place of Black's definition of subsidiary subject, Reinhart suggests that the subsidiary subject is "the something which the focus can modify literally" (p.388), or more formally:

> The frame, F_j [ ], in which the occurence of E_i results in a literal expression F_j [E], so that F_j [E_i] is not similar in meaning to F_i [E_i]. (p.388)

To understand what all this means, consider Reinhart's illustration:

> in the metaphor riding the waves, the waves is the principle subject [the frame]..., and the subsidiary subject is horses, since the occurrence of the focus riding in the frame, [ ] horses would result in the literal expression riding the horses which...is not similar in meaning to the metaphorical expression...(p.388)

This interpretation is a bit confusing itself, since it seems at least a little arbitrary to claim that "horses" are what must be ridden. Certainly "horse" is not ruled out, but more abstractly it seems correct to say the subsidiary subject is "those things which can be ridden."

It is Reinhart's view that the interpretation of metaphor is a two-fold act comprising focus- and vehicle-interpretation, with the relative importance of the two kinds of interpretation varying from case to case. Focus-interpretation involves transference of features (or a kind of interaction) between the focus (the eliminable part of the expression) "riding" and "floating" or some other term which could literally take its place in the expression. Vehicle interpretation

> assumes that the metaphor involves a double perception of the concept of a wave and of horse. Through this process, a change may occur in the meaning of the word "waves" in the metaphor, and it may acquire certain of the features of "horse." A description of the metaphor of 'animation' rests on the choice of this possibility. (p. 390)
>
> What is still to be accounted for is the "image" aspect of the metaphor, which is captured by vehicle interpretation. Interactive statements concerning a comparison or juxtaposition of the two concepts in a metaphor, which are so frequent in literary criticism, reflect the operation of this procedure. (p.392)

Thus, on this view, vehicle-interpretation amounts to an imaging in which horse/wave is somehow conceived, with the waves, I think, somehow seen as equine. The imaging is

certainly not limited to the visual variety. Nor is the interpretation guided by an exclusively semantic interaction; the system of associated commonplaces connected to the concepts enters into the interaction.

The idea that part of our understanding of the "riding the waves" metaphor comes from imagining the waves as a horse, exemplifies a recurrent theme in the literature. Levin (1977) and Miller (1979), for example, both suggest that metaphor interpretation requires imagining another possible world in which the metaphor would be true. And Verbrugge and McCarrell (1977) suggest that a metaphor like "Skyscrapers are the giraffes of the city" requires the interpreter somehow to view skyscrapers with their necks stretched above surrounding things. These observations are troublesome since they require the reader/hearer to imagine, what is intuitively impossible for many people, the unimaginable. Yet the notion seems to make sense to the writers discussed above. Perhaps the idea of a possible world in which metaphors are true is simply the best presently available way of explaining a good idea that will be made clear in time.

Linguistic Approaches to Metaphor

An important goal of a grammar of the language, as set forth by Chomsky (1957), is to generate all and only the sentences of the language, as well as structural descriptions of those sentences. To prevent, or block, the generation of ungrammatical strings, linguists have developed the notion of "selection restriction". Simply put, a selection restriction will specify the sort of linguistic objects with which another linguistic object can combine, and how. For example, "The shadow moved" would observe the selection restriction that the subject of the verb "moved" must be a perceivable noun. "The shadow laughed", however, would be blocked by the selection restriction that the subject of "laughed" must be "human", or at least "cognitive." Some metaphors, of course, violate selections and would seem, on that basis, to lie outside of the Language. A number of linguists, though, working within the tradition of transformational grammar, have directly or indirectly addressed the existence and nature of metaphor as a language-related phenomenon.

Chomsky (1964) recognizes the usefulness and impact of expression like Dylan Thomas' "a grief ago" and Thorsten Veblen's "perform leisure," but he finds unconvincing the

arguments that explicate them within the grammar, "contriving possible interpretations in constructed contexts, concluding that the examples do not illustrate departure from grammatical regularity"(p.385) Chomsky believes these maneuvers obscure the distinction between a class of utterances which "need no apologetic or imposed interpretation and the class of utterances that do.

Chomsky is looking for a way for "a grammar [to] assign to an arbitrary phone sequence a structural description that indicates its degree of grammaticalness, the degree of its deviation from the grammatical regularities, and the manner of its deviation." (p.386) For example, it would be possible to construct a three-level hierarchy of grammaticality. Level one might consist of <u>all</u> the formatives included in the language: nouns, verbs, etc. The second level might distinguish between classes of formatives; the third level might further distinguish between them; animate nouns, inanimate nouns, etc. In this way, any string of formatives would be assignable to the one or more level(s) to which it conforms. "John loves company", to adopt Chomsky's example, would, like all strings of formatives, be a member of level one, would fall within the class of NVN structures on level two, and would satisfy the more refined description N V (requiring animate suject)N .

As Chomsky points out, the greater the delicacy of subcategorization, the greater the number of degrees of well-formedness that would be identifiable. To illustrate with one of Chomsky's examples,

> 'misery loves company' will not be generated by the grammar, although 'John loves company' will. However, 'misery loves company' has a level two representation in common with a generated utterance, namely, NVN. We therefore call it semi-grammatical on level two. (p. 387)

But this approach seems to qualify the deviance of the string rather than represent fully its structure. Chomsky's approach, in short, does not provide an interpretation of deviant string, a fact of which he was fully aware.

Paul Ziff(1964) also approaches linguistic "deviance" by describing its "distance" from well-formed sentences. In fact, Ziff proposes that to write a grammar of deviance (if that phrase is permissible) one must construct re-write rules which provide the "simplest route" from the deviant string back to well-formedness. So, for example,

(well-formed) (deviant)

NP - V - NP ←——————————— NP - NP - V (p.396)

the above rule would account for "The men the woman kiss," allowing its derivation from "the men kiss the woman." (This, of course, is not an example of the derivation of a metaphor, but the same principle could be applied to "ill-formed metaphors.)

As an aid in the explanation of metaphor, Ziff's treatment of linguistic deviance leaves something to be desired. As Levin points out, "Ziff's proposal for dealing with deviant expressions is a long way from being able to provide them with senses."(1977, p.17) One reason that this is so is that, even granting that we have a satisfactory analysis of the meaning of the nondeviant string to which these new rules relate the deviant string, it is certainly another matter entirely to interpret the deviant string on the basis of this "simplest-route-yoking."

There is the additional problem that no reasonable constraint can be placed on the sorts of deviance which must be "explained" by these rules. The deviance quickly becomes uninterpretable, with the pool of linguistic intuitions

drying up, since it is hard to imagine what sort of intuitions speakers would have about uninterpretable deviant strings.

Katz (1964) recognizes this problem with Ziff's proposal. He maintains that there is deviance, and then again there is deviance. Katz proposes the introduction of transfer rules, associated with rules of the grammar, that allow some violation of well-formedness. These seem to me to be pretty much what Ziff had in mind. But Katz also calls for "traffic rules" which are intended to prevent the application of transfer rules to the point of incomprehensibility. The application of the transfer rules in obedience to the traffic rules yields "semisentences" (the interpretable deviant sentences; or, if you will, well-formed ill-formed strings).

Associated with each semi-sentence is a "comprehension set" or group of sentences that would have been generated if at each point where a transfer rule applied, the normal rule would have been applied. According to Katz, to say that a speaker understands a semi-sentence is just to say he understands the comprehension set. To this claim, Levin (1977) objects that

> referring the meaning of a semi-sentence to the meanings of the sentences in its comprehension set, while it may point to the area from which the meaning is to be elicited, leaves unanswered the whole question of how exactly to assign interpretations to semisentences. (pp.17-18)

Critical questions about Katz' plan deserve attention. How do we construct these traffic rules, and should we? If we rely on intuitions as to which deviant string is interpretable, we are in deep water indeed, possibly conflating competence with performance, since interpretability is likely to have much to do with pragmatic considerations, as well as factors like memory capacity. Imposing traffic rules would amount to saying that two applications of rule Z are permissible, but three applications are not. That is tantamount to having a grammar that allows Y embeddings but not Y+1 embeddings.

Furthermore, there is the serious problem that the set of sentences comprehended by the semi-sentence is likely to be rather large. Take for example the string "The tree wept," which most certainly would be a semi-sentence. The transfer rule would allow the insertion of a nonanimate (non-weeping?) noun into the frame regularly demanding an "animate" or even "human" one. In this way, the semi-sentence is connected to the nondeviant structure where any

right sort of agent is said to be weeping. If this is so, then the comprehension set of this simple personification includes:

The dog wept.
The man wept.
The woman wept.
ad indefinitum

In fact, all those sentences in which anything literally capable of weeping is weeping. Now while understanding "The tree wept" is somehow related to understand all the other "weeping" sentences, it is not identical to such an understanding, I think. Specifically, the comprehension set does nothing in the way of explaining how "trees" are related to all those weeping entities, and that relationship must be at the metaphor's heart.

Michael J. Reddy(1969) objects to approaches to metaphor which treat metaphor as linguistic deviance. In his essay, he seeks to demonstrate why metaphor should not be viewed in terms of selectional restriction violation. Theories which look at metaphor from that perspective, he asserts, are mortally flawed because of "the existence of a class of utterances with the following two characteristics:

(1) they violate no conceiveable sort of selection restrictions, and (2) they are precisely what we recognize as metaphor." (p.242)

Consider Reddy's example:

> He suspected that most of his listeners were sympathetic to the position that selection restrictions were totally inadequate. But he attacked the sputtering tyrant once again, if only to place his little penknife alongside the daggers of his companion. (p.242)

In this example, there is no linguistic deviance, but, contextually, there is metaphor. Consequently, on the basis of examples of this sort Reddy argues that there is no necessary bond between metaphorhood and grammatical deviance.

One main branch of Reddy's argument is that the selectional restrictions/deviance approach is based on "two very naive, epistomological fallacies: the assumption that utterances are <u>about the world</u>, and the assumption that some normal, external world exists from which it is possible to extract selection restrictions." (p.243) (It is not clear, I think, that these assumptions are, in fact, the ones upon which Katz and others act.) Reddy takes what he considers a Russellian view of knowledge, holding that all we can be

certain about is our experience of the world, not the world itself, because of mistakes, hallucinations, etc. From his epistemological stance, he maintains that "the utterance of the word 'table' is the speaker's decision to place some bundle of internal events in that class." (p.243) People, Reddy holds, have an intuitive notion of "this highly conglomerate nature of external reality," (p.245) and will literally (on his view) apply class terms to events in an unlimited range of situations. Therefore, he concludes, the notion of selectional restrictions is naive. According to Reddy, then, the linguistic-deviance approach is founded on a mistaken view of the world which is carried over into a mistaken theory of language.

Perhaps the most important implication of Reddy's argument that linguistic deviance is neither a necessary nor a sufficient condition for an expression's metaphorhood is that metaphor is a pragmatic phenomenon. A linguistically deviant expression might be exploited in a pragmatic explanation of metaphor, but such a pragmatic theory will also have to provide metaphorical interpretations of nondeviant expressions.

Reddy sees metaphor as working, somehow, through the referentiality of its terms. He introduces two key terms which are essential to his argument, and which I therefore reproduce here:

A. Sphere of reference (anything which a term can be used to refer to)

B. Literal sphere of reference (a proper conventional subset of (A)) (p.247)

Reddy's argument that linguistic deviance is neither a necessary nor a sufficient condition for metaphorhood means that metaphor is a pragmatic phenomenon. That is, since it is impossible to classify an expression as metaphorical exclusively on formal grounds, it is necessary to invoke explanations that refer to intentionality and other contextual considerations. The contextual deviance of an expression might be exploited in a pragmatic explanation of metaphor. As Miller and others have pointed out, one possible model of metaphor processing requires the listener to recognize that a nonstandard meaning must be worked out for an expression, and Reddy provides one plausible explanation for that recognition: The special metaphor subroutine is triggered by "the failure to find a referent for a given word [I would add, "or a given expression"] within the 'literal frame of reference.'" (p.247)

Dorothy Mack (1975) has developed a comparison theory of metaphor that is cast in linguistic terms. She offers a two-part argument. The first is a linguistic one in which she argues that we should posit an underlying deep structure for metaphors which is closely identified with the underlying deep structure for similes. In other words, she would treat metaphor, within a generative semantic framework, as an implicit simile. In the second part of her paper, Mack views "metaphoring" as an act with certain "happiness conditions" attached to its doing (to phrase it in her terms).

Similes, Mack notes, state explicitly the qualities being compared. More specifically, there must be an assertion and a presupposition which are "conjoined, in that order, by comparison marker" in deep structure. (pp.221-222) Further, the assertion must refer properly; the presupposition must be accurate and correct. (pp.221-222)

Mack manages to associate similes and metaphors formally by postulating a comparison marker in deep structure, and a set of deletion rules that remove the comparison marker from the surface structure of metaphors. This introduces a substantial complication of the linguistic

machinery, but Mack maintains that the loss of parsimony is justified by the benefits it yields. She claims her scheme "ENDS THE MISCONCEPTION THAT":

> [1.]...SIMILES ARE INTENDED AND INTERPRETED AS LITERAL FACTUAL COMPARISONS.(p.230)
> [2.]...METAPHOR IS A VIOLATION OF THE RULES OF THE GRAMMAR.(p.231)
> [3.]...METAPHOR CAN BE ISOLATED IN A SINGLE PHRASE OR WORD.(p.233)
> [4.]...METAPHORS DO NOT COMPARE, THEY EQUATE--SOMEHOW WITHOUT BEING FALSE.(p.233)
> [5.]...METAPHOR OPERATES IN SOME SPECIAL, ALMOST MYSTICAL FASHION...(p.234)
> [6.]...METAPHOR MERELY 'GIVES X A NAME THAT BELONGS TO Y'
> [7.]...A METAPHOR HAS ONE MEANING AND THUS A LITERAL TERM CAN BE FOUND UNDERLYING THE METAPHOR.(p.235)
> [8.]...THE DISTINCTION BETWEEN SIMILES AND METAPHORS IS CRUCIAL, RATHER THAN ALLOMORPHIC.(p.236)
> [9.]...LIKE AND AS ARE NECESSARY AND SUFFICIENT MARKERS FOR SIMILES. (p.238)
> [10.]..METAPHOR IS A PURELY "SEMANTIC" PHENOMEMON.(p.240)
> [11.]..METAPHOR IS A PURELY LINGUISTIC PHENOMENON.(p.240)

In part, this is a dubious list of virtues as well as a list of dubious virtues. Mack's argument amounts to argument by fiat. Virtues (1) through (7) are a direct result of her decision to give identical deep stuctures to the two figures; putative virtue (8) amounts to the clearing up of a misconception that no serious writer on metaphor has every held, to my knowledge. Virtue (7) may well be the vice for which this theory is culpable. I would maintain

with other writers (even with Miller who seems to agree with Mack that metaphor is implicit simile) that the meaning of "Man is a wolf" is patently different from "Man is like a wolf," on the grounds, among others, that the two expressions have radically different truth conditions. Thus, I think Mack is wrong when she connects metaphor and simile through deep structure, believing as I do that (many) metaphors assert contingently impossible (but imaginable) states of affairs.

Samuel Levin (1977) seems motivated by a belief that metaphor, when based in semantic deviance, ought to be accounted fo by the linguist, even if the task complicates his job:

> Naturally, the incorporation of such rules complicates the grammar proper. But since the production and interpretation of deviant sentences, especially as they are used in ordinary language, is within the scope of a speaker's competence, it would seem reasonable to expect that the grammar should be made to deal with them. (p.31)

These remarks are qualified later, however, when Levin tells us that the relation between a theory of metaphor and a grammar need not be decided now.

Levin takes as a paradigm case the sentence "The stone died," and he borrows from Katz the schema for "stone" and "died":

([NP,s] v [NP,VP,Pred-Phrase,S])

stone; (((Object) (Physical)) (Natural) (Nonliving) (Mineral) (Concreted)).

die; (((Process) ((Result) ((Cease to be) (Living)))X)
[NP,S]
X

[(Human) v (Animal) v (Plant)] . (p.34)

This notation requires a few words of explanation. The objects within the parentheses are semantic markers, the symbols within brackets indicate the syntactic environment into which the predicate can enter, and those within angles indicate the selection restrictions which categorize the set of semantic markers that the object of this verb must satisfy.

In this paradign sentence,

> We see that, although the reading...[of stone]... satisfies the grammatical specifications of the variable in the selection restriction of...[die]...,it is not clear that it is consistent with the later's semantic requirements. We must therefore see in somewhat greater detail the relationship between inherent semantic markers and the markers in selection restrictions. (p.34)

Some sentences are outside of language proper, according to Levin, because they are "analytically impossible". These sentences, for example, "My red after image is colorless", which Levin (after Katz) calls "contradictory sentences", have subject readings that are antonymous (after Katz) with their predicates. Some sentences, "contradictions, are "logically impossible", for example, "John has a hairy bald head." In these sentences, the impossibility lies entirely in the predicate. The class of possible metaphors, however, springs from those deviant sentences, which Levin calls "anomalous", which have a sense which is "[t]he expression of truth conditions that are contingently not satisfied." (p.36) In anomaly, the subject does not lie within the range of that which is predicated of it. Because the satisfaction of the truth conditions of anomalous sentences is neither analytically nor logically impossible but merely contingently so,

> interpretation may be imposed on an anomalous sentence either by modifying the sense so that its truth conditions are made contingently satisfiable or so that the conditions are made satisfied under different contingencies; ie, either the sense of the expression is changed or the structure of the world is. (p.38)

Levin's plan for obtaining semantic interpretations for anomalous sentences is to extend the mechanism of feature transfer which is tightly restricted in Katz' system, where

transfer is allowed only into pro-forms. For example, in Katz' theory the sentence, "The boy is tasting something" is interpreted by transferring the selectional restrictions of "tasting" into the reading of something, so that "something" inherits the features (concrete), (edible), etc.

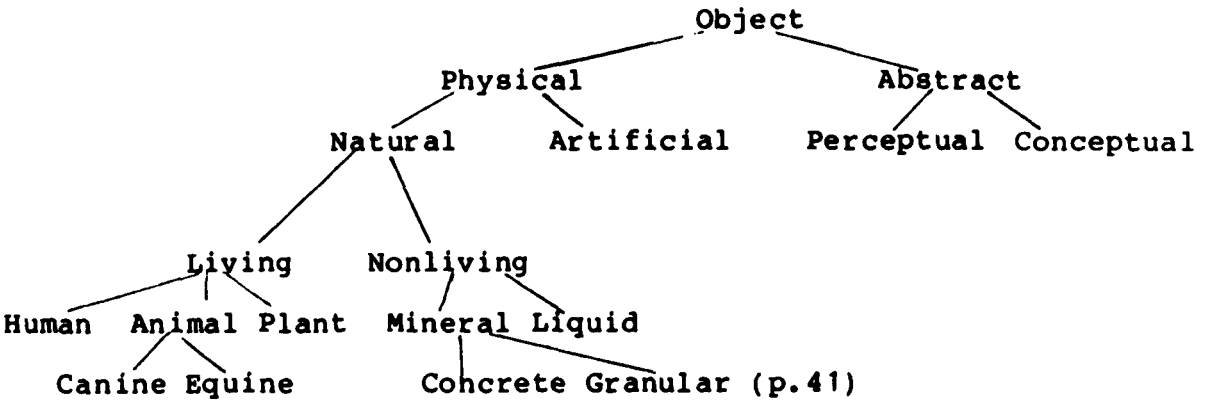
To obtain an interpretation of, say, "The stone died," it is necessary to do more than simply mark it as ill-formed. It is necessary to develop procedures

> for the transfer features to combine with the semantic markers of the host semantic representation and thus make possible the construal of new readings. These combinations will take two basic forms; the transferred feature (either selectional or inherent) will be adjoined to the semantic representation of the item into which it is shifted or it will displace a feature in that representation. (p.46)

The majority of the remainder of Levin's argument is devoted to working out precise modes and rules of construal, and he identifies six ways in which the transfer of features in the interpretation of anomalous strings might work. An important theoretical question for Levin's scheme is just what feature(s) to displace or adjoin. In the case of "stone", he illustrates by shifting "(Human)" from the reading of stone (given above), obtaining, (less syntactic specification).

Stone (((Object) (Physical) (Natural) (Nonliving) [(Human)...(Mineral)] (concreted)). (p.41)

The decision on where to position the semantic marker "(Human)" is made by exploiting the hierarchy of semantic markers, which is an attempt to model the structural relations between markers in a semantic system. To illustrate how this works, I have reproduced a "portion" of the semantic space below:



(p.41)

Figure 1. A hierarchical representation of semantic space.

"(Human)", transferred from "died", is placed next to the marker in the host reading of "stone", which is at the same level of the hierarchy as it is. The underlying principle, I believe, is that the transfer should be sufficient to make the anomalous sentence contingently possible while shifting its meaning in the most semantically conservative way.

I will not give a detailed account of the six modes of construal and their attendant rules. But I will select one mode for illustration (N V, disjunctive). (p.44) Because [(Human) and (Mineral)] are disjunctively incompatible, the procedure here is to turn to the hierarchy and find the most specific feature which the incompatible features share; "(Natural)", in this case. This has the effect of neutralizing the incompatibility, yielding an interpretation something like: "The natural physical object died." (P.44) Later in his book, Levin attempts to formalize the rules of construal which operate on these new readings ("Production Sets", he call them), but I will not repeat them here.

Levin's proposal is the most rigorously elaborated one available for the construal of deviant sentences. But it has its weaknesses--some of which he notes--which ought to be identified.

First, there are convincing arguments that hold that linguistic deviance is neither a necessary nor sufficient condition for metaphorhood (see Reddy, above). If those arguments are correct, Levin's contribution must be identified as restrictedly useful for the explication of that subset of metaphors which are anomalous.

Second, Levin's theory is, if not a linguistic theory, at least a linguistically based or oriented one, with the strengths and weaknesses of that approach. The weaknesses arise because many metaphors derive their force from a host of extralinguistic sources. These sources include the "system of associated commonplaces", as Black (1962) once named them, which gives "Man is a wolf" its meaning, for example. That is, it is not by moving or deleting or collapsing some semantic feature(s) from "wolf" that "Man is a wolf" works, but because of some commonly believed "facts" about wolves, no matter how untrue or nondefinitional. In other words, the crucial features of "wolf" in this case are simply not semantic.

A theory of meaning that is cultural or encyclopedic would include information from the "system of associated commonplace", however, and if that approach could be formalized and merged with Levin's theory, one of the serious limitations of his approach might be overcome. But at what price? Katz would claim that we would be embracing a concept which fails to distinguish analytic from synthetic statements.

Margalit and Cohen (1972) offer a radical proposal for the interpretation of metaphor. According to those writers, it is not the case that extralinguistic knowledge of the world is used in interpreting metaphor, but instead, as they put it,

> the metaphorical meanings of a word or phrase in a natural language are contained, as it were, within its literal meaning or meanings. (p.735)

But how can this be so? What about Katz' distinction between factual and semantic knowledge? Or, if one rejects that distinction on Wilson's grounds (1967), what about Wilson's claim that it is impossible to draw the line between dictionary and encyclopedic knowledge? Their answer is that a feature's successful metaphorical use is precisely evidence that it has passed into the language! But as Mooj (1976) rightly points out, this response is sheer question begging. We begin with the purpose of deciding whether some metaphorically significant feature belongs in the dictionary, and we are told that, if it is understood, it must be. But we already knew it was comprehensible. Why cannot there be extralinguistic knowledge which aids comprehension? In fact, there certainly is. Some evidence independent of comprehensibility must be summoned, but Margalit and Cohen offer none.

Levin proposes that thinkers like Ryle are wrong in holding that metaphors, when taken literally, are absurd and therefore unthinkable. Briefly, Levin reminds us that the deviant expressions he is discussing are not contradictories or contradications but anomalies, and therefore merely contingently without satisfiable truth conditions. He maintains that we suspend ordinary truth conditions in certain opaque contexts like "I dreamed..." and "I thought...", and that there is in the use of metaphor always an implicit opaque context. In poetic contexts, Levin suggests it is the "higher sentence": "I imagine (myself in) and invite you to conceive a world in which..." (p.116) In short, when making metaphorical statements in poetic contexts, at least, the speaker intends the anomalous expression (with its semantic incompatibility), to be taken literally, and the reader/hearer is asked to imagine a possible world in which that can be done.

Derek Bickerton (1969) advocates a linguistic approach to metaphor because "nonlinguistic approaches have done little more than obscure the issues, and it can be argued that they have failed precisely because they are nonlinguistic."(p.36) Bickerton maintains that this failure to

explain metaphor is due to some false assumptions about language, which he enumerates. The three false assumptions are that

> i. Words have fixed and definite meanings.
> ii. The meaning of a sentence is the sum of the meanings of the words that compose it.
> iii. The interpretability of texts is mode-of-discourse free. (pp.36-37)

Bickerton believes assumption "i." is mistaken because word meanings shift over time; assumption "ii." is false because syntax contributes to meaning; and, "iii" is false because the particular "sub-language" in which a violation occurs may aid interpretation.

Mindful of these false assumptions, Bickerton attempts to account for the kinds of linguistic deviance which do contribute to the use of metaphor by invoking the notion of "specific attribute". By specific attibute he means "a particular quality, usually assumed to belong to the denotatum of a sign. Thus iron, in English, is assigned the attribute 'hardness'." Bickerton proposes the following model of semantic space, containing four main categories, which he illustrates:

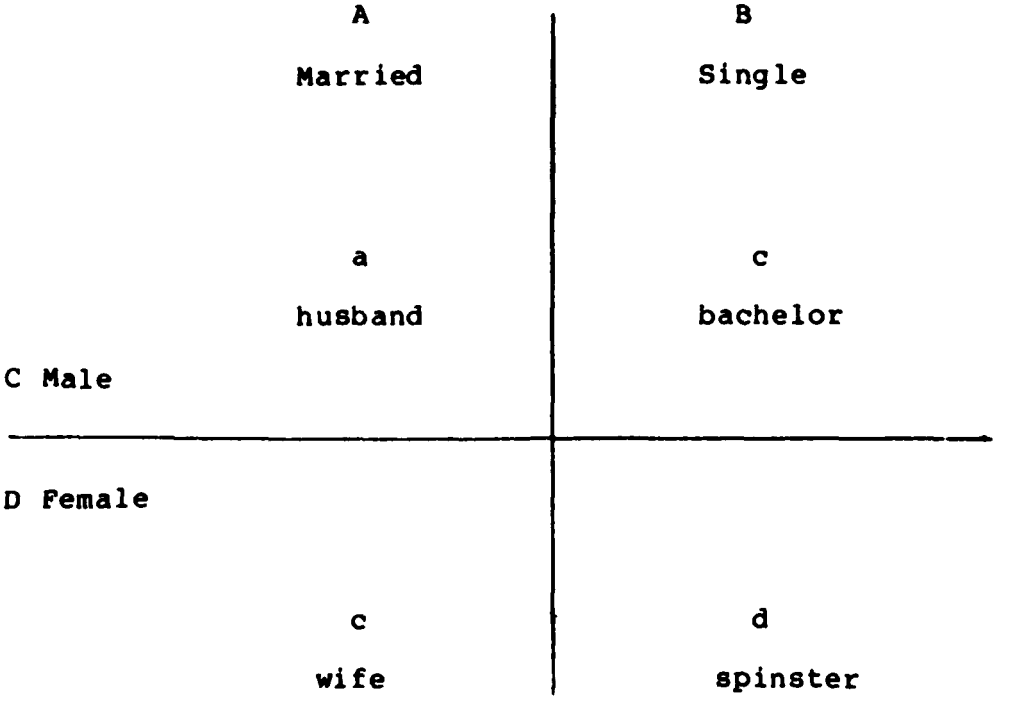


Figure 2. Bickerton's representation of semantic space.

We therefore have two binary oppositions in this system--(A)Married/(B) Single; (C)Male/(D)Female--which form four mutually exclusive categories: (AC)Married males; (AD)Married females; (BC)Single males; (BD)Single females. Within each system is the domain of literalness. On the other hand, "'a'[husband] and 'c' [bachelor] are compatible by C/D and incompatible by A/B, ie, simultaneously compatible and incompatible." (p.45) The simultaneously

compatible and incompatible is the domain of possible metaphors. Boundary crossing is permissible in the case of marked signs only. "Bachelor" can cross the C/D boundary and combine with a D member, "girl", to form the possible metaphor "bachelor girl." The other, unmarked member cannot so move. Being unmarked, these signs cannot cross boundaries, are not "simultaneously compatible and incompatible", and cannot enter into metaphorical combinations.

Robert J. Mathews (1971) proposes a theory of metaphor which he introduces through a criticism of Bickerton's theory. Mathews believes that theorizing about metaphor should yield to some better formulation of the questions those theories are meant to answer.

Any theory of metaphor, Mathews maintains, ought to satisfy two requirements: "The theory would have to be such that it establishes necessary and sufficient conditions for the distinguishing of metaphors from nonmetaphors."(p.413) And, second, "The theory would have to be such that it accounts for how, in terms of linguistic competence, the speaker understands or interprets metaphors." (p.413) Bickerton's theory, in Mathews' view, fails to satisfy either of these requirements.

You will recall that Bickerton invoked the notion of marked signs in his theory of metaphor. But the only way to know which signs in a language are marked is to observe how they are used. Because of this, Bickerton has actually provided a descriptive list rather than an explanation. Moreover, as Mathews objects, "how do we account for the bulk of examples of metaphor which are not (and could not) involve a 'marking' simply because they have not been previously constructed? There will certainly be first occurence of a given metaphor." (p.415) So, Mathews' complaint runs, if signs are only marked when they regularly have been used mataphorically, how did they ever come to be metaphors in the first place?

According to Mathews, his condition (1) also is not met by Bickerton's theory, since it cannot, in principle, provide necessary conditions along with sufficient ones. Bickerton's theory may identify a set of linguistic structures which intersect with the proper set of metaphors, but those sets are nonidentical since there is another set of structures which Bickerton does not describe but which, in proper context, may be metaphorical. (Mathews shows how Bickerton's own example of nonmetaphorical structures may in fact be metaphorical. Reddy also showed how "literal" language can work metaphorically in context).

Mathews sees the difficulty with Bickerton's proposal as growing out of the

> fundamental error in this notion of "marked sign"... that the performance distinction between metaphor and nonmetaphor was equivalent to the competence distinction between potential metaphor and simple deviance, rather than deviant and nondeviant sentences. (p.417)

Ordinarily, in Mathew's view, we assume the meaningfulness or interpretability of expressions when someone utters them. Therefore, it is unnecessary to distinguish the two categories of deviant and the metaphorical--as Bickerton does"[T]he important competence distinction to be made, rather, is between deviant and nondeviant sentences."(p.417)

In regard to his second condition of adequacy, Mathews believes that Bickerton has little to say. It appears to him that Bickerton's explanation of the meaning of metaphor is a fairly straightforward substitution theory with all its attendant weakness.

Mathew's own proposal involves applying Chomsky's view that metaphors, as deviant sentences, "are apparently interpreted by direct analogy to well-formed sentences that observe the selectional rules in question." (p.419) Mathews

attempts "to demonstrate how, in terms of lexical features and the sentence's phrase structure, these deviant sentence" are interpreted.(p.419)

Consider Mathew's example--one which is probably excruciatingly familiar by now--"Man is a wolf", which he see as structurally associated with

a. The man is a gentleman.
b. The man is a fool.
c. The man is a professor.(p.420)

No selectional restrictions are violated in "a." through "c.", but in "Man is a wolf" such a violation does occur, as an examination of Mathews' diagram reveals:

(the) man	is	(a)	wolf
+ definite			+ count
+ count			+ animate
+ animate			+ mammal
+ mammal			+ canine (-human)
+ human			+ quadrupedal
+ adult			+ tail
+ male			+ hairy
+ adult			+ nocturnal
+ male			+ vicious
+ linguistic			+ predatory
+ bipedal			+ avoid man (p.421)

In structures of this form, members of one class are asserted to be members of another class. The violation here, according to Mathews, is that the noun "man" (+human, +bipedal, etc.) is asserted to be a member of another class, "wolf" (-human, +quadrupedal). That violation constitutes the linguistic deviance of the string. Moreover:

> "clustered around the (+human) (-human) selectional restriction violation there are associated violations, or more correctly, violations which specify in more detail just what is meant by the (+human)/(-human) violation: for example, (+bipedal)/(+quadrupedal), (+linguistic)/(-linguistic), (-tail/+tail,etc. The wolf features which are most important in "organizing" our view of the wolf-system, are nonetheless less directly implicated in the selectional restriction violation.(p.422)

There are some very promising moves contained in Mathews' position. First, Mathews' entire enterprise depends on a very unorthodox lexicon. Briefly, he abandons the view of lexical readings which sees meaning as analytic for a view which includes information about the "related system of commonplaces", or encyclopedic knowledge. Mathews' argument in this regard is that,

> The notion of lexical features, as I understand it, does not assume either the feature's psychological or physical reality. If, for example, a certain speaker regards wolves as immortal creatures, then, within that speaker's lexicon, the lexical entry wolf will have the lexical feature (+immortal).(p.419)

drying up, since it is hard to imagine what sort of intuitions speakers would have about uninterpretable deviant strings.

Katz (1964) recognizes this problem with Ziff's proposal. He maintains that there is deviance, and then again there is deviance. Katz proposes the introduction of transfer rules, associated with rules of the grammar, that allow some violation of well-formedness. These seem to me to be pretty much what Ziff had in mind. But Katz also calls for "traffic rules" which are intended to prevent the application of transfer rules to the point of incomprehensibility. The application of the transfer rules in obedience to the traffic rules yields "semisentences" (the interpretable deviant sentences; or, if you will, well-formed ill-formed strings).

Associated with each semi-sentence is a "comprehension set" or group of sentences that would have been generated if at each point where a transfer rule applied, the normal rule would have been applied. According to Katz, to say that a speaker understands a semi-sentence is just to say he understands the comprehension set. To this claim, Levin (1977) objects that

> referring the meaning of a semi-sentence to the meanings of the sentences in its comprehension set, while it may point to the area from which the meaning is to be elicited, leaves unanswered the whole question of how exactly to assign interpretations to semisentences. (pp.17-18)

Critical questions about Katz' plan deserve attention. How do we construct these traffic rules, and should we? If we rely on intuitions as to which deviant string is interpretable, we are in deep water indeed, possibly conflating competence with performance, since interpretability is likely to have much to do with pragmatic considerations, as well as factors like memory capacity. Imposing traffic rules would amount to saying that two applications of rule Z are permissible, but three applications are not. That is tantamount to having a grammar that allows Y embeddings but not Y+1 embeddings.

Furthermore, there is the serious problem that the set of sentences comprehended by the semi-sentence is likely to be rather large. Take for example the string "The tree wept," which most certainly would be a semi-sentence. The transfer rule would allow the insertion of a nonanimate (non-weeping?) noun into the frame regularly demanding an "animate" or even "human" one. In this way, the semi-sentence is connected to the nondeviant structure where any

right sort of agent is said to be weeping. If this is so, then the comprehension set of this simple personification includes:

The dog wept.
The man wept.
The woman wept.
ad indefinitum

In fact, all those sentences in which anything literally capable of weeping is weeping. Now while understanding "The tree wept" is somehow related to understand all the other "weeping" sentences, it is not identical to such an understanding, I think. Specifically, the comprehension set does nothing in the way of explaining how "trees" are related to all those weeping entities, and that relationship must be at the metaphor's heart.

Michael J. Reddy(1969) objects to approaches to metaphor which treat metaphor as linguistic deviance. In his essay, he seeks to demonstrate why metaphor should not be viewed in terms of selectional restriction violation. Theories which look at metaphor from that perspective, he asserts, are mortally flawed because of "the existence of a class of utterances with the following two characteristics:

(1) they violate no conceiveable sort of selection restrictions, and (2) they are precisely what we recognize as metaphor." (p.242)

Consider Reddy's example:

> He suspected that most of his listeners were sympathetic to the position that selection restrictions were totally inadequate. But he attacked the sputtering tyrant once again, if only to place his little penknife alongside the daggers of his companion. (p.242)

In this example, there is no linguistic deviance, but, contextually, there is metaphor. Consequently, on the basis of examples of this sort Reddy argues that there is no necessary bond between metaphorhood and grammatical deviance.

One main branch of Reddy's argument is that the selectional restrictions/deviance approach is based on "two very naive, epistomological fallacies: the assumption that utterances are <u>about the world</u>, and the assumption that some normal, external world exists from which it is possible to extract selection restrictions." (p.243) (It is not clear, I think, that these assumptions are, in fact, the ones upon which Katz and others act.) Reddy takes what he considers a Russellian view of knowledge, holding that all we can be

certain about is our experience of the world, not the world itself, because of mistakes, hallucinations, etc. From his epistemological stance, he maintains that "the utterance of the word 'table' is the speaker's decision to place some bundle of internal events in that class." (p.243) People, Reddy holds, have an intuitive notion of "this highly conglomerate nature of external reality," (p.245) and will literally (on his view) apply class terms to events in an unlimited range of situations. Therefore, he concludes, the notion of selectional restrictions is naive. According to Reddy, then, the linguistic-deviance approach is founded on a mistaken view of the world which is carried over into a mistaken theory of language.

Perhaps the most important implication of Reddy's argument that linguistic deviance is neither a necessary nor a sufficient condition for an expression's metaphorhood is that metaphor is a pragmatic phenomenon. A linguistically deviant expression might be exploited in a pragmatic explanation of metaphor, but such a pragmatic theory will also have to provide metaphorical interpretations of nondeviant expressions.

Reddy sees metaphor as working, somehow, through the referentiality of its terms. He introduces two key terms which are essential to his argument, and which I therefore reproduce here:

A. Sphere of reference (anything which a term can be used to refer to)

B. Literal sphere of reference (a proper conventional subset of (A)) (p.247)

Reddy's argument that linguistic deviance is neither a necessary nor a sufficient condition for metaphorhood means that metaphor is a pragmatic phenomenon. That is, since it is impossible to classify an expression as metaphorical exclusively on formal grounds, it is necessary to invoke explanations that refer to intentionality and other contextual considerations. The contextual deviance of an expression might be exploited in a pragmatic explanation of metaphor. As Miller and others have pointed out, one possible model of metaphor processing requires the listener to recognize that a nonstandard meaning must be worked out for an expression, and Reddy provides one plausible explanation for that recognition: The special metaphor subroutine is triggered by "the failure to find a referent for a given word [I would add, "or a given expression"] within the 'literal frame of reference.'" (p.247)

Dorothy Mack (1975) has developed a comparison theory of metaphor that is cast in linguistic terms. She offers a two-part argument. The first is a linguistic one in which she argues that we should posit an underlying deep structure for metaphors which is closely identified with the underlying deep structure for similes. In other words, she would treat metaphor, within a generative semantic framework, as an implicit simile. In the second part of her paper, Mack views "metaphoring" as an act with certain "happiness conditions" attached to its doing (to phrase it in her terms).

Similes, Mack notes, state explicitly the qualities being compared. More specifically, there must be an assertion and a presupposition which are "conjoined, in that order, by comparison marker" in deep structure. (pp.221-222) Further, the assertion must refer properly; the presupposition must be accurate and correct. (pp.221-222)

Mack manages to associate similes and metaphors formally by postulating a comparison marker in deep structure, and a set of deletion rules that remove the comparison marker from the surface structure of metaphors. This introduces a substantial complication of the linguistic

machinery, but Mack maintains that the loss of parsimony is justified by the benefits it yields. She claims her scheme "ENDS THE MISCONCEPTION THAT":

> [1.]...SIMILES ARE INTENDED AND INTERPRETED AS LITERAL FACTUAL COMPARISONS.(p.230)
> [2.]...METAPHOR IS A VIOLATION OF THE RULES OF THE GRAMMAR.(p.231)
> [3.]...METAPHOR CAN BE ISOLATED IN A SINGLE PHRASE OR WORD.(p.233)
> [4.]...METAPHORS DO NOT COMPARE, THEY EQUATE--SOMEHOW WITHOUT BEING FALSE.(p.233)
> [5.]...METAPHOR OPERATES IN SOME SPECIAL, ALMOST MYSTICAL FASHION...(p.234)
> [6.]...METAPHOR MERELY 'GIVES X A NAME THAT BELONGS TO Y'
> [7.]...A METAPHOR HAS ONE MEANING AND THUS A LITERAL TERM CAN BE FOUND UNDERLYING THE METAPHOR.(p.235)
> [8.]...THE DISTINCTION BETWEEN SIMILES AND METAPHORS IS CRUCIAL, RATHER THAN ALLOMORPHIC.(p.236)
> [9.]...LIKE AND AS ARE NECESSARY AND SUFFICIENT MARKERS FOR SIMILES. (p.238)
> [10.]..METAPHOR IS A PURELY "SEMANTIC" PHENOMEMON.(p.240)
> [11.]..METAPHOR IS A PURELY LINGUISTIC PHENOMENON.(p.240)

In part, this is a dubious list of virtues as well as a list of dubious virtues. Mack's argument amounts to argument by fiat. Virtues (1) through (7) are a direct result of her decision to give identical deep stuctures to the two figures; putative virtue (8) amounts to the clearing up of a misconception that no serious writer on metaphor has every held, to my knowledge. Virtue (7) may well be the vice for which this theory is culpable. I would maintain

with other writers (even with Miller who seems to agree with Mack that metaphor is implicit simile) that the meaning of "Man is a wolf" is patently different from "Man is like a wolf," on the grounds, among others, that the two expressions have radically different truth conditions. Thus, I think Mack is wrong when she connects metaphor and simile through deep structure, believing as I do that (many) metaphors assert contingently impossible (but imaginable) states of affairs.

Samuel Levin (1977) seems motivated by a belief that metaphor, when based in semantic deviance, ought to be accounted fo by the linguist, even if the task complicates his job:

> Naturally, the incorporation of such rules complicates the grammar proper. But since the production and interpretation of deviant sentences, especially as they are used in ordinary language, is within the scope of a speaker's competence, it would seem reasonable to expect that the grammar should be made to deal with them. (p.31)

These remarks are qualified later, however, when Levin tells us that the relation between a theory of metaphor and a grammar need not be decided now.

Levin takes as a paradigm case the sentence "The stone died," and he borrows from Katz the schema for "stone" and "died":

([NP,s] v [NP,VP,Pred-Phrase,S])

stone; (((Object) (Physical)) (Natural) (Nonliving) (Mineral) (Concreted)).

die; (((Process) ((Result) ((Cease to be) (Living)))X)
[NP,S]
X

[(Human) v (Animal) v (Plant)] . (p.34)

This notation requires a few words of explanation. The objects within the parentheses are semantic markers, the symbols within brackets indicate the syntactic environment into which the predicate can enter, and those within angles indicate the selection restrictions which categorize the set of semantic markers that the object of this verb must satisfy.

In this paradign sentence,

> We see that, although the reading...[of stone]... satisfies the grammatical specifications of the variable in the selection restriction of...[die]...,it is not clear that it is consistent with the later's semantic requirements. We must therefore see in somewhat greater detail the relationship between inherent semantic markers and the markers in selection restrictions. (p.34)

Some sentences are outside of language proper, according to Levin, because they are "analytically impossible". These sentences, for example, "My red after image is colorless", which Levin (after Katz) calls "contradictory sentences", have subject readings that are antonymous (after Katz) with their predicates. Some sentences, "contradictions, are "logically impossible", for example, "John has a hairy bald head." In these sentences, the impossibility lies entirely in the predicate. The class of possible metaphors, however, springs from those deviant sentences, which Levin calls "anomalous", which have a sense which is "[t]he expression of truth conditions that are contingently not satisfied." (p.36) In anomaly, the subject does not lie within the range of that which is predicated of it. Because the satisfaction of the truth conditions of anomalous sentences is neither analytically nor logically impossible but merely contingently so,

> interpretation may be imposed on an anomalous sentence either by modifying the sense so that its truth conditions are made contingently satisfiable or so that the conditions are made satisfied under different contingencies; ie, either the sense of the expression is changed or the structure of the world is. (p.38)

Levin's plan for obtaining semantic interpretations for anomalous sentences is to extend the mechanism of feature transfer which is tightly restricted in Katz' system, where

transfer is allowed only into pro-forms. For example, in Katz' theory the sentence, "The boy is tasting something" is interpreted by transferring the selectional restrictions of "tasting" into the reading of something, so that "something" inherits the features (concrete), (edible), etc.

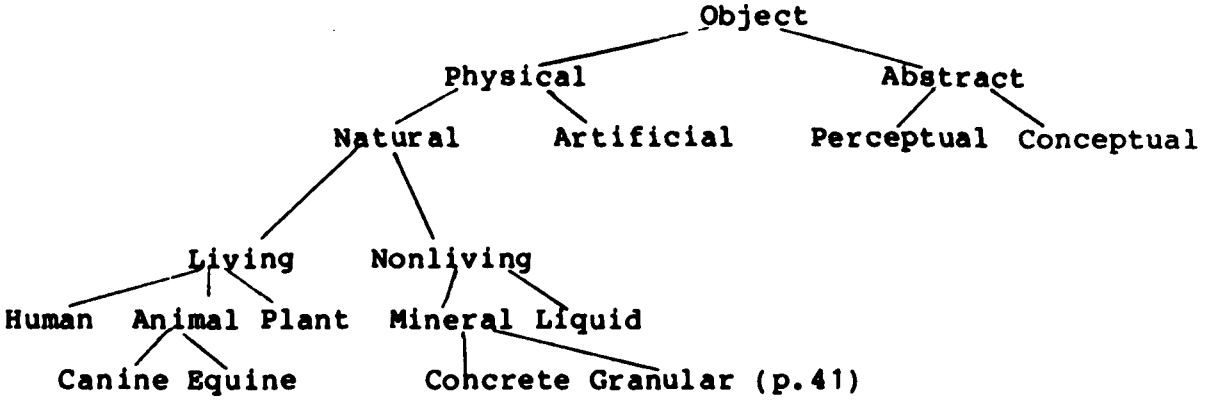
To obtain an interpretation of, say, "The stone died," it is necessary to do more than simply mark it as ill-formed. It is necessary to develop procedures

> for the transfer features to combine with the semantic markers of the host semantic representation and thus make possible the construal of new readings. These combinations will take two basic forms; the transferred feature (either selectional or inherent) will be adjoined to the semantic representation of the item into which it is shifted or it will displace a feature in that representation. (p.46)

The majority of the remainder of Levin's argument is devoted to working out precise modes and rules of construal, and he identifies six ways in which the transfer of features in the interpretation of anomalous strings might work. An important theoretical question for Levin's scheme is just what feature(s) to displace or adjoin. In the case of "stone", he illustrates by shifting "(Human)" from the reading of stone (given above), obtaining, (less syntactic specification).

Stone (((Object) (Physical) (Natural) (Nonliving)
[(Human)...(Mineral)] (concreted)). (p.41)

The decision on where to position the semantic marker "(Human)" is made by exploiting the hierarchy of semantic markers, which is an attempt to model the structural relations between markers in a semantic system. To illustrate how this works, I have reproduced a "portion" of the semantic space below:



(p.41)

Figure 1. A hierarchical representation of semantic space.

"(Human)", transferred from "died", is placed next to the marker in the host reading of "stone", which is at the same level of the hierarchy as it is. The underlying principle, I believe, is that the transfer should be sufficient to make the anomalous sentence contingently possible while shifting its meaning in the most semantically conservative way.

I will not give a detailed account of the six modes of construal and their attendant rules. But I will select one mode for illustration (N V, disjunctive). (p.44) Because [(Human) and (Mineral)] are disjunctively incompatible, the procedure here is to turn to the hierarchy and find the most specific feature which the incompatible features share; "(Natural)", in this case. This has the effect of neutralizing the incompatibility, yielding an interpretation something like: "The natural physical object died." (P.44) Later in his book, Levin attempts to formalize the rules of construal which operate on these new readings ("Production Sets", he call them), but I will not repeat them here.

Levin's proposal is the most rigorously elaborated one available for the construal of deviant sentences. But it has its weaknesses--some of which he notes--which ought to be identified.

First, there are convincing arguments that hold that linguistic deviance is neither a necessary nor sufficient condition for metaphorhood (see Reddy, above). If those arguments are correct, Levin's contribution must be identified as restrictedly useful for the explication of that subset of metaphors which are anomalous.

Second, Levin's theory is, if not a linguistic theory, at least a linguistically based or oriented one, with the strengths and weaknesses of that approach. The weaknesses arise because many metaphors derive their force from a host of extralinguistic sources. These sources include the "system of associated commonplaces", as Black (1962) once named them, which gives "Man is a wolf" its meaning, for example. That is, it is not by moving or deleting or collapsing some semantic feature(s) from "wolf" that "Man is a wolf" works, but because of some commonly believed "facts" about wolves, no matter how untrue or nondefinitional. In other words, the crucial features of "wolf" in this case are simply not semantic.

A theory of meaning that is cultural or encyclopedic would include information from the "system of associated commonplace", however, and if that approach could be formalized and merged with Levin's theory, one of the serious limitations of his approach might be overcome. But at what price? Katz would claim that we would be embracing a concept which fails to distinguish analytic from synthetic statements.

Margalit and Cohen (1972) offer a radical proposal for the interpretation of metaphor. According to those writers, it is not the case that extralinguistic knowledge of the world is used in interpreting metaphor, but instead, as they put it,

> the metaphorical meanings of a word or phrase in a natural language are contained, as it were, within its literal meaning or meanings. (p.735)

But how can this be so? What about Katz' distinction between factual and semantic knowledge? Or, if one rejects that distinction on Wilson's grounds (1967), what about Wilson's claim that it is impossible to draw the line between dictionary and encyclopedic knowledge? Their answer is that a feature's successful metaphorical use is precisely evidence that it has passed into the language! But as Mooj (1976) rightly points out, this response is sheer question begging. We begin with the purpose of deciding whether some metaphorically significant feature belongs in the dictionary, and we are told that, if it is understood, it must be. But we already knew it was comprehensible. Why cannot there be extralinguistic knowledge which aids comprehension? In fact, there certainly is. Some evidence independent of comprehensibility must be summoned, but Margalit and Cohen offer none.

Levin proposes that thinkers like Ryle are wrong in holding that metaphors, when taken literally, are absurd and therefore unthinkable. Briefly, Levin reminds us that the deviant expressions he is discussing are not contradictories or contradications but anomalies, and therefore merely contingently without satisfiable truth conditions. He maintains that we suspend ordinary truth conditions in certain opaque contexts like "I dreamed..." and "I thought...", and that there is in the use of metaphor always an implicit opaque context. In poetic contexts, Levin suggests it is the "higher sentence": "I imagine (myself in) and invite you to conceive a world in which..." (p.116) In short, when making metaphorical statements in poetic contexts, at least, the speaker intends the anomalous expression (with its semantic incompatibility), to be taken literally, and the reader/hearer is asked to imagine a possible world in which that can be done.

Derek Bickerton (1969) advocates a linguistic approach to metaphor because "nonlinguistic approaches have done little more than obscure the issues, and it can be argued that they have failed precisely because they are nonlinguistic."(p.36) Bickerton maintains that this failure to

explain metaphor is due to some false assumptions about language, which he enumerates. The three false assumptions are that

> i. Words have fixed and definite meanings.
> ii. The meaning of a sentence is the sum of the meanings of the words that compose it.
> iii. The interpretability of texts is mode-of-discourse free. (pp.36-37)

Bickerton believes assumption "i." is mistaken because word meanings shift over time; assumption "ii." is false because syntax contributes to meaning; and, "iii" is false because the particular "sub-language" in which a violation occurs may aid interpretation.

Mindful of these false assumptions, Bickerton attempts to account for the kinds of linguistic deviance which do contribute to the use of metaphor by invoking the notion of "specific attribute". By specific attibute he means "a particular quality, usually assumed to belong to the denotatum of a sign. Thus iron, in English, is assigned the attribute 'hardness'." Bickerton proposes the following model of semantic space, containing four main categories, which he illustrates:

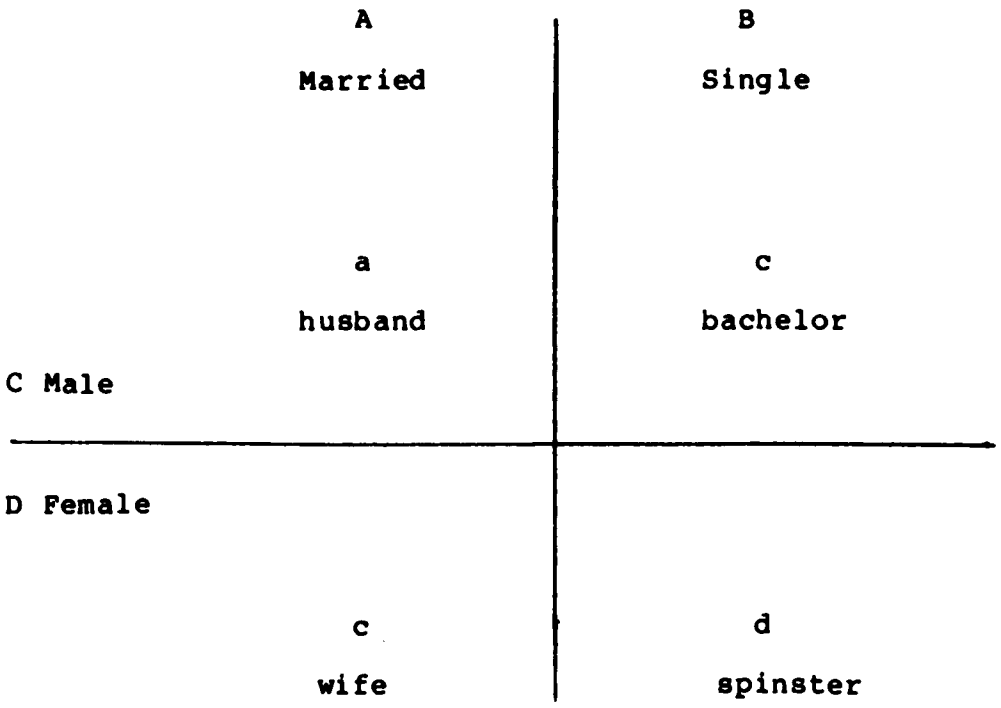


Figure 2. Bickerton's representation of semantic space.

We therefore have two binary oppositions in this system--(A)Married/(B) Single; (C)Male/(D)Female--which form four mutually exclusive categories: (AC)Married males; (AD)Married females; (BC)Single males; (BD)Single females. Within each system is the domain of literalness. On the other hand, "'a'[husband] and 'c' [bachelor] are compatible by C/D and incompatible by A/B, ie, simultaneously compatible and incompatible." (p.45) The simultaneously

compatible and incompatible is the domain of possible metaphors. Boundary crossing is permissible in the case of marked signs only. "Bachelor" can cross the C/D boundary and combine with a D member, "girl", to form the possible metaphor "bachelor girl." The other, unmarked member cannot so move. Being unmarked, these signs cannot cross boundaries, are not "simultaneously compatible and incompatible", and cannot enter into metaphorical combinations.

Robert J. Mathews (1971) proposes a theory of metaphor which he introduces through a criticism of Bickerton's theory. Mathews believes that theorizing about metaphor should yield to some better formulation of the questions those theories are meant to answer.

Any theory of metaphor, Mathews maintains, ought to satisfy two requirements: "The theory would have to be such that it establishes necessary and sufficient conditions for the distinguishing of metaphors from nonmetaphors."(p.413) And, second, "The theory would have to be such that it accounts for how, in terms of linguistic competence, the speaker understands or interprets metaphors." (p.413) Bickerton's theory, in Mathews' view, fails to satisfy either of these requirements.

You will recall that Bickerton invoked the notion of marked signs in his theory of metaphor. But the only way to know which signs in a language are marked is to observe how they are used. Because of this, Bickerton has actually provided a descriptive list rather than an explanation. Moreover, as Mathews objects, "how do we account for the bulk of examples of metaphor which are not (and could not) involve a 'marking' simply because they have not been previously constructed? There will certainly be first occurence of a given metaphor." (p.415) So, Mathews' complaint runs, if signs are only marked when they regularly have been used mataphorically, how did they ever come to be metaphors in the first place?

According to Mathews, his condition (1) also is not met by Bickerton's theory, since it cannot, in principle, provide necessary conditions along with sufficient ones. Bickerton's theory may identify a set of linguistic structures which intersect with the proper set of metaphors, but those sets are nonidentical since there is another set of structures which Bickerton does not describe but which, in proper context, may be metaphorical. (Mathews shows how Bickerton's own example of nonmetaphorical structures may in fact be metaphorical. Reddy also showed how "literal" language can work metaphorically in context).

Mathews sees the difficulty with Bickerton's proposal as growing out of the

> fundamental error in this notion of "marked sign"... that the performance distinction between metaphor and nonmetaphor was equivalent to the competence distinction between potential metaphor and simple deviance, rather than deviant and nondeviant sentences. (p.417)

Ordinarily, in Mathew's view, we assume the meaningfulness or interpretability of expressions when someone utters them. Therefore, it is unnecessary to distinguish the two categories of deviant and the metaphorical--as Bickerton does"[T]he important competence distinction to be made, rather, is between deviant and nondeviant sentences."(p.417)

In regard to his second condition of adequacy, Mathews believes that Bickerton has little to say. It appears to him that Bickerton's explanation of the meaning of metaphor is a fairly straightforward substitution theory with all its attendant weakness.

Mathew's own proposal involves applying Chomsky's view that metaphors, as deviant sentences, "are apparently interpreted by direct analogy to well-formed sentences that observe the selectional rules in question." (p.419) Mathews

In structures of this form, members of one class are asserted to be members of another class. The violation here, according to Mathews, is that the noun "man" (+human, +bipedal, etc.) is asserted to be a member of another class, "wolf" (-human, +quadrupedal). That violation constitutes the linguistic deviance of the string. Moreover:

> "clustered around the (+human) (-human) selectional restriction violation there are associated violations, or more correctly, violations which specify in more detail just what is meant by the (+human)/(-human) violation: for example, (+bipedal)/(+quadrupedal), (+linguistic)/(-linguistic), (-tail/+tail,etc. The wolf features which are most important in "organizing" our view of the wolf-system, are nonetheless less directly implicated in the selectional restriction violation.(p.422)

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By including encyclopedic information in the lexicon, we have a theory that can account for many more metaphors than one which maintains a purely semantic account of meaning.

Mathews goes on to remark that lexical features are not to be considered as primitive. On this view,

> Lexical features characterize the common uses of the lexical entry, and thus lexical features might best be viewed as ELUCIDATIONS of literal usage rather than an analysis or definition of the lexical entry. (p.419)

What Mathews is proposing looks very much like a use theory of meaning. A full discussion of use theories of meaning would be out of place here, but it should be noted that such theories have profound weaknesses, and that a use theory makes a strange bedfellow with the competence view of language that Mathews ostensibly embraces.

Formal requirements ought not be permitted to block imaginative thinking, I believe, but clear definitions are certainly desirable. How are we to know which features are directly, and which less directly, involved in the selectional restriction violation? The ability to decide which is which is central to the feasibility of Mathew's scheme. Without some formal apparatus for deciding, the likelihood is that our <u>intuitions</u> are guiding our decisions

in a very suspect way, since it is our intuitions we are seeking to explicate. (Levin does attempt to provide a formal procedure tied to a hierarchically structured semantic domain, you will recall, though he necessarily eschews the inclusion of encyclopedic information).

J.T. Price (1974) has a further related (and possibly more damaging) criticism of Mathews' proposal. Mathews' theory either does not respect the competence/performance dichotomy and/or does not provide the necessary and sufficient conditions he himself lays out:

> Mathews rejects [Bickerton's] explanation for the reason...that it [Bickerton's explanation] depends on performance. But consider the explanation which Mathews would put in its place: 'The distinction between metaphor and simple deviance involves the intention on the part of the speaker or hearer to be metaphorical.' Clearly this notion of intention (which is not further explained) is a phenomenon of performance, and has not been given any formal specification on the level of competence. (p.254)

Without recourse to speaker intention, Price argues, Mathews is left with a competence theory which cannot distinguish between metaphorical and merely deviant strings. On those grounds, Mathews has failed to provide the necessary and sufficient conditions for a string's "metaphoricity" which Mathews himself had demanded.

When it comes time to present a positive theory of metaphor, Price is less convincing. He believes that metaphor ought not not be accounted for within a theory of linguistic competence because it is not creativity in Chomsky's sense of a productivity that leaves language unchanged; instead, as Price sees metaphor, it is the kind of "[creativity] that actually changes the set of grammatical rules..." (p.254)

Price's position is the orthodox one, and it may well outlive my skepticism. For my part, however, I reject the view that metaphor is a rule-changing process. Metaphor production appears to follow conventional forms. Its creation displays a pattern that appears to conform to rules, and should be viewed as rule-governed behavior. Metaphor, from this perspective, appears to be a phenomenon that leaves the underlying structure of language unchanged. Metaphor, in fact, seems to be only one of many tropes that are generated by rules we tacitly know as we know other linguistic rules, and that we may optionally employ for stylistic, rhetorical, and communicative purposes. It is not that performance/pragmatics should bear none of the burden of accounting for metaphor, but, rather that we should carefully examine how much of the burden a linguistic model can bear before we begin jettisoning the load.

Pragmatic Theories of Metaphor

At least one conclusion seems justified after a review of linguistic approaches to metaphor. It would seem that linguistic theories might be able partially to explicate metaphor, but some of the work will have to be taken up by performance theory. Dorothy Mack (1975) argues that no linguistic theory can identify metaphor, since "metaphorizing"--as she call it--is a speech act which occurs in some situation; or, in Austin's (1962) words: "What we have to study is not the sentence but the issuing of an utterance in a speech situation." (p.254) A linguistic theory can only "supply POTENTIAL anomalous, and POTENTIAL metaphorical interpretations." (p.245)

Assuming a potential metphorical structure, certain happiness conditions must still be met for the successful use of metaphor:

> (A.1) There must exist AN ACCEPTED CONVENTIONAL PROCEDURE having a certain conventional effect, that procedure to include the uttering of certain words by certain persons in certain circumstances.
>
> (A.2) The particular PERSONS AND CIRCUMSTANCES IN A GIVEN CASE MUST BE APPROPRIATE for the invocation of the particular procedure invoked.
>
> (B.1) The procedure must be executed by all participants CORRECTLY.
>
> (B.2) The procedure must be executed by all participants COMPLETELY.

> (T.1) The persons must so CONDUCT THEMSELVES SUBSEQUENTLY. (p.245)

Of course, as with all speech acts, the happiness conditions might not be met, and consequently a whole array of "hitches" and "flaws" might develop.

Robert M. Harnish (1976) suggests that H.P. Grice (1975) would offer the following explanation of metaphor:

> ☐ Metaphor: A: "You're the cream in my coffee." (P). Gloss: (1) P is categorically false. (2) Therefore the contradictory of what A has made as if to say will strictly speaking be a truism. (3) Therefore, it cannot be that, A is trying to get across. (4)The most likely supposition is that A is attributing to his audience some feature in respect to which the audience resembles (more or less fancifully) the mentioned substance." (pp.346-347)

Harnish finds fault with this explication of metaphor, and I am sympathetic with his faultfinding. Grice's theory seems to me on very firm ground in identifying utterances which should not be taken naively as tokens of their obvious type, but on somewhat shakier ground when telling us what is implicated. That is, the theory of conversational implicature is much better at ruling-out than at ruling-in.

In this regard, Harnish offers the following reaction to Grice's explication of metaphor:

> Again, why is (4) supposed to be true? Why is it the "most likely supposition"? I take it that Grice would like to explain metaphor along these lines rather than appeal to some sort of loose "metaphor conventions" to sanction the move to (4)--that is, the move to (4), and others like it, is to explain metaphorical uses of language. But then we need some principles to guide our search for the correct supposition. I do not see why the proposition Grice gives is the most likely. (italics mine; p.347)

Harnish's incredulity is, I think, well-placed. I do not know whether Harnish is correct in saying that Grice wants to avoid appeal to some sort of "loose metaphor-convention," though, or even what Harnish thinks those conventions would look like. Most important, Grice's proposal might help us recognize those utterances that are not literally intended, but we would still need an explanation of how we arrive at the intended meaning. Furthermore, even this limited utility of Grice's proposal would seem to be less well suited for the treatment of linguistically deviant metaphors, which have no literal meaning.

Searle (1979) also proposes an explanation of metaphor within the framework of a pragmatic theory of language. For this reason, Searle views explaining metaphor as "a special case of... the problem of how it is possible to say one thing and mean something else..." (p.92). As Searle puts the issue, "the question we are trying to answer is, How is it possible for the speaker to say metaphorically "S is P" and mean "S is R," when P plainly does not mean R; furthermore,

How is it possible for the hearer who hears the utterance "S is P" to know that the speaker means "S is R"? (p. 113) In this regard, metaphor bears a striking similarity to sarcasm, irony, and hyperbole.

Searle's position rests on the notion that words and sentences have literal meanings and that the interpretation of metaphor involves working from those literal meanings to the sentence's utterance meaning, a process of construal that involves a number of steps:

> First,...[the hearer]must have some strategy for determining whether or not he has to seek a metaphorical interpretation of the utterance in the first place. Secondly, when he has decided to look for a metaphorical interpretation, he must have some set of strategies, or principles, for computing possible values of R, and, third, he must have a set of strategies, or principles, for restricting the range of R's--for deciding which R's are likely to be the ones the speaker is asserting of S.(p.114)

This excerpted passage does not do justice to the elaborateness of the theory of metaphor Searle offers us in his essay. He catalogues, for example, many of the strategies used to understand "which R's are likely to be the ones the speaker is asserting of S." (p.114) But for my purposes, the most important features of Searles analysis are that it assumes metaphor to work <u>off</u> or <u>through</u> literal meanings--presupposing, of course, the existence of literal meanings--and that, as a consequence, it would seem that the

interpretation of metaphor is always moe complex than the interpretation of literal utterances, with all else held equal.

Conclusions on Analytic Approaches to Metaphor

What conclusions can be reached after examining such a diverse array of explanations of metaphor, and discovering not only different approaches but approaches to what seem to be different things?

Katz, I think, was correct to rule metaphor outside the bounds of linguistics proper. The only alternative that would have a chance of working would be to allow into the province of linguistics all human knowledge and abandon a competence theory, for to fully understand many metaphors seems to require some idea of the speaker's/writer's intentions--arrived at through the interpreter's knowledge of the rules of conversation--plus a good deal of knwledge that could not be located in a formal lexicon without radically changing the traditional conception of the lexicon. This does not mean that linguistic competence plays no role in understanding metaphors, as it plays a role in understanding other expressions.

The grammar might, in some way, inform us that an anomalous string is present, but it cannot tell us whether the use of that sentence was an error or an intended outcome; besides, there are other metaphors that are only metaphorical in context and are perfectly well-formed and could not be marked as "metaphorical" on purely linguistic grounds in any way I can imagine. That problem aside, we see clearly enough in this review that certain metaphors can only be understood by recourse to encyclopedic knowledge. Furthermore, sometimes similarities or grounds must be discovered that contain a novel insight not reducible to previously existing atoms of meaning.

In short, while philosophers, critics, and linguists might all have valuable observations to offer about what a metaphor is, what it is to know what one means (that is, understand it), and so on, the understanding of metaphor is finally a psychological act, a performance phenomenon that takes place in real minds in real time in context. It is toward the psychological study of metaphor that we now direct our attention.

Experimental Research

A few years ago one could write that almost no experimental research had been done into the processing of metaphorical language by adults. Recently, however, psychologists have become increasingly interested in the comprehension of nonliteral language, including metaphorical language, and a body of research is beginning to develop. Still, the research is scattered, concerned with many different issues.

In this review, I will pay particular attention to those studies that bear on the question that seems to me to be emerging as the most important one: What is the relation between the ways in which literal and nonliteral uses of language are comprehended? One can imagine a variety of answers to that question. It might be that metaphorical sentences are understood through the literal meanings of the sentences used. If this were so, metaphorical sentences would certainly be, in some sense, more psycholinguistically complex than literals. It might be that, in fact, the distinction between metaphorical and literal language is ill-founded, at least from the psycholinguistic point of view. Then, again, it might turn out that in most cases there is no distinction between how literal and metaphorical sentences are processed, but that in some--perhaps unusual-

-cases, there are special metaphor-routines that are invoked. It will probably not escape the reader's attention that these same issues have popped up before in this review of the literature. It does indeed appear that experimental psychologists are drawing their inspiration from the philosophers, literary critics, and linguists who have preceded them.

Johnson, Malgady, and Anderson (1974) found that the "better" figure a literary metaphor is, the easier it is to interpret, and "that goodness and interpretability are correlated with the degree of similarity between nouns linked in a metaphor (Noun is a Noun)..." (cited in Malgady and Johnson, 1976, p.43) Later Johnson and Malgady (1976) reasoned that if "feature combinations" were at the heart of the process of metaphor interpretation, adding adjectives because they direct attention toward one part of the metaphor's range, would influence a metaphor's interpretability. In a study to test this hypothesis, the metaphor form Adjective Noun ---Adjective Noun was manipulated, yielding the following conditions:

(1) nouns A and B, each modified by an adjective related to both nouns (old house--poor beggar)
(2) nouns A and B modified by adjectives related to each noun (but not each other) (red house--ragged beggar)
(3) a reversal of (2) (ragged house--red beggar)

(4) modification of each noun by an adjective unrelated to both nouns (curly house--sour beggar)
(5) nouns, unmodified (house--beggar)

Ratings were obtained for "similarity", "goodness", and "interpretability" of the metaphors. The "similarity judgement" task required subjects to read pairs of the word complexes and make similarity comparisons between them; with five conditions for each word complex, there were ten possible comparisons between conditions. For example, the subjects would be asked to decide which word complex is more similar, that in condition (1) or condition (2), above.

In the second part of this experiment, subjects were asked to decide which members of the paired comparisons were "the best or most acceptable figure of speech." (p.43) Finally, in part three of the experiment, subjects were simply given booklets containing the metaphors formed by taking the basic word complexes and tranforming them into sentences (for example, "The old house is a poor beggar"), and asked to write interpretations of them. The interpretations were later rated by the judges to determine how "interpretable" each metaphor was.

Malgady and Johnson grouped the noun complexes into those which were rated either high or low in initial similarity; that is, their rated similarity when unmodified by adjectives. The results indicated that adjective modification was correlated with indexes of "constituent similarity", "goodness", and "interpretability". When the adjectives were associated with both nouns were high in initial similarity, "the three measures are about equally intercorrelated--albeit moderately. With initially dissimilar pairs, constituent similarity and metaphor goodness are highly correlated, but interpretability is linearly independent of these variables."(p.50) The metaphor constituents, Malgady and Johnson maintain, "are encoded in a single feature representation." (p.51) A metaphor, to be interpretable, must possess "sufficient integrity" and that depends upon constituent similarity, which in turn can be influenced by adjectival modification.

The results are explained in terms of Johnson's (1970) theory "that elementary cognitive features which encode the meaning of each metaphor constituent are summed to form a single representation, qualitatively distinct from that of the constituents." (p.51) To the extent that these elementary features are shared by the constituents, metaphors will be considered good and will be interpretable. Metaphors, no matter how linguistically deviant, will be

judged good and will be easily interpreted if there is enough "similarity" between constituents to form a coherent new meaning. This implies that metaphors with sufficient constituent similarity might be no more difficult--or perhaps even less difficult--to interpret than "well-formed" sentences with less constituent similarity.

In a subsequent study, Johnson and Malgady (1979) studied judgements about, and interpretations of, primarily "poetic" metaphors. Word associations for the key nouns of metaphors in and out of context, and similarity judgements in and out of context were studied. For some word pairs, subjects were asked to respond with a list of properties common to both members of the pair. Judgements of metaphor goodness in context were obtained, as were interpretations of the metaphors. The results indicated that the greater the similarity between terms in a metaphor, the more likely it is to be judged "good" and "interpretable". Moreover, there was was a strong correlation between "the overall degree of relatedness between metaphor interpretation and inter-word relatedness..."(p.262)

While Johnson and Malgady are committed to a particular dogma, their claim for their results is compatible with a number of perspectives:

> [M]etaphor interpretation and appreciation, word association, similarity judgements, and listing of common properties are cognate word games played under a more general set of cognitive rules....The degree to which the meaning of two words can be successfully integrated into a single organized whole may determine how 'good' the combination is and how easily a meaning can be assigned and interpreted, and may be determined by the pattern of shared properties which are responsible for similarity.(p.263)

If sentences of the form Malgady, et al studied are seen as bringing together two different frames of reference, it is not particularly difficult to understand why two highly associated frames of reference are relatively easy to interpret. Perhaps the most important implication of the study is that the process of sentence interpretation may be the same, in some important respects, for sentences which are formally distinct. So, a metaphor formed of two highly associated nouns might be more easily interpreted than a literal sentence formed of two relatively unrelated nouns. The possibility that one mode of interpretation is present in the processing of both metaphorical and literal sentences does not escape Malgady and Johnson, who mentions it in passing.

There are problems with the cognitive features approach, problems the authors recognize. No one seems to have a very good idea of what a cognitive feature is and, consequently, predictions based on a model of this sort are quite weak. This theory is particularly vague in respect to

how the new, "qualitatively distinct" representation is produced. And while this sort of vagueness is understandable, it is also unfortunate. On the other hand, where Malgrady's theory is relatively strong--in its claim that the meaning of a metaphor is the additive sum of some subset of the features of the tenor and vehicle--it is disconfirmable. (The work of Verbrugge and McCarrell(1977), discussed below, makes some very strong disconfirming arguments.)

In sum, then, the finding of Malgady and his colleagues are consistent with the view that the comprehension of metaphor involves the bringing together of two spheres of meaning, with the complexity of the task depending on the degree to which those domains share similar features (though just what a feature is remains obscure; perhaps the best thing to do is recognize that "feature" is a place-holder term). All we can say with confidence, I think, is that ease-of-interpretation depends upon how difficult subjects find it to discover the common ground in sentences of the form Malgady studied. This is a very different claim than the one Malgady makes since his claim presupposes the existence of some finite group of elemental features, while my weaker claim is that the commonality must be discovered.

It might be built-up from some pre-existing pool of meaning elements; on the other hand, the commonality might be a genuinely novel construct!

Malgady and his colleagues are not alone in discovering that subjects can interpret sentences that would be classified as deviant on most standard linguistic theories. Pollio and Burns (1977) found that subjects were better at recalling well-formed than anomalous sentences (a common finding in early psycholinguistic research), but they also found that subjects were quite capable of interpreting anomalous strings. When they were first required to interpret the sentences and then memorize them, subjects could do so as easily for anomalous as for the nonanomalous ones. Exactly what this means is uncertain, but it is consistent with the view that while conformity with normal sentence structure facilitates memory for sentences, when processed first for meaning there is nothing special about metaphors (qua metaphors) of the anomalous kind. The researchers conclude:

> Thus the problem of distinguishing between metaphor and anomaly comes down to one of deciding whether or not we are interested in language or speaking....If...we are interested in speaking, definitions cannot be made independent of speakers and their situation. What this means is that metaphor and anomaly can be defined only in terms of asking speakers to deal with sentences the language system has specified as anomalous (or metaphoric) and then seeing if and when such sentences are dealt with differently.(p.249)

Their experiments were carried out as tests of the conceptual base hypothesis, and were taken by their authors to result in support for that theory.

One important question then, is whether the anomalous/well-formed dichotomy, which is coextensive with one sort of metaphor/literal distinction, applies when one one is proposing a performance theoy of metaphor.

Honeck, Reichmann, and Hoffman (1975) report on their research into the processing of proverbs. Honeck et al distinguish between what they call the "conceptual base" of a sentence from its "propositional" structure":

> ...propositional structure refers to the logical relations between morphemes of a linguistic construction...By contrast, a conceptual base is considered to be a recoding of propositional structure into a new form....Thus propositional structure constrains the content of the conceptual bases, but is distantly related to it because knowledge of the world also contributes to the base.(p.409)

The proverbs used in this experiment were believed by the experimenters to be unfamiliar to the subjects (for example, "Reputation is commonly measured by the acre"), so it might be argued that the sentences studied were indeed novel metaphors <u>for these subjects</u>. The thirty-two subjects in this study heard proverbs that were considered to be

"high-imagery" or "low-imagery" on the basis of independent ratings. For each of the proverbs, interpretations were constructed that were "good", "mediocre", "poor", and "unrelated", and which were meant not to share any important linguistic features with the proverbs themselves.

During the first stage of Experiement I, the subjects were presented with a tape recorded list of metaphors, each with an associated interpretation. Later, during the second stage of the experiment, subjects were asked to recall the sentences (proverbs) they had heard earlier and were prompted with the interpretation-sentence that had originally accompanied it. No significant differences were found between the "good", "mediocre", and "poor" prompts (which were, for the purpose of analysis, subsequently lumped together as "related"), but each of these were better prompts than the "unrelated" interpretations when the accuracy of recall was a "propositional" (rather than "content-word" or "word-order") measure. Also, significantly better recall-of-proposition was found for "high-imagery" than for "low-imagery" proverbs, and "the interpretation by Imagery Level interaction was significant...[O]nly the unrelated interpretations of high-imagery proverbs failed to surpass recall from the corresponding low-imagery proverbs."(p.411)

In a second experiment, subjects were given a first booklet which contained proverbs and were asked to write interpretations of them. After the first stage was completed, the booklets were collected and new ones were distributed. This time the prompts were of two different types. One class of prompts consisted of subject-noun pairs drawn from the original proverbs, while the other class contained vignettes which, in some sense, illustrated the proverbs. The analysis revealed that "high-imagery" proverbs were more likely to be recalled, but that the kind of prompt did not matter. Nor was there any prompt-by-imagery interaction, with word recall (in any order) the measure.

With proposition-recall the measure, "[t]he analysis revealed no significant effect due to imagery level,... or to prompt type. However, the Imagery Level by Prompt Type interaction was significant." (p.413) Honeck, et al, can offer no explanation of the prompt type-by-imagery level interaction, and, in fact, an earlier, similar study, by Honeck (1973), revealed no such interaction. Honeck, et al rated the quality of the interpretations in Experiment II and found that they correlated strongly with the recall of proverbs, and this was particularly true for low-imagery proverbs.

Since the interpretations were paired with proverbs during the memory stage of the experiment, the fact that "related" interpretations were better prompts than "unrelated" interpretations for the higher imagery proverbs in Experiment I was taken as support for the conceptual base hypothesis by the authors. They argue that:

> The link between proverb and related interpretation was not logical-propositional or vocabulary based, yet subjects were able to understand something of this relationship. And high imagery proverbs, because they can be better held in operational memory and/or because they are more interpretable, helped produce the interaction. We conclude, therefore, that subjects remembered conceptual bases, abstract intermediaries between the proverbs and their interpretations, which allowed subjects, when given the interpretation, to "deduce" the correct proverb. (p.412)

If these conclusions are valid, they carry an important implication for the theory of metaphor. The conceptual base hypothesis in general argues against a more narrow, "interpretive" theory. It suggests that a conceptual representation of a passage is constructed from the context in which the relevant "propositions" appear. This is a general theory about language comprehension, not one narrowly held for the interpretation of metaphorical sentences, and if the conceptual base hypothesis is found to account for both metaphoric and non-metaphoric language processing, we would have a unified theory of sentence comprehension, a theoretically desirable parsimony. Of

course, the conceptual base hypothesis is regrettably vague about particulars and..."is not a unique one. Similar ideas have been proposed by Chase and Clark (1972), Pylyshyn (1972), Kintsch (1972), Simon (1972), and Winograd (1972)." (p.414)

In a way, then, what we have is a body of evidence against a narrow, interpretive psycholinguistics (what Clark (1978) would call the independence view) and in favor of some, as yet ill-defined, system in which the comprehended meaning of a sentence is some representation, highly enriched by general knowledge and arrived at through some inferential process guided by linguistic and nonlinguistic context. We must wonder whether these processes are any different for metaphorical than for literal expressions.

The general position of Grice (1975), discussed above (p. 58) and Searle (1979), also discussed above, has been taken up by Clark and Lucy (1975) in the form of an experimental hypothesis. Clark and Lucy propose a stage model of the comprehension of speech acts in which listeners first construct a literal interpretation of a sentence, then check it against the context-of-utterance for plausibility. If the first interpretation fits the context, it is held; if

the literal interpretation is contextually implausible, the comprehender applies conversational rules to arrive at the speaker's conveyed meaning.

Clark and Lucy see three important predictions entailed by their hypothesis (the first and third of which are directly tested by their experiments):

1. There should be some empirical evidence that listeners literally interpret the sentence before construing the conveyed meaning.
2. If the conveyed meaning is different from the literal meaning, interpretations should take longer.
3. Since the conveyed meaning is the interpreted meaning, there should be evidence that the listener is using the intended meaning of the sentence.

Clark and Lucy's design rests on certain assumptions gathered together as the Clark and Chase model (1972), and outlined below.

> [S]ubjects veryifying a sentence against a picture
> 1. represent the sentence in an abstract format
> 2. represent the picture in the same format,
> 3. compare the two representations,
> 4. respond with the correct answer. (p.59)

The model just outlined leads to the following "3-feature" pattern:

(1) A sentence ultimately coded in a positive form at Stage 1 can be judged true faster than it can be judged false.

(2) A sentence ultimately coded in a negative form evinces the opposite pattern: It can be judged false faster than it can be judged true, and by the same increment.

(3) A sentence coded in a positive form can be judged more quickly overall than its corresponding negative...(p.59)

In order to test their hypotheses, Clark and Lucy constructed eighty displays. Each display consisted of a sentence and, to its right, a circle colored either pink or blue. For example

"Please color the circle blue." [with a blue circle]
"Please color the circle blue." [with a pink circle]

The subjects were "instructed to treat each sentences as a request to color the "circle a particular color, and to consider the circle on the right as a response to that request."(p.60) The subjects were asked to indicate whether or not the request had been fulfilled by pressing a "Yes" or "No" button. The sentences were constructed in conformity with categories of conveyed requests suggested by Gordon and Lakoff (1971). Some of the requests were direct ("Please color the circle blue"), while some were indirect ("Can you make the circle blue?").

The subjects viewed the tachistoscopically presented displays, with their response times in making the judgement of whether the requests had been fulfilled, measured in

milliseconds, the dependent variable. Clark and Lucy do not provide the actual mean response latencies, but they do give us the relative differences between those times. The data are reproduced here.

Positive Requests	Negative Requests	All Requests
"true" 346 msecs. faster than "false"	"false" 308 msecs. faster than "true"	positives" 222 msecs. faster than "negative" requests

Prediction (1), of course, is crucial to Clark and Lucy's theory, since at its heart is the claim that indirect requests are understood via literal meanings. Most directly relevant to this prediction are sentence pairs 9 and 10, reprinted below:

Sentences	Polarity of Conveyed Request
9. I'll be happy if you make the circle blue.	Positive
I'll be sad if you make the circle blue.	Negative
10. I'll be very sad unless you make the circle blue.	Positive
I'll be very happy unless you make circle blue.	Negative

(p.61)

The "unless" requests, (10), took considerably longer to judge than the "if" requests, (9). Clark and Lucy maintain that since (9) and (10) have identical surface structures,

"differential 'perceptual' difficulty" cannot account for the time difference, "[n]or can this difference be attributed to reading time."(The difference is too large for that). "Apparently," they conclude, "the differences can only be attributed to a difference in their literal interpretation: unless, as an inherent negative meaning "if not", simply took much longer to encode than "if". (p.68)

Prediction 3. maintains that while subjects arrive at the literal meaning of a conveyed request first, they ultimately use the conveyed meaning to decide whether the requests have been complied with. The results manifest the 3-feature pattern entailed by Prediction 3, as can be seen from the tables presented here: true positives are verified more quickly than false ones; false negative more quickly than true negatives; and, overall, positive requests are verified more quickly than negative ones.

While Clark and Lucy do not directly address the status of metaphors as indirect speech acts, it appears that some metaphors would be open to their analysis. Granting the concept of literal meaning, metaphors like "He is some father!" (spoken about a forty year old man dating an eighteen year old girl) certainly convey a meaning different from their literal one.

The proposal of Clark and Lucy has at least prima facia appeal. It makes predictions about sentence processing that imply a dichotomy between literal and metaphor processing mechanisms paralleling a pretheoretical literal/monliteral distinction, providing one establishes that metaphor is a species of indirect speech act; that is, an expression whose intended meaning differs from its literal meaning.

While Clark and Lucy did not directly study the processing of metaphor they recognize that it is a pervasive phenomenon in human communication. "Conveyed meaning occurs so commonly that it is hard to imagine communication without it. Sarcasm, irony, understatement, and a host of other rhetorical devices all require...[it]" (p.70) Their study's implication for metaphor-processing, though they don't specifically make that implication, seems clear: The processing of metaphor is the interpretation of an indirect speech act. The listener must recover the literal meaning and then check it for plausibility with the context; if the literal meaning is implausible, processing must continue. Importantly, however, there is a difference between metaphor and indirect speech acts like sarcasm, irony, and indirect requests: not all metaphors have a literal meaning that can--even in principle--be derived at stage 1. of the proposed model. Therefore, metaphors like "My house is

bleeding" ought to be distinguished from those that do have a literal meaning. There is no reason to assume that these two kinds of metaphor are processed in only one way.

The implications of the Clark and Lucy study for a theory of metaphor processing were recognized by R.J. Harris (1976):

> One specific testable hypothesis about metaphor comprehension is that it occurs as a two-stage process of, first, understanding the words in a literal way and next, using that literal meaning to construct the intended metaphorical interpretation. Evidence for such a two-stage comprehension process of other types of nonliteral language has been obtained by studying conversationally conveyed requests...and unfamiliar proverbs...(p.312)

Harris chose thirty-six metaphorical quotations from the work of William Shakespeare. In Harris' view, the "phrases were readily, though not necessarily instantly, interpretable out of context to modern listeners and involved an interpretation of semantic domains characteristic of metaphors, e.g., personification ...,concretation of abstraction..., and man-object comparison."
(p.312)

Harris took Shakespeare's metaphors (M_o) and constructed three new, but related sentences or phrases:

M_o Myself eating the bitter bread of banishment.
M_1 Myself tasting the acrid wine of banishment.
N_1 Myself sustaining the sorry state of banishment.
N_2 Myself enduring the sorry state of banishment.(p.313)

A new metaphor with the "same abstract meaning" (M_1) and two sentences that literally expressed the abstract idea (N_1 and N_2) were constructed. Subjects were placed before a pile of index cards with M_o, M_1, N_1, and N printed on them, and were instructed to turn the cards over, read and paraphrase them: "The mean latencies over all responses to metaphorical and nonmetaphorical sentences were 18.33 and 18.86[seconds], respectively. This difference was not significant; F_1 (1,2,7) = .302, F_2 (1,35) = . 041, mini F'(1,44) = .036"(p.313) These results, in Harris' view, are evidence against the two-stage theory.

Apart from the obvious difficulties facing anyone arguing for the null hypothesis, there are some reasons to doubt the import of Harris' findings in this experiment. First, the experiment was carried out under extremely loose circumstances. Timing was by a stopwatch manned by an experimenter who sat at a right angle to the subject:

> As he/she turned to a sentence, the experimenter started a stopwatch; at the subject's initiation of the paraphrase, the stopwatch was stopped and the latency recorded. The clock was not stopped if the subject's initial vocalization was clearly nonparaphrasing (e.g., uh...uh,' 'Gee, this is a tough one.'(p.313).

We might reasonably wonder whether paraphrase response latency actually measured the presence or absence of two-stage processing and, if it did, whether it was a sensitive enough measure. We might further wonder whether the method used to measure response latencies was accurate. It depended on the human timer judging correctly and consistently when the subject began to read the card, and that might be a highly subjective and erratic decision. Beyond that, the decision to stop the timer when a paraphrase began rested on the assumption that the beginning of a paraphrse coincides with the point of understanding. Perhaps there is a response bias that leads subjects to begin to paraphrase at about eighteen seconds whether or not interpretation is complete. Harris instructed the subjects not to begin their paraphrase until they fully understood the sentences, but that is no guarantee that they followed the instructions.

While Harris rated the quality of paraphrases and found then essentially similar from sentence type to sentence type, he did not measure how long the paraphrases took once initiated. Conceivably, if a more complex sentence was paraphrased just as well as a less complex one, and if the initiation of paraphrase was essentially the same from

sentence type to sentence types, complexity differences could still show up in the time it took to complete the paraphrase, once begun.

If one considers the sample set of sentences from Harris' experiment provided above, a further problem with the experiment becomes clear. Harris may find these sentences "readily comprehensible," but I do not. They are all in Elizabethan, or quas-Elizabethan syntax, and they are therefore somewhat strange to modern English speaker/hearers. The strangeness may be evenly distributed, but it is nonetheless confounding if we are interested in how the modern speaker/hearer understands ordinary speech in normal speech contexts.

Furthermore, it is not at all clear that all four sentences share the same abstract meaning, as Harris claims. First, remember that it is an active question whether metaphors share the same meaning with any literally meaningful phrase (with the possible exception of the most trivial metaphors). To suggest that metaphors are interchangeable with literal sentences is to propose a version of the substitution theory. But that objection aside, is "sustaining the sorry state of banishment" a literal paraphrase of "eating the bitter bread of banishment."?

In sum, the design weaknesses of the Harris study undermine the claim that it disproves the presence of a two-stage comprehension of metaphor. That claim may still be correct, of course, but it will have to rest on a more secure foundation.

A more recent series of experiments by R.J. Harris (1977), using different measures of psycholinguistic complexity than the experiment just reviewed, also failed to find any significant differences between literals and metaphors.

In the first experiment, thirty-one subjects heard lists of novel metaphors, dead metaphors, and nonmetaphors. After hearing each list, the subjects heard a string of digits. The subjects were instructed to write the string of digits on the top page of their answer booklets, then turn the page and write as many of the sentences heard as possible. The answer sheet contained prompts for each sentence.

There was no main effect of sentence type on recall. And, interestingly, there was "a strong trend for sentences of all three input types, if not recalled verbatim, to be recalled in a less metaphorical, rather than a more metaphorical, form, $p < 0.01$ by sign test."(p.66)

A second experiment, with one hundred eight subjects participating, was conducted. The subjects were asked to rate each sentence used in Experiment I on a scale from 1 through 5 (from completely unmetaphorical to highly and novelly metaphorical). Harris computed mean metaphoricity ratings for the materials, and the results are listed below:

Table 1

Mean Metaphoricitiy Ratings From Harris (1977)

Metaphor:	$\bar{x}$ 3.74
Dead Metaphor:	$\bar{x}$ 2.91
Nonmetaphor:	$\bar{x}$ 1.67

These figures suggest that the experimenters had assigned the sentence-type labels soundly in Experiment I. Furthermore, the "probability of recall" ratings from Experiment I and the "mean metaphoricity" ratings from Experiment II for the same sentences were analyzed to discover if there was any correlation between the two factors. The scores provided firm evidence "that there was no correlation of degree of metaphoricity of a sentence and the probability of its being recalled correctly."(p.67)

The third and final experiment in this series used a recognition measure to make certain that the absence of an effect of sentence type identified in the earlier experiments was not task specific. The design was essentially the same as that in Experiment I in most respects.

But this time a recognition rather than a recall measure was used with the eleven subjects indicating whether or not they had heard a sentence in the original list. Again no main effect of input type was found suggesting the results of Experiment I were not an artifact of the recall task.

One can, of course, define psycholinguistic complexity in many different ways. Harris defined it in terms of the memorability of the sentences, and by this definition Harris' study seems to support the view that no signficant difference exists between the psycholinguistic complexity of metaphors and nonmetaphors. It is undeniably interesting to learn that when subjects fail to recall metaphorical sentences verbatim they tend to produce sentences toward the literal end of the metaphorical/nonmetaphorical continuum. But it is difficult to know what to make of their finding. Perhaps there is a strong response bias toward the nonmetaphorical, but it seems just as likely that this is an experimental artifact, requiring a sociolinguistic explanation: subjects may tend to be less figurative when recalling items during a psycholinguistic experiment.

Verbrugge and McCarrell (1977) approach metaphor from what might be called a neoAristotelean perspective. In metaphor the topic and vehicle domains are being compared, with the subject invited to discover the ground (the

resemblance between topic and vehicle). "The task for the psychologists..." they write, "is to characterize the structure of the apprehended resemblance, its relationship to the terms that appear in a sentence, and the process by which the resemblance is discerned."(p.495) Verbrugge and McCarrell, then, were not directly studying the psycholinguistic complexity of metaphors but rather the process of metaophor comprehension. If it turned out that this process was more complex for metaphorical than literal sentences, of course, that would imply that metaphors are more complex than their literal mates. This question could not be resolved by this study, of course, since they did not compare memory of metaphors and literals in this experiment.

In the first experiment of a series, the authors wanted to find out whether the ground of a metaphor can be an effective prompt for the recall of the metaphor. They reasoned that prompted recall might be a "sensitive measure of inferential activity during comprehension, the kind of resemblance inferred, and the context of specificity of a topic's interpretation..."(p.500)

The experimenters prepared two lists of metaphor-sentences of the topic-vehicle form. The topic was the same in lists "A" and "B", but the topics were modified by different vehicles in the two lists. For example, in list

"A" we find "Skyscrapers [topic] are honeycombs of glass [vehicle]," while in list "B" we find "Skyscrapers [topic] are the giraffes of the city [vehicle "B"].

The metaphors, recorded on audiotape, were played twice for the subjects, with a five second pause between playings, and with a pause of the same duration between sentences on the list. The subjects were instructed to listen to the items on the list and attempt to understand their meaning, but they were not informed about the subsequent recall task at that time.

During the recall portion of this experiment, subjects were prompted with the associated ground. The examples below illustrate the technique used:

Table 2

Sample Metaphor-Prompt Pairs

	Metaphor	Ground
A.	Skyscrapers are honeycombs of glass	are partitioned into hundreds of smaller units
B.	Skyscrapers are the giraffes of a city	are very tall compared to surrounding things

Note that grounds A and B are not direct restatements of either topic or vehicle. A control on the effectiveness of grounds as prompts was obtained by using matched pairs--identical topics but different vehicles. The following table of means presents the results of Experiment I.

Table 3
Mean Proportion of Sentences Recalled

Acquisition List	Prompts			
	Topic	Vehicle	ground A	ground B
A	.86	1.00	.70	.22
B	.86	.94	.26	.73

As the data show, the topics and vehicles served to prompt nearly complete recall. But much more interesting is the relationship between ground-prompts and recall. The same grounds were much better prompts for their "own" metaphors than for the other pair-member. The authors conclude that, "The results demonstrate that an abstract statement of the implicit ground of a metaphor is sufficient to remind a person of the metaphor at some later time," and that "[t]he results are consistent with the hypothesis that subjects infer a resemblance during their initial encounter with a metaphoric sentence and that the resemblance is integral to what is stored as a memory of that experience."(p.505)

Verbrugge and McCarrell conclude that the results show an "abstract statement of the explicit ground of a metaphor is sufficient to remind of a metaphor at a late time." (p.505) On the basis of the list-by-ground interaction, Verbrugge and McCarrell believe that "the semantic role of the topic is highly specific to the context supplied by the vehicle."(p.505) In part, Verbrugge and McCarrell present their findings as part of an argument against a variety of models that suggest the understanding of metaphor is explainable by recourse to a set of properties associated with either the topic or vehicle, or with both of them. The results of the first experiment, for example, are seen as evidence against what they call a "topic-property recognition model". According to that model, there is no interaction between the topic and vehicle; that is, each component of the metaphor is stored independent of the other. The ground is effective as a prompt because the property shared by both the topic and ground was activated or primed during the acquisition of the metaphor, or because "in scanning a record of topics plus vehicles during recall, the system notes a match between the ground and the predicates or features already associated with the topic."(p.505) If this were so, Verbrugge and McCarrell reason, grounds ought to be equally effective regardless of the vehicle attached to the topic in the acquisition of the metaphor, but that was not what was found in Experiment I.

A possible response to the results of the first experiment, Verbrugge and McCarrell suggest, is a more sophisticated version of the topic-property recognition model in which the vehicle plays a role in influencing the saliency of certain of the predicates associated with the topic. But Verbrugge and McCarrell argue that this model probably would not work since "[t]he 'property' under discussion may not be part of a persons's knowledge before hearing a metaphor, and, even if it is familiar, it may have to be rediscovered with a nuance unique to that context." (p.507)

Verbrugge and McCarrell argue that any model of metaphor comprehension that claims an interaction between topic and vehicle entails the following consequences:

> (1) A ground should be less effective in prompting [recall of an] isolated topic than in prompting a full metaphor with the relevant vehicle.
>
> (2) A ground may be more effective in prompting an isolated topic than in prompting a full metaphor with an irrelevant vehicle. (This prediction would follow if there is a greater likelihood that subjects will hit upon the "correct" context or properties while thinking about the isolated topic, compared to the topic in a conflicting context.(p.507)

A second experiment was designed, the purpose of which was to study the effect of the metaphor vehicle on comprehension by comparing subjects' interpretation of a topic with and without a vehicle. Subjects in this experiment heard either List A or

List B, or a new list which presented a "topics-only" condition. As in Experiment I, half the subjects in all acquisition conditions received half ground A and half ground B prompts. For the topic-only acquisition conditions, the instructions were to "think about what each word or phrase is describing." (p.508) During the recall phase, those in the "topic only" conditon were asked to write down the word or phrase from the original list prompted by either ground A or B, and those in the other two conditions were asked to write down " the topic or subject." (p. 508)

The pattern of results in this second experiment is similar to that of the first:

Table 4

II

PROMPTS

Acquisition List	Grounds A	Grounds B
A (topic A/vehicle A)	.69	.29
B (topic A/vehicle B)	.21	.64
Topic only (topic A)	.41	.44

(p.508)

In the new, topics-only condition, the recall rate is intermediate between the two other conditions. The finding of intermediacy for the topics-only condition turns out to be a little misleading, however.

> For example, 10 out of 10 subjects recalled the isolated topic skyscrapers in response to the ground are very tall compared to surrounding things. (Recall that this was also an effective prompt for the 'irrelevant' skyscraper-honeycomb sentence.) Low recall of isolated topics occurred when a ground required a relatively novel context for interpreting the topic. In response to the ground are tubes which conduct water to where it's needed no subject recalled the isolated topic tree trunks. (p.510)

Verbrugge and McCarrell explain the results in the topic-only condition, then, as reflecting "a central tendency along a continuum of likelihood that the relevance of a property will be noted in a null context."(p.510)

Another approach to the results of the first experiment would be to explain the results in terms of a "vehicle-feature recognition model". Such a theory predicts that prompting should be equally effective no matter with what topic a vehicle is paired, since the vehicle's properties, on this theory, determine the meaning of the metaphor and are the focal point for processes of recall. A third experiment was designed and conducted to test this hypothesis.

In the third experiment, topics and vehicles were paired randomly. Not surprisingly, this experiment demonstrated that when a vehicle appeared in a principled metaphor, relevant grounds prompted recall of the sentences much more effectively than when the same vehicle appeared in an arbitrary metaphor. The author's conclude that "[t]hese considerations...suggest that the comprehension process results in a partial identification (or fusion) of the topic and vehicle domains. To some extent, the imagined tree trunk may become a straw and the skyscraper may become a giraffe extending its neck above the city skyline.(p.519) In other words, the metaphor is neither a comparison nor a substitute expression, but creates a new, "imaginary" entity. This position bears a certain family resemblance to the interaction theory of metaphor discussed earlier. And it is, importantly, not quite clear how "fusion" is to be understood.

Verbrugge and McCarrell consider still one more possible explanation of the results of Experiment I. This view holds that the ground-prompts were likely to cause the vehicle or topic to come to mind, even without the acquisition stage. As the authors note, this would not amount to an explanation of what it is to understand a metaphor even if it did account for the data in the first experiment. At any rate, an experiment was designed to test this possibility, and no support for it was found.

Two sets of prompt booklets were prepared, with one containing grounds A and one grounds B. Subjects were told to treat the grounds as incomplete sentences ("...are the giraffes of the city,") for example, and to complete them by supplying at least three subjects. Responses were scored as either topics or vehicles in the metaphor associated with the ground. Overall, subjects gave responses categorizable as only 25% of the topics or vehicles.

> "If being reminded directly of the topic or vehicle were a prerequisite for recall of principled metaphors, then we could expect subjects to recall no more than 25% of the 14 sentences, even if we assume recall proceeds errorlessly once a topic or vehicle is known. This estimate falls far short of the level of relevant prompted recall observed in Experiment I..."(p.521)

The model of metaphor-comprehension that Verbrugge and McCarrell propose describes metaphor comprehension as involving a recognition of resemblance in terms of the relations between the topic and vehicle domains (schemata). To present this model of metaphor comprehension the experimenters invoke a concept employed in the explanation of event perception by Shaw, McIntyre, and Mace (1974). They suggest events can be analyzed into a "transformational invariant" (a kind of transformation exerted over a structure, e.g., rotation and a "structural invariant" (what the transformation leaves unchanged, e.g.,

spherical shape (p. 499). According to their theory, these domains include, but are usually not limited to, the entities appearing in the nominal terms of the metaphor:

> In the tree trunks-straws sentence ["Tree trunks are like straws"], for example, the topic term is tree trunks, but the topic domain is a type of transformation (fluid transport) exerted over certain structures (tree trunks, leaves, branches, water, roots, earth, etc.). A comparable description is also necessary for the vehicle domain, which is only partially specified by the terms straw and thirsty.(p.526)

The ground, on this view, is an amalgam of transformational and structural invariants common to both the topic and vehicle domains. The nominal terms in the metaphor should be described semantically so as to aid in the generation of topic and vehicle domains, as well as "transformational/structural resemblances as the 'product' of comprehension."(p.526) On this theory, the topic and vehicle terms trigger the transformational and structural invariants, and together the invariants constrain the possible relationships between the topic and vehicle terms.

The underlying view held by Verbrugge and McCarrell, that no a priori list of attributes can explain the comprehension of metaphor, leads them to see topic and vehicle domains where others see topic and vehicles and to conceive of those domains as abstract entities, comprehended under a set of constraints:

> We suspect that it will prove easier to define constraints on metaphoric transformations if structural concepts are defined from the outset by potential transformations under which they remain invariant.As we noted above, this may allow theoretical development of a single type of comprehension process that generates interpretations for both metaphoric and literal sentences.(p.528)

A recent report on the research of Ortony, Reynolds, and Antos (1978), explicitly challenges the two-stage model of metaphor-comprehension suggested by the Clark and Lucy (1975) results and Searles three-stage model (1979). Furthermore, Ortony et al.'s work also confronts what they see as one implication of the Verbrugge and McCarrell (1977) study, "that the additional inferences necessary for the comprehension of metaphors will manifest themselves in increases in processing time"(p.466). (It should be noted that Verbrugge and McCarrell are not themselves committed to the view that language comprehension involves inference-making and believe that "comprehension is not representationally mediated, but is a vicarious engagement of the processess underlying perception and action..."(p.530) While acknowledging that the Verbrugge and McCarrell, Searle, and Clark and Lucy positions have different theoretical foundations, Ortony, et al maintain that both views lead to the prediction of increased processing time for metaphor-comprehension. Against those positions, Ortony, et al., suggest:

> that the stage model is not incorrect but that it represents a limited rather than a general account of the comprehension of figurative language. In general, we propose that a hearer or reader uses an already constructed representation

> of what had gone before (context) as a conceptual framework for interpreting a target sentence, or any other linguistic unit...(p. 467)

Ortony, et al., maintain that the interpretation of figurative language is often without special difficulty since "the listener can almost predict what will be conveyed and the target sentence [the sentence following a context] is used, as it were, to confirm an already formed hypothesis about its meaning."(p.467) But in other cases this route will not get the reader to the destination, as, for example, when Verbrugge and McCarrell and Clark and Lucy present "target sentences...with minimal or no preceding context." (p.467) Without contextual support to guide expectations, the inferential processes entailed by the stage model and the Verbrugge and McCarrell analysis may have to be made quite deliberately.

With this background sketched, Ortony concludes that the processing time of a target sentence is correlated not with the literal/metaphorical distinction but rather with "how easily it can be interpreted in the light of the contextually determined expectations..." (p.467) Ortony, et al see this position entailing the following consequences:"First, given insufficient contextual support, targets requiring a metaphorical interpretation should take longer to be processed than targets requiring a literal interpretation. Second, given sufficient contextual support, they should not." (p. 467) In short, the

metaphor's conveyed meaning is simply less predictable on its face, but can be embedded in a context that makes it as predictable and as easy to process as are literally meaningful sentences.

Ortony, et al., prepared paragraph length "vignettes" consisting of two parts, an antecedent context and a sentence-length target.(p.467) The vignettes were so constructed that they biased the interpretation of the target sentences in a literal or a metaphorical direction. Subjects were seated at a video display terminal on which the "context" was displayed. They were instructed to press the space bar when they understood the text. The pressing of the space bar caused the target sentence to appear. Subjects were instructed to press the space bar again as soon as the target was understood. The computer, which controlled the presentation of material, also recorded the elapsed time between the presentation of the target sentences and the second bar-press, and that elapsed time was the dependent variable, a measure of comprehension time.

The researchers point out that "in contrast to the metaphors of Verbrugge and McCarrell..., our metaphors were contextually anomalous whole sentences." (p.467) We must keep this in mind because it is not at all clear what makes something a metaphor, and the use of different kinds of materials in the different experiments reviewed casts a shadow across any attempt to generalize from the individual findings.

In addition to the long-context vignettes (those of paragraph length), short contexts were also constructed by using all or part of the first sentences of the vignettes.

To expose what I consider to be a serious weakness of their study, it is necessary to reproduce here an example of their materials (the underlined segment served as the short context):

Table 5

Sample Materials: Ortony et al. (1978)

Literal inducing context

Approaching the enemy infantry, the men were worried about touching off landmines. They were very anxious that their presence would be detected prematurely. These fears were compounded by the knowledge that they might be isolated from their reinforcements. The outlook was grim.

Metaphorical inducing context

The children continued to annoy their babysitter. She told the little boys she would not tolerate any more bad behavior. Climbing all over the furniture was not allowed.

She threatened to spank they if they continued to stomp, run, and scream around the room. The children know that her spankings hurt.

Target

Regardless of the danger, the troops marched on. (p.467)

The method of preparing short contexts deserves close attention for a number of reasons. First, the contrast between long and short contexts may be greater and different than Ortony, et al., intended. To this reader, in the present example, the shortening of context in the metaphorical member of the pair (yielding "The children continued to annoy their babysitter") is not merely a reduction of information but is also misleading. In the shortened context, designed to induce metaphorical interpretation, the target sentence becomes a kind of non sequitur, while this is not the case for the shortened literal inducing context. If this observation is correct, we would expect the short metaphorical inducing context target to be psycholinguistically more complex on grounds quite independent of those Ortony, et al., offer. If this analysis is correct, the difficulty becomes one of the relative complexity of

processing logically sensible, as compared to logically nonsensical, passages. Of course, Ortony, et al., might not disagree with this interpretation. They might simply maintain that this is what the metaphorical/literal distinction amounts to when sentences are considered in context.

Clark (1978) identifies three views of language comprehension. One position, the independence view, is held by those who understand comprehension to be "concerned with only those processes that apply to a sentence independent of its context."(p.296) The constructivist position, on the other hand, views comprehension as including more--too much more, in Clark's opinion: "the process by which listeners, relying on real world knowledge, build elaborate mental edifices for the situations the sentence describes."(p. 296) Clark's own intensional view occupies a middle ground between the two opposed camps, considering "comprehension...to be the process by which people arrive at the interpretation the speaker intended them to grasp for that utterance in that context."(p. 296)

Clark proposes a four step model of language comprehension on the intensional view. Ortony et al.'s materials will serve to illustrate Clark's model. In the target sentence, "Regardless of the dangers the troops marched on," the first step would be to compute a description of "troops"; the second step would be to scan memory for a referent that satisfies the

description of "troops" obtained in Step 1. But the difficulty of accomplishing Step 2 would appear to be radically different for the short metaphorical as opposed to the literal context conditions.

Though it is difficult, if not impossible, to estimate the amount of inference necessary to connect two expressions, certainly the connection between "troops" and "The children continued to annoy the babysitter" is less obvious than that between "troops" and "Approaching the enemy infantry". Step 3 in Clark's model is triggered when Step 2 fails to find the referent. The comprehender is constrained to make the simplest assumptions ("bridging assumptions") necessary to identify a referent in memory. Whether or not bridging assumptions are needed only in the metaphor inducing context or in the literal one also, the inference in the literal case would seem to be simpler. Since it is reasonable to assume that making assumptions takes time, getting to step 4 would be more time consuming in the metaphorical than in the literal case.

As Ortony, et al., point out, their materials consist of contextual metaphors, as opposed to the structural sort. Consider what might be happening in processing the metaphors. Up to the point of the target sentence, normal comprehension can be assumed to take place. When the target sentence arrives, ("Regardless of the danger, the troops marched on"), the reader

must seek to discover the referent of "troops". In the long context condition, the search is likely to be easier than in the short context condition because the previous sentence provides grounds for identifying the subject.

Both context-by-type and context-by-length interactions were highly significant, as were the differences between the metaphors and literals in the short, though not the long context conditions. In light of these findings, Ortony, et al., conclude

> Thus the process of first interpreting a sentence literally, then determining that such an interpretation does not fit the context, and finally computing the intended figurative meaning does not seem always to underlie the interpretation of figurative language.(p.9)

Metaphor, Context, and the Autonomy of Processing

There has emerged in recent years a controversy between those who argue for a "global" theory of language processing and those who maintain that processing is "autonomous". The global theorists hold that linguistic and nonlinguistic information is processed by a General Problem Solver that has simultaneous access to all information relevant to sentence processing. Forster (1979) and Cairns (note 1) have proposed autonomy theories that view comprehension as the operation of subcomponents, each independent of the other. Forster's model includes a lexical processing subcomponent that operates on perceptual input and accesses items in the lexicon that match the feature list in the input string; a syntactic subcomponent that organizes the lexical information; and a message processor subcomponent that produces a conceptual representation of sentences from the output of the two other subcomponents. These three subcomponents, together with the mental lexicon, form Forster's autonomous system, a system that cannot make use of extralinguistic information in the lexical, syntactic, or message processor stages of its operation. The General Problem Solver (GPS), the only component in this system with access to real world knowledge,completes the comprehension process by acting on the output of the linguistic system. The GPS is not peculiarly linguistic, but, rather, is

involved in a variety of cognitive operations. The GPS acts on the output of the linguistic processor by making necessary inferences and performing necessary integrative operations to arrive at the sentence's conceptual representation--the content of the conveyed message.

The existence of a facilitative effect of context on sentence processing bears importantly on the controversy between the global and autonomy theorists. In turn, the effect of context and the status of the autonomy/global controversy bear importantly on our understanding of metaphor processing.

We know intuitively that context aids in the interpretation of language, but how? If the global theorists are correct, context ought to facilitate processing during lexical, syntactic, and message processing; if the autonomy theorists are correct, on the other hand, lexical and syntactic processing (and message processing if it turns out to be distinguishable from the GPS) ought to proceed uninfluenced by context.

As a number of psycholinguists have observed, it is very hard to locate the effect of context at some specific level within language processing, since all our experimental data until now have resulted from the operations of the

General Problem Solver. Some critical experiments, however, using measures of on-line processes to begin to decide the debate between autonomy and global theorists, seem to be available.

Lexical Processing

The lexical processing stage involves at least a "retrieval" of the item from memory, a "post access" stage during which what is retrieved is evaluated to see if it is what the input signal demands, and an "intergration" stage during which information provided by the lexical and syntactic stages is transformed into a conceptual whole.

Research during the 1970's demonstrated that lexical ambiguity was resolved by the sentence's end (Cairns, 1971, 1973)--in fact, as soon as within two syllables after the anbiguous item (Cairns and Kamerman, 1975). Later, Yates (1978) argued that the lexical retrieval stage is automatic, but that attentional processes are required to move the one derived meaning into short term memory.

Context does help to resolve linguistic ambiguity, but does it do so during retrieval or by aiding in the post-access process? A number of researchers (Schvaneveldt,

Meyer, and Becker 1976; Morton, 1969, for example) have demonstrated the existence of a "priming effect". On this view, the prior context heightens (or "primes") meanings related to it. Priming, therefore, seemed to demonstrate that context works at the retrieval stage; the primed sense of an ambiguous item is the one which is then triggered by the phonetic item. However, Cairns (in press) argues convincingly that the priming effect, while real, may not represent a fundamental process of sentence comprehension. Cairns puts the issue clearly and succinctly: "If the priming account is correct...the autonomy hypothesis is clearly falsified, for we would have a lexical processor whose retrieval stage is affected by semantic and real world information."(p.9)

The question of whether a biasing prior context facilitates the resolution of ambiguity received a number of different answers. Some (Swinney and Hakes, 1976; Cairns and Hsu, 1980, for example) found a facilitating effect of biasing contexts. But a number of other reseachers found that biasing contexts do not remove the ambiguity effect (Foss and Jenkins, 1973; Conrad, 1974; Holmes, Arwas and Garrett, 1977). Further, there was no way of knowing whether those who did find a bias effect had tapped retrieval or post-access operations.

Swinney (1979) tested the hypothesis that lexical retrieval is directed by prior context. Despite strongly biasing prior contexts, Swinney found that all meaning of a lexically ambiguous item are available immediately after the item is presented, although a lexical decision is quickly made thereafter. This amounts to strong support for the view that lexical access is an autonomous process. In Tannenhaus, Leiman, and Seidenberg (1979) two biasing contexts were constructed for 24 noun-verb ambiguities (for example, "rose"), so that an ambiguous item was at the end of one sentence that was biased toward its noun reading and one toward its verb version ("She held a rose," and "They all rose"). Subjects had to read a word, visually presented at 0, 200 or 600 msecs. after the ambiguous word, that was related to either the verb or noun reading. The naming latency was the dependent measure. At 0 msecs. the presence of the ambiguous items facilitated naming of either related target. By 200 msecs., however, only those targets related to the meaning of the sentence had a facilitative effect. This would seem to comport well with the Swinney finding, suggesting again that retrieval is autonomous, undirected by prior context. Although disambiguation takes place quickly, it appears to be a post-access phenomenon.

Unambiguous Lexical Items

An increasing body of research is accumulating to demonstrate that context facilitates the processing not only of ambiguous but also of unambiguous items. Context has been found to facilitate the processing of unambiguous items using the phoneme monitor device (Cairns and Foss, 1971); lexical decision speed (Schuberth and Eimas, 1977); and, importantly for the present study, comprehension time (Cairns, et al 1980); as well as many other measures.

Syntactic Processing

The clash between the global and autonomous positions on the syntactic processor is clear, even if the available evidence produces no clear victor. The global theorists claim that the syntactic processing has access to semantic and conceptual knowledge; the autonomy theorists maintain that syntactic processing proceeds independently. On the autonomy view, semantically and conceptually implausible sentences will be processed at the syntactic level in precisely the same way as plausible ones, an important claim for the present study since one class of metaphors is syntactically "ill-formed" (if one believes that selectional restrictions are syntactic).

Slobin's early finding (Slobin, 1966) that "irreversible passives" were understood as quickly as "actives" amounted to support for the global theorists. Because "irreversible passives" were syntactically more complex than actives, it seemed they ought to be psycholinguistically more complex; the absence of a complexity difference suggested that real-world knowledge was facilitating syntactic processing. But the work of Forster and Olbrei (1973) suggested that the inference from Slobin's findings is mistaken. Using a variety of comprehension complexity measures, Forster and Olbrei established that both reversible and irreversible passives were, in fact, more complex than their active controls. Further, Forster (1979) has shown that re-ordering of lexical items, with its effect on syntactic operations, has no less substantial an effect on the processing of a plausible sentence than on an implausible one.

Hurtig (1976) used a sentence completion task to study the on-line influence of context on the processing of ambiguous and unambiguous sentences. Hurtig, investigating whether a prior biasing context would direct the syntactic analysis of ambiguous sentences, found a persistent ambiguity affect on completion time, an effect as great for

biased as for neutral contexts. Hurtig's results would seem to undermine the claim that the syntactic analysis of ambiguous sentences is guided by prior context.

The most important putuative support for the global theory comes to us from the work of Tyler and her colleagues (Tyler and Marslen-Wilson, 1977; Marslen-Wilson, Tyler, and Seidenberg, 1977). For example, Tyler and Marslen-Wilson (1977) studied naming latencies of singular and plural verbs when they were preceded by ambiguous phrases that themselves followed clauses which biased the interpretation toward a gerundive or adjectival reading. They found that when the biasing context was compatible with the number and verb, shorter naming latencies were obtained. They construed this finding as support for an "on-line interactive model" which allows context to direct syntactic analysis.

Tyler and Marslen-Wilson's interpretation of their results, however, is questioned by Cowart (1980), who analyzed their materials and argues that the majority of the biasing was actually structural rather than semantic. For example, consider one of Marslen-Wilson and Tyler's sentences, "As they fall to the ground, burning trees...". On Cowart's view the plurality of "burning trees" is determined by the structural analysis of "they". If Cowart's analysis is correct, the Tyler and Marslen-Wilson

results pose no challenge to a theory of autonomous syntactic analysis, since it is information within the syntactic subcomponent that is actually facilitating syntactic processing.

Considering the crucial experiments, it would seem fair to conclude--at least--that some of the evidence supports an autonomous level of syntactic processing. Further, there seems to be no evidence against autonomous syntatic processing. On the contrary, all the evidence seems to be consistent with the existence of autonomous syntactic processing.

The Message Processor and the General Problem Solver

Forster's model, again, incorporates into it a message processor that operates autonomously to integrate output from a lexical and syntactic processor. The message forms a conceptual representation of the input string by a series of acts including "identifying the referents of the referring expressions, (b)resolving ambiguities, (c)making inferences from the surface structure, and (d)supplying additional information from the lexicon that may be relevant to the interpretation of the sentence."(p.35) This process is absolutely uninfluenced by real-world knowledge. Further,

the dedicated processors can only act on information received from the level immediately beneath it, which means each level of processing is entirely autonomous. As Cairns (Note 1) points out, however, it is possible to propose an autonomous theory of processing that consists only of a mental lexicon, a lexical and a syntactic processor. In fact, it is extremely difficult to distinguish between the work of the General Problem Solver in Forsters model and that of the message processor. (Since the crucial experiments have not been performed, I will not bother to distinguish between the operation of these two, possibly separate, components.)

Concluding Observations on Autonomy, Context, and Metaphor

The evidence discussed above holds some important implications for the processing of metaphor. The picture that emerges is of a language processor that produces a conceptual representation of sentences, uninfluenced by its syntactic well-formedness or semantic and real world plausibility. Many metaphors seem to violate restrictions, but the autonomy model does not entail greater processing complexity at either the lexical or syntactic stages for sentences that violate restrictions. Many metaphors are, if taken "literally", implausible, but an autonomous processor can make use of plausibility only at the level of the

message processor/General Problem Solver. At that level, the linguisitic representation produced by the autonomous system must be enriched by inferences; the linguistic strings must be given an interpretation that makes sense of them in light of real world knowledge. The interpretation must be accomplished both within and across sentences, and at that level the linguistic and nonlinguistic context must be used to produce coherent meanings for the sentences. In short, the role of context in the interpretation of metaphor would seem to be played outside the level of lexical and syntactic processing.

Cairns (1980) distinguishes between components of the comprehension process which may contribute to processing complexity, Integrational and Inferential operations:

> Integration processes are those which fuse information associated with separate lexical items into a conceptual representation governed by the syntactic relations among them. Similarly, information will be integrated across clauses (also governed by the syntactic relations between them) and across sentences (Bransford and Franks, 1972) (p.30)...Whereas integrational processes fuse information across constituents, inferential processes add information which was not directly coded by the lexical and syntactic information contained in the sentence. Evidence abounds that information from inferences, which may be generated by various kinds of internalized knowledge, is indeed part of the conceptual representation of sentences. (p. 32)

This distinction between integrational and inferential operations carries an important implication for the processing of metaphors. Those sentences which are metaphorical because of their linguistic and nonlinguistic context are complex primarily because of the inferential processes involved in understanding them, while sentences which are metaphorical because of their inter-segmental connections are complex primarily because of integrational problems of comprehension. Of course, both sorts of complexity can be present in any particular case.

In Summary

The work of Johnson and his colleagues in the series of experiments discussed earlier suggests that there is an intimate connection between the interpretability and "goodness" of metaphors and the degree to which the topic and vehicle are similar. Their explanation of "similarity", however, is problematic, since it does not explain how the melding of topic and vehicle is accomplished. The work of Polio and Burns (1977) provides evidence that subjects can recall metaphors just as well as literals when they are first required to interpret them. Honeck, Reichman, and Hoffman (1975) found no difference in prompted recall of metaphors and literals when a measure of meaning was used, offering still more evidence that humans are quite skillful at understanding metaphors. Their investigation, however, leaves open the question of how metaphors are understood. It is possible that metaphors and literals are ultimately represented in a similar way--and, therefore, are equally easy to recall--while the process of comprehension, up to some point, is quite different.

The work of Clark and Lucy (1975) can be interpreted as evidence for a stage theory of the processing of metaphor, if one is willing to grant that metaphors are a species of indirect speech act, though they did not study metaphors and do not directly make this claim. Certainly this is the view of Harnish

(1976) and Searles (1979). Harris, however, (in a methodologically weak study), found no time difference for the processing of metaphors and literals. In addition, in a subsequent series of studies (1979), he developed more support for the similarity between the processing of literal and metaphorical language.

Against the evidence and arguments in favor of a stage theory of metaphor processing, stands the work of Ortony et al., Verbrugge and McCarrell, and Harris.

Earlier I offered some reasons for doubting whether Ortony, et al., were actually comparing metaphor and literal processing. These objectives aside, their experiment suggests that, given sufficient context, metaphors are no more complex to process then literals. If that is so, the stage theory is wrong.

The work of Verbrugge and McCarrell is compatible with, even if unfriendly, toward the view that metaphors are psycholinguistically more complex than literals, if we speculate that discovering a metaphor's ground requires additional inferential work.

It seemed to me, at the time my experiments were first planned, that the sort of metaphors regularly found in ordinary language are quite easy to understand, but that, for a number of

theoretical and empirical reasons, they must be more pyscholinguistically complex than literals. In retrospect, it seems my own intuitions together with the evidence from Clark and Lucy and the arguments of Grice, Searle, Black, Beardsly, and others, convinced me that metaphors were the more complex of the two forms.

The Verbrugge and McCarrell evidence was compelling: subjects seemed to discover an abstract ground during the process of comprehension. Therein, I thought, lies an important connection between the work of Ortony, et al., and Verbrugge and McCarrell. To the extent that context makes the discovery of ground easier --by providing clues, for example--metaphors in context might approach the comprehensibility of literals, while remaining more complex in isolation. (Ortony, et al., of course, had found "no difference" in context, but I have already expressed my interpretation of that study.) A sufficiently sensitive measure of complexity should reveal a persistently greater processing difficulty for metaphors as compared to literals, however, for either of two reasons. From one point of view, the processing of metaphors involves a greater number of stages than does the processing of literals; additional stages ought to increase complexity. And if one rejects the stage theory for that proposed by Verbrugge and McCarrell, still the discovery of a

metaphor's ground ought to require more inferential work than more obvious "grounds" in literal statements of similarity, even within context.

Therefore, I hypothesized that metaphors are more complex than literals in isolation, that the relative difference in complexity will be substantially reduced as the context which makes the ground explicit is provided, but that there will always be greater complexity in processing metaphors than literals. A series of experiments was designed and conducted to test this hypothesis.

CHAPTER TWO: THE EXPERIMENTS

The reader will recall that Ortony et al., had used sentences that could receive either a metaphorical or literal interpretation, depending upon the context that preceded them. As I have already argued, it is a serious and open question whether these sentences were metaphors at all. Regardless of how that question is answered, however, there are certainly other kinds of metaphors than those Ortony et al, studied, and it is important to know whether their findings are relevant to metaphoric comprehension <u>in general</u>.

It seemed possible that Ortony et al.'s results were artifactual, in the sense that their "no difference" finding in the long context condition might have resulted from an insensitive measure. Consequently, I wanted to find a sensitive measure for the present study.

I hypothesized that metaphorical sentences were more difficult to process than literal sentences. This hypothesis was motivated by two separate lines of reasoning. If the pragmatic theorists were correct and metaphors are parasitic on ordinary language, metaphors would be

understood by first arriving at the "literal" interpretation of a sentence and then construing its metaphorical meaning. The extra step, it seemed, would contribute to a metaphor's psycholinguistic complexity. On the other hand, if Verbrugge and McCarrell's position that understanding metaphors requires more inference than understanding literals was correct, metaphors would still be more psycholinguistically complex than literals.

Two experiments, with a number of purposes, were conducted. First, I wanted to test my prediction that in constructed sets of metaphor/literal pairs, presented out of context, the metaphorical sentences would be more difficult to process. Further, I wanted to test two prospective measures of psycholinguistic complexity for use in a subsequent study.

When I predicted in the first experiment that metaphors would be more complex than literals in the zero-context (that is, without preceding text), my intention was subsequently to conduct an experiment that would test my additional prediction that the complexity effect would diminish, but persist, with the addition of contextual support. This hypothesis was motivated by my belief that

context could facilitate the construal of the metaphorical meaning (since pragmatic theories envision the use of context in the interpretation of intended meaning), on the one hand, and the belief that context would facilitate the inference necessary to discover the metaphor's ground, on the other hand.

Pre-test I

To test my hypothesis about the effect of context on the processing of metaphors, it was necessary to construct and pre-test materials to meet certain criteria that would make generalization from the results possible.

Literal/metaphor pairs of roughly equal length and linguistic complexity were needed. For each member of the set, short and long context were constructed so that no short context of any set would be longer than the long context of any other set. The construction of these materials was particularly challenging, since the metaphorical and literal sentences of any pair were to follow from the same short and long contexts.

The metaphorical and literal sentence mates had to follow equally well from the same short and long context, so that any differences in processing time that was found could not be attributed to differences in how well metaphors as opposed to literals were related to the prior context.

The context sentences would test the hypothesis that the putative difference in processing complexity between metaphors and literals would diminish, but would not vanish with increased prior context. Consequently, the objective was to construct long contexts that provided more contextual support than the short contexts of the same set.

A group of candidate sentence-pair-context sets was constructed. In light of traditional theory and the findings of Verbrugge and McCarrell that the comprehension of metaphors involves the discovery of an underlying ground, the contexts were written with the purpose of making the grounds explicit, and they did so in the opinion of this experimenter and two judges.

In Pre-test I, one hundred twenty subjects judged how well target sentences--the metaphor and literal pair members--followed from preceding contexts, indicating their

judgements on a seven point scale. There were three context conditions in this pre-test: short (a), short (b), and a long context, with the long contexts formed by the simple addition of the two short contexts. Having two short context conditions improved the likelihood of obtaining materials that satisfied the pretest criteria. For each metaphor/literal pair, therefore, there were six conditions, with the same contexts being used for the literal and metaphorical sentences of each set.

TABLE 6

Sample Materials: Pre-Test I

Short context: By moving step by step from kindergarten through college, people are able to increase their chance of obtaining a good job.

Metaphor: The educational system is a staircase to success.

follows well__:__:__:__:__:__:__doesn't follow

short context: This upward progression offered by the school system provides those who take advantage of it the likelihood of prestige and good salaries.

Metaphor: The educational system is a staircase to success.

follows well__:__:__:__:__:__:__doesn't follow

long context: By moving step by step from kindergarten through college, people are able to increase their chance of obtaining a good job. This upward

progression offered by the school system provides those who take advantage of it the likelihood of prestige and good salaries.

Metaphor: The educational system is a staircase to success.

Short context: By moving step by step from kindergarten through college, people are able to increase their chance of obtaining a good job.

Literal: The educational system is a means to success.

follows well__:__:__:__:__:__:__doesn't follow

short context: This upward progression offered by the school system provides those who take advantage of it the likelihood of prestige and good salaries.

Literal: The educational system is a means to success.

follows well__:__:__:__:__:__:__doesn't follow

long context: By moving step by step from kindergarten through college, people are able to increase their chance of obtaining a good job. This upward progression offered by the school system provides those who take advantage of it the likelihood of prestige and good salaries.

Literal: The educational system is a means to success.

Forty-eight sentence-pair-context sets were included in the first pre-test, with twenty-four sets included in each test booklet. In all, there were twelve different booklets (six booklets for one set of twenty-four sets, six booklets for the other).

Pre-test I was conducted in classes in the Department of Communication Arts and Sciences at Queens College with undergraduate students participating voluntarily and without pay. Only the booklets of native English speakers were analyzed. The experimenter read the instructions aloud (see Appendix A) and answered any questions subject had about the study, but the subjects were not informed of the purpose of the pre-test, except that it was part of a pyscholinguistic study.

Results of Pre-test I

A rational method of categorizing the sets on the basis of the pre-test results had to be developed if a principled way of selecting materials for the subsequent experiments was to be found. It was decided that the seven-point scale would be treated as having three domains. All responses in the center of the scale would be treated as "neutral"; all responses in the three spaces between the neutral position and "does not follow" on the seven-point scale would be labelled "does not follow"; finally, all those responses between the neutral position and "follows well" would be

labelled "follows". In deciding which sets to select for use in the experiments, the following principles were applied:

1. select no set in which the metaphor is judged to follow less well than the literal

2. no pairs will be chosen in which there are more "does not follow" responses in the metaphorical than in the literal pair member

3. sets may have up to two "does not follow" responses in each of the paired sentences, but there can be no more of them in the metaphorical than in the literal pair member, and no more than one more "does not follow" response in the literal member than in the metaphorical one

In any case in which two context conditions met the criteria, the one that followed better for the metaphor inducing context was chosen. The application of these principles was meant to ensure that the literal and metaphorical pair members of any set followed about equally well from the same contexts and that the metaphor pair-

member never followed less well than its literal mate. Consequently, if metaphors turned out to be more complex than literals, it could not be claimed that the metaphors simply followed from the contexts less well than the literals. Twenty metaphor-literal-context sets met the criteria of selection for use in the subsequent series of experiments.

Pre-test II

Because a minimum of twenty-four sets was needed, a second pre-test was conducted. This time small changes were made in some of the sets that had approached, but had not reached, the level of acceptability in Pre-test I, in the belief that small changes might make them follow well enough to pass muster. In addition, new materials were included in the second pre-test to increase the likelihood that a sufficient number of sets would survive.

In Pre-test II, there was one short context and one long context condition for the sixteen tested items since it was felt a sufficient number of additional sets would qualify. Four distinct booklets were prepared, and

the thirty-two subjects, from the same population as those who participated in Pre-test I, proceeded in the same fashion. Again, responses were treated as falling into one of three domains. Again, the only sets selected were those in which the metaphor was judged to follow as well as or better than the literal pair members, in which there were no more than two "does not follow" responses for the literal member of the pair, with only one more "does not follow" response in the literal than in the metaphorical conditions permitted. The aim again was to discover pairs that followed about equally well from the same contexts while making certain that the literal never followed better than the metaphor.

Experiments IA and IB

Beyond testing my hypothesis that metaphorical sentences are psycholinguistically more complex than literal sentences, the first experiments had the purpose of testing two measures of pyscholinguistic complexity for possible use in a later, more elaborate experiment; the context-effect was not tested in Experiments I A and B, but it was my intention to test it in Experiment II. Therefore, two

experiments were designed, each using a different measure of psycholinguistic complexity, with both experiments being run during one experimental session.

Experiment IA

Materials and Design

Twelve of the metaphor/literal pairs--without their preceding contexts--were chosen at random from the twenty-four that had met the pre-test criteria. Two filler sentences were placed at the beginning of the experimental materials, and the twelve experimental sentences, together with eight additional fillers, were randomly ordered, with every experimental sentence's literal or metaphorical mate occupying the coordinate position on the other list. The remaining twelve sentences that had met the pre-test criteria of selection were used in Experiment IB. Because the two experiments were conducted during one experimental session, with only a short rest period between them.

Experiment IA was conducted first at half the sessions, with Experiment IB conducted first during the other half, to avoid an order effect.

Procedure

In Experiment IA subjects, assigned at random to one of the experimental conditions, were seated at booths. They listened to the sentences, which had been recorded with natural pace and intonation, over earphones. The subjects were informed that they would be hearing sentences, that the word READY would warn them that a sentence was about to be spoken, and that they were to press the response button in front of them as soon as they understood each presented sentence (instructions in Appendix B). A 1Khz tone, inaudible to the subjects, was placed near the end of each experimental sentence, starting a millisecond timer that was stopped by the subject's button-press. The response latency was the dependent variable.

The subjects were informed that they would be asked questions about the sentences they would hear, and that they should indicate their "yes" or "no" answers on the sheet provided. These questions were included with the hope of

assuring the subjects' attention to the materials, and the subjects' scores on the "exam" provided an objective criterion for rejecting subjects whose attention had drifted from the task. Subjects with more than one error on this comprehension test were to be removed from the analysis (no subjects, in fact, had to be removed). The experiments were preceded by a practice session to accustom the subjects to the procedure.

Subjects

The subjects were twenty-four Queens College undergraduates who were recruited from classes in the Department of Communication Arts and Sciences as well as from a subject pool maintained by that department. The volunteer subjects, all native English speakers, were paid $2.50 for their participation in the experiments.

Experiment IB

Materials and Design

The design of Experiment IB was quite similar to that of IA, though the task was different. The twenty-four experimental sentences in this experiment were those that had met the criteria of selection in the pre-tests but had not been used in Experiment IA. For the purposes of this experiment, however, the sentences were altered so that they were introduced by a subordinating expression such as "since", "because", and "although". For example, the pre-tested sentence (a) become (b) in Experiment IB.

(a) The sun is my alarm clock.

(b) Although the sun is my alarm clock_____.

The task was to complete the sentence fragments thus formed. As in Experiment IA, there were two forms of the experimental materials, with the literal or metaphorical pair member on one form and its literal or metaphorical mate on the other in the coordinate position. A 1khz tone, inaudible to the subject, started a millisecond timer while

the voice of the subject stopped it by triggering a voice operated relay connected to the timer. The subjects were instructed to speak into the microphone that was in front of them, completing the sentence fragments as soon as they could. The time it took to initiate the sentence completion response was the dependent variable in this study.

Procedure

Subjects seated at experimental booths heard the sentence fragments, recorded at normal rate with normal intonation, over the earphones. The subjects were informed that they would be hearing sentence fragments over the earphones, that the fragments would be preceded by the word READY, and that their task was to listen to the sentence fragments, completing them as soon as they could. The subjects were instructed not to begin to complete the fragments until they had the completing phrase in mind. There was a practice session consisting of three sentence fragments in order to familiarize the subjects with the task and reduce any practise effect. The experimental session took about twenty-five minutes.

Subjects

The same subjects who participated in Experiment IA participated in Experiment IB during the same session, with a short rest between experiments.

Results: IB

Regrettably, the variation both within and between subjects in Experiment IB was so great that analysis was futile. Many sentences were not completed at all; many took ten to fifteen seconds to complete; many others took only one or two seconds to complete. Clearly, sentence completion time was not the sensitive measure I was seeking.

Results: IA

Although the subjects were given detailed instructions and a brief practice session to familiarize them with the experimental task, an examination of the data reveals that some of the data points could not reflect actual comprehension time. In one case, one data point is missing where a subject failed to push the response button at all. It was decided to exclude all outliers above 1.5 seconds.

In all, twelve out of the two hundred eighty-eight data points were removed from the analyzed data, or slightly over 4% of the total. Rejecting the twelve data points created gaps in the raw data, so the by-subject and by-sentence analyses were computed with mean response times for those items substituting for the eliminated data.

In Experiment IA, subjects took longer to comprehend metaphors than literals, as predicted, and the mean comprehension times are displayed in Table 7.

Table 7

Comprehension Time Means

Experiment IA

Metaphors	Literals
.517 msec.	.408 msec.

While there was a substantial by-group difference in the within-subjects analysis of variance, it was not statistically significant and the results were collapsed across groups for analysis (possibly, the by-group

difference reflects a practice effect, since the different groups participated in Experiment IA either before or after Experiment IB).

While it had been my intention to place the 1khz signal 500 msc. before the end of each experimental sentence, measurement of those sentences with a Visicorder revealed that the tones actually occured at various distances from the ends of the sentences. Therefore, a Visigraph of each experimental sentence was made, allowing the precise measurement of the actual point at which the tone began; thereby, a conversion score for each experimental item was determined, making possible the comparison of sentence data.

The difference between the means of the metaphorical ($\bar{x}$=.577 seconds) and the literal ($\bar{x}$=.408 seconds) sentences was significant by subjects; $F(1,21)=9.625$, $p<.006$. A by-sentence comparison, with means collapsed across groups, reveals that the metaphors have higher associated comprehension times than the literals ($\bar{x}$=.521 seconds and $\bar{x}$=.406 seconds, respectively); $F(1,11)=6.41$, p .028. However, the Minimum F' for Experiment IA only approached significance; Minimum $F'(1,24)=3.8476$, $p<.1$.

Discussion

After the first two experiments, it seemed clear that the sentence completion task would not yield usable results, given the substantial within- and between-group variation. While the button-press experiment yielded a Minimum F' only approaching significance, the significant by-subject and by-sentence results provided some confirmation of the hyphothesis. In light of these results, I believed that the button-press measure would yield reliable results in a larger, more elaborate experiment, designed to investigate the hypothesis regarding the effect of context on the processing of metaphor.

Experiment II

Though the mini F' for Experiment IA was not significant, the significant by-subject and by-sentence effects convinced me of the sensitivity of the button-press measure. A second experiment, with 24 experimental sentences, was designed to again test the hypothesis that metaphors are more complex than literals. Further,

Experiment II was meant to test the hypothesis that this effect would diminish but not vanish as supporting context was supplied.

All twenty-four of the sentence-context sets that had met the criteria of selection in Pre-tests I and II were used in Experiment II. Twelve filler items, five of which were followed by associated yes/no questions, were placed in front of the experimental sentences, and six more fillers and associated questions were randomly distributed among the twenty-four experimental items. The experimental materials, then, consisted of forty-two sentence-context sets and eleven associated questions on each of the six experimental forms. The experimental session was immediately preceded by a seven-item practice session with three associated questions to familiarize the subjects with the experimental task.

In addition to the factor of metaphoricity, there was a second factor, context-length, which had three levels: no context, short context, and long context. The experiment was designed so that each metaphorical and literal member of each experimental set was heard as a target sentence

following each of the three context conditions. Therefore six different forms of the experimental materials were needed.

As in the earlier experiments, a 1khz tone, inaudible to the subjects, was placed near the ends of the experimental sentences. The tone started a millisecond timer, as in the earlier experiments. Subsequently, an acoustic spectrogram of each of the one hundred forty-four experimental sentences was produced, and it was determined, by agreement between this experimenter and a speech scientist (Michael Studdert-Kennedy), how long before the end of each sentence the tone had actually sounded. In this way, a conversion factor was obtained for each of the sentences, allowing a comparison between them. As in Experiment IA, subjects stopped the timer when they pressed the button before them, indicating they had understood the sentence, and the elapsed time was the independent variable in this experiment. Because some of the target sentences followed a linguistic context and some did not, an audible tone was placed in front of each target sentence so that the subjects would know after which sentence to indicate their understanding with a button-press.

Procedure

The subjects, one or two at a time, were seated at booths with a response button in front of them. They were instructed to listen to the sentences over the earphones and to press the response button as soon as they had understood each sentence. (Instructions in Appendix C) They were told that the word READY would signal the beginning of an item, that the target sentence would be immediately preceded by an audible "beep", and that when a series of sentences came before the target sentence they were to understand the target as a continuation of the preceding context. The experimental procedure took about twenty minutes.

Subjects

Again, the subjects were Queens College undergraduate student volunteers who received $2.50 for their participation in the experiment. All subjects were native English speakers.

Results

In examining the data from Experiment II, what was only a "hunch" during the running of the experiment was confirmed. Some of the subjects were treating experimental sentence number five as having been completed before it actually was, yielding artificially fast comprehension times for that sentence. Consequently, the data points for the six conditions of sentence five were removed from the analysis. In addition, there were two data points where there were no responses at all, and twelve where subjects pushed the response button before they could have understood the sentence or in which the time-lag was too great (suggesting that attention had flagged). Those responses 250msc. or more before the end of the target sentences and more than 1.5 seconds after were removed from the analyzed data. The fourteen outliers were replaced in the by-subject analysis with means for the subject's response in that condition and in the by-sentence analysis with the mean for that sentence. About 1.7% of the data points for the twenty-three sentences (or 5.8% of the twenty-four sentences) were replaced with means.

The analysis of the by-subject comprehension times, displayed in Table 8, reveals that the mean comprehension times for the metaphors were once again greater than for the literals in all context conditions.

Table 8

Comprehension Time Means

EXPERIMENT II

Length

	No Context	Short Context	Long Context
Metaphors	.505	.355	.389
Literals	.485	.346	.350

In the by-subject analysis in Experiment II, for example, length is revealed to be a significant variable; $F(2,60)=45.81$, $p < .001$. And in the by-sentence analysis, a similar phenomenon is reflected, with the factor of length also significant, $F(2,44)=15.573$, $p<.001$; Minimum $F'(2,7)=11.622$, $p<.01$. The group-by-metaphor ($F(5,30) = 1.696$) and the context-by-metaphor ($F(2,10) = .807$) interactions were not significant. The results, collapsed across groups, approach significance with $F(1,30) = 3.727$, $p=.064$.

The by-sentence analysis reveals a different story. While the metaphors produce larger mean comprehension times than the literals in all conditions (see table 8), those differences are not significant; $F(1,22)=p<1.0$.

Discussion of Experiments IA and II

In psychological experiments, of course, there is always some concern over whether the task is measuring the phenomenon of interest. In this study, response latency is the measure, and we might wonder if it does truly measure the relative psycholinguistic complexity of the literal and metaphorical sentences. If it does not, failure to find a significant difference between the "comprehension times" of metaphorical and literal sentences, of course, would be of no great interest. However, the data from Experiment II strongly suggests that the measure used in this experiment measured what it was intended to measure.

To understand the meaning of these figures, one must remember that the contexts in this experiment were written with the intention of making the grounds of the metaphors explicit, that the literals followed about as well from the contexts as did the metaphors, and that it was the opinion

of the experimenter and two judges that the contexts "explained" the targets. Furthermore, one must remember that it is a consistent finding in the literature that context facilitates comprehension. In view of the significant context effect found in Experiment II and the nature of the contexts themselves, it seems reasonable to conclude that the dependent measure in this experiment was, in fact, measuring comprehension complexity. The failure to find a significant difference between the metaphorical and literal comprehension times in this study cannot be laid at the doorstep of an irrelevant or insensitive measure.

While it is true that the non-significant by-sentence analysis and the nearly significant by-subject analysis on the variable of metaphoricity in this experiment give insignificant justification for rejecting the null hypothesis, the comprehension time differences between the metaphorical and literal sentences should not be passed over too quickly, either. In five of the six groups in Experiment II the metaphors took longer to comprehend than the literals in the by-subject analyses.

Further, in the by-sentence analysis, while the difference between the metaphorical and literal sentences did not begin to approach statistical significance, it is also true that the mean comprehension times for the metaphors was greater than that for literals in all of the three context conditions. Add to these observations the significant by-subject and by-sentence analyses and the marginally significant Minimum F' in Experiment IA, and there is the hint, at least, of something worthy of examination.

As I examined the results from the series of experiments, it seemed possible that some phenonemon closely related to the metaphorical/literal distinction, yet not identical to it, was at work beneath the surface.

When examining the experimental materials used in Experiment II (after having scrutinized the analysis of those results), I was struck by something I had not recognized earlier. While the materials had been quite thoroughly pre-tested, it was my intuition, in retrospect, that the members of the sentence pairs differed from one

another in a quite unexpected way: some of the metaphors seemed to be more clearly "sensible" than their literal mates, while the reverse was the case in some other pairs.

Consider the following illustrative pair:

a. M The sun is my alarm clock.
b. L The sun disturbs my sleep.

Sentence "a." struck me and the judges as a relatively novel metaphor when it was first constructed, while sentence "b" seemed a straightforwardly literal expression. Though one certainly cannot draw firm conclusions from this one pair, consider what understanding these two sentences might involve. To fuse the topic and vehicle in sentence "a.", what sort of act might be required?

Understanding some sentences, according to the intentional view (see discussion of Clark, p.106) would to require more inferring to get the speaker/writer's intended meaning, and this holds an important implication for a theory of metaphor comprehension. In metaphorical sentences, we might wonder whether the inference-work necessary to fuse subject and predicate is often substantial (especially, in poetic metaphor). On the other hand, if it

is inference-making that largely determines the comprehension time of metaphors (the fewer the inferences, the shorter the time required), then literal sentences with "weak" or "low" probability connections between subject and predicate might be just as psycholinguistically complex as metaphorical sentences, and, in some cases, might be even more so.

In the "sun" sentence above, what sort of bridging assumptions might be needed? To fuse the topic and vehicle domains in the "alarm clock" member of the pair, something like the following might be "inferred": "has some property which is exploited to wake one from sleep?" Perhaps. (Certainly any attempt to paraphrase a psychological process is open to alternative proposals. In order to grasp the intended meaning of an utterance of sentence "a", however, something akin to my paraphrase must be assumed.) In understanding the literal member of the pair, it is just as likely that the reader/hearer must imagine some way in which this asserted property of the sun operates; the sun has some property, brightness perhaps, that makes sleep difficult.

I am not claiming that in the "alarm clock" example, or in others like it, the "metaphors" clearly require more inference-work than the literal to be understood; I do not know how one would quantify that, or how one could measure the psychological complexity of one inference as compared to another. However, for those sentences which are similar in meaning and syntactic complexity, it seems reasonable to conclude that the "metaphorical" or "literal" status of the sentence does not reliably predict which one will require more inference-work to understand. Moreover, if Clark is right when he claims that formulating bridging assumptions must take time, it seems to me that degree-of-metaphoricity is not harnessed any too securely to psycholinguistic complexity. In fact, one must wonder about the psychological reality of the concept metaphor itself.

In light of the failure of the second experiment to find any complexity difference between metaphors and literals, and the argument just summoned that it is the inference work, tied as it is to plausibility, which makes on experimental sentence more complex than another, it seemed desirable to take another look at the materials and the data. For that reason, I designed a post hoc paper-

and-pencil experiment to test the hypothesis that plausibility is a better predictor of comprehension time than is metaphoricity.

Experient III

Materials and Design

A third experiment was designed to discover whether my hunch that the plausibility of the subject-predicate fusion might be a better predictor of comprehension time than metaphoricity. Experiment III sought to quantify the plausibility of the material used in Experiment II so that the relative correlation of plausibility and metaphoricity wih comprehension time for those sentences could be compared.

The metaphorical and literal versions of the twenty-three sentences analyzed in Experiment II were the experimental items in this study. Together with four "cheater items" (included to test the sincerity and attention with which the subjects responded to the items), the sentences were randomly ordered. Two forms of the materials were constructed, counterbalanced for order.

The materials were constructed so that the subjects were given the head noun phrase of the sentence (which in all cases was the same for the metaphorical and literal version of each sentence) and were presented with a choice between the metaphorical and literal vehicle to complete the sentence.

Procedure

The subjects were instructed to choose the phrase which most plausibly completed the sentence, in their view, by circling their choice. For example,

2. The desert a. is an ocean of sand.
   b. is an expanse of sand.

The experimenter read the instructions, answered any questions the subjects had, and collected the forms from the subjects when they had finished. The subjects were not told the purpose of the study except that it was part of a psycholinguistic experiment.

Subjects

The thirty-four subjects in the experiment were drawn from the same population as were those in the earlier experiments. The study was conducted in two separate classes in the Department of Communication Arts and Sciences, with fourteen participating in one class and twenty in the other. The subjects were native English speakers.

It would have been desirable to have obtained plausibility ratings from the same subjects who participated in Experiment II, ideally during the same sessions. Clearly, however, the need for such a measure was not anticipated at that time. As it is, the plausibility ratings and comprehension times were derived from the same populaton, so it seems justifiable to examine the correlation using this data.

Results

Since each subject could choose either of the completing-phrases, with thirty-four subjects participating, any completing-phrase could be chosen between zero and

thirty-four times. I decided to use the number of times any completing phrase was chosen as a measure of its "plausibility". In this way, plausibility ratings for the metaphorical and literal versions of each of the twenty-three sentences were determined. Using these plausibility ratings, it was possible to discover whether metaphoricity or plausibility was more highly correlated with the comprehension times of the forty-six sentences. A Pearson product-moment correlation was run and the correlation coefficients are reproduced in Table 9. Since the values for metaphor were binary, the program computed a point biserial product coefficient for those correlatons.

Table 9

Pearson Product Moment Coefficients

Experiment III

	Plausibility	Comprehension Time
Metaphoricity	−0.4983 (46) $p < .001$	-.0957 (46) p=0.263
Plausibility		-0.2134 (46) p=0.077

(coefficient/(sentences)/significance)

Some question exists as to the degrees of freedom in this analysis. In one sense, the plausibility scores of the 46 sentences are not truly independent, since in any pair the forced-choice paradigm meant that the more plausible one pair-member was rated, the less plausible was its mate. If one chooses to view the number of cases as 23, the correlation between plausibility and comprehension time is clearly insignificant.

However it is not clear that this highly conservative line of reasoning is justified. What is being correlated are comprehension times and plausibility ratings, and those

items are completely independent of one another. I have voted for this argument and use an N of 46 in the analysis that follows.

Metaphoricity and plausibility are inversely correlated; the less plausible a sentence, the more likely it is to be a metaphor rather than a literal (in this corpus); conversely, the less probable, the more likely it is to be a metaphor. This finding is even more interesting when one considers that the metaphors chosen for use in this experiment were felt to be readily understandable and likely to be found in normal discourse--not "poetic" metaphors. This inverse correlation between metaphoricity and plausibility, predicted by the ex post facto hyphothesis, is highly significant.(p .01)

Second, while metaphors are not significantly correlated with comprehension time--no surprise in light of the earlier analysis of variance--plausibility and comprehension time are correlated at a relaxed level of significance ($p = .077$). This suggests that the plausibility of the subject-predicate fusion may be a more important factor in determining comprehension time (and complexity), than metaphoricity. In short, then, the series

of experiments reported here provides little, if any, support for the psychological reality of the metaphorical/literal distinction but suggests the presence of a more fundamental underlying factor, plausibility.

Chapter III: General Discussion

When we consider the sort of metaphors that have been studied from the psycholinguistic perspective, we discover at least two important kinds. There are those whose metaphorical status is due to the particular linguistic or extra linguistic context in which they are found (e.g., Ortony, et al.'s sentences). This is the class of metaphors which Levin (1977) has termed "pragmatic." There are those expressions that are classified as metaphors by virtue of their within-sentence structure (e.g., those I studied, and those studied by Verbrugge and McCarrell). These are the metaphors which Levin has termed "semantic." Because of the materials I used, the results of my experiments pertain only to semantic metaphors. In light of the literature reviewed and my findings in Experiments I, II, and III, it seems plausible that there is no special processing complexity associated with metaphors qua metaphors. Instead the complexity of some particular metaphors may grow out of the special problems they pose to the language processor (problems faced, also, when understanding other, nonmetaphorical sentences).

The important question underlying the series of experiments reported here is whether, and if so, in what cases, the language processing system treats "metaphors" in a way

fundamentally different from the way in which it treats "literal" expressions. Intimately connected with that question is another one: Is the metaphorical/literal distinction psychologically real? The series of experiments described in Chapter II were designed to explore these questions.

In Experiment I, using response time as the measure of processing complexity, metaphors were found to be significantly more difficult to process than their literal mates. In Experiment II, the metaphors and literals were presented as targets either alone or following short or long contexts. While context clearly speeded the processing of both metaphors and literals, and while metaphors generally took longer to process than literals, the difference between those two forms only approached significance. At that point, it occurred to me that some phenomenon, somehow related to the intuitively satisfying concept of a metaphorical/literal distinction (but not identical to it) was at work. The plausibility of the subject-predicate connection seemed to be the most likely candidate. In Experiment III, subject judgements about the plausibility of the experimental materials was found to be highly correlated with metaphoricity, but even more highly correlated with comprehension time.

There is some question as to whether plausibility is the best concept to characterize the fact that seems to have partly controlled processing time in my experiments. It might be argued that the degree to which the subject phrases predicted the predicate phrases, rather than the plausibility of the subject-predicate fusion, was the determining factor. Ortony et al., the reader will recall, argued that the pragmatic metaphors they studied were only comparatively complex when they were relatively unpredicatable from the preceding context. But Ortony et al.'s metaphors were different from the semantic metaphors I studied. Furthermore, there is evidence that context is only facilitative when it is highly predictive (Forster, 1981), and the predicate phrases in Experiment III are not clearly determined by the subject phrases; in each case many other predicate phrases could plausibly complete the expressions. In addition, the subjects in Experiment III were instructed to choose the most plausible completing phrases, and they appeared able to follow those instructions quite naturally. For these reasons, I am convinced that plausibility rather than predictability best describes the underlying psychological factor identified in Experiment III.

A review of the literature has revealed, furthermore, that many--though not all--other researchers, using many different measures of complexity, have also been unable to

locate evidence of the greater psycholinguistic complexity of metaphors as compared to literals. Some of those researchers who did find a significant difference used questionable methodology (Harris, 1976).

One study that does suggest that metaphors are more difficult to process than literals (Clark and Lucy, 1975) was not directly concerned with metaphors but rather with other "indirect speech acts". It is worth recalling that the sentences used in that study had "direct" meanings that were imcompatible with the context-of-utterance. The indirect request, "Could you open the door?", for example, would be re-processed when the hearer realized that the speaker knew he could open the door and searches for a possible, indirect meaning. Logically, it would seem that such sentences are good candidates for a reprocessing effect; perhaps those metaphors that do have a "literal" meaning are understood in this way.

The study by Ortony, et al., revealed that metaphors took longer to process than literals in a short context but that no significant difference between those two sentence types persisted in the presence of a longer, richer preceding context. As I pointed out in Chapter I, Ortony et al.'s short contexts struck me as not merely short but also misleading. In that experiment, the "short context con-

dition" was created by placing all or part of the first sentence of the long context before the target sentence. While the long context may have virtually predicted the target, as Ortony, et al., maintained, the short context may actually have pointed in another direction. Since sentences are interpreted in terms of their context, the misleading short-context condition may have increased the processing time of the metaphors in that study--perhaps to a time that was longer than it would have been with no preceding context. Possibly, lacking a directive preceding context (or, given a misleading one), discovering the sentence's meaning is a more complicated task. But not all metaphors occur out of context, or after a misleading one. So if this short context effect is not due to some special feature of metaphors but rather to the plausibility of those sentences in their context, Ortony et al., would seem to be justified when they conclude that metaphors are not inherently more complex.

As Cairns (1980) points out, the degree to which the representation of the sentence's conceptual structure requires inference-making is reduced by contextual support. Therefore, the strong context effect in Experiment II is not surprising, since the contexts were written with the purpose

of making the grounds of the sentences explicit, hence reducing the number of inferences required to construct a coherent conceptual representation.

Opposed to metaphors whose psycholinguistic complexity grows primarily out of their contextual improbability are those that are complex primarily because of the integrational complexity of fusing the constituents internal to the sentences. In the metaphors I studied, the integrational complexity resided largely in the fusing of subject and predicate, though one could easily imagine other metaphors whose complexity would lie within a noun phrase (for example, "The hounding sun awoke me from my sleep".) However, is this complexity peculiar to metaphors?

There is a substantial uniformity of opinion in the literature on metaphor, cutting across partisan boundaries, that understanding metaphors demands some special mental act of joining subject and predicate. Within linguistics, we have seen this couched in terms of selection restriction violations; for Black, an "interactionist", the special act is a reinterpretation of the topic domain in terms of the vehicle domain; for Richards, it is the creation of some special context in which the metaphor makes sense; for Miller, there is a particular mode of "reconstruction" that is necessary. All these positions, and others, different as

they are in some respects, are not necessarily incompatible one with the other. I agree with them as far as they go, but suggest that we go a step further. The interaction, the fusion, the discovery of ground, and the other putatively special metaphorical acts, I propose, are at work, to one extent or another, in all acts of language comprehension.

All sentences of the form "X" is a "Y", not only metaphorical ones, require the listener to find some ground for seeing an "X" as a "Y". "A car is a vehicle", for example, requires that we view the "car" in terms of its function as a transporter of things. On its face, this seems a relatively simple act of comprehension, since it is in terms of a car's vehicular function that we conventionally view it. Of course, an automobile is also an artifact, a polluter of the air, a burner of fossil fuel, an expensive purchase, something which is isolating, disruptive of family life, and useful in escaping from the scene of a bank holdup. In isolation, then, the perfectly "literal" sentence "the autombile is responsible for the destruction of the American family" requires the listener to see the car in terms of the predicate phrase, which might require a good deal of inference-work, and that inference-work will undoubtedly contribute to the processing complexity of the sentence. Such a perfectly literal sentence may be no less complex, in

fact, than the sentence "The automobile fractures family life," a metaphor which, on my explanation, is primarily -- though not exclusively--integrationally complex.

My proposal is that all acts of sentence comprehension require the fusing of subject and predicate phrases and that the difficulty of that operation is not reliably linked to the metaphorical/literal status of the expression: the interpretive complexity hinges on the plausibility of the assertion the sentence expresses. An experiment by Ratcliff (1979) is interesting in this regard. He constructed sentence pairs in which one sentence was more plausible than the other. In one condition, the aim was to fashion subject-predicate phrases in which the connection between those two constituents was "as simple as possible and to involve only information contained in the lexicon." Ratcliff found that sentences like (72) are processed more quickly than those like (73):

(72) The tailor made the uniforms.
(73) The usher made the uniforms.

Ratcliff's explanation of these results is that one thing tailors do is make uniforms--it is almost part of the definition of "tailor"--while that is not true of ushers, who may incidentally make uniforms.

Ratcliffe found a statistically significant plausibility effect only for sentences like those above, though he tested two other conditions as well. In the second condition, it was Ratcliff's view that the connection between subject and predicate involved inferences not dependent on information in the mental lexicon, though (75) was intended to express a more plausible state of affairs than (76).

(75) The carpenter bought the timber.
(76) The lecturer bought the timber.

In a third condition, it was believe..."the connection between the subject NP and the predicate is even more remote."

(77) The fireman sprayed the stadium.
(78) The gamblers sprayed the stadium.

Only in sentences of the first kind was the plausibility effect significant, but in the two other conditions the implausible sentences took a nonsignificantly longer time to process than their more plausible mates.

If we accept Ratcliff's distinction between the three tested conditions, then it would seem that this sort of plausibility might have an effect on sentence complexity only in those cases in which the noun phrase contains the

information predicated of it in the more plausible sentence but not in its mate. For example, (72) would have roughly the following meaning: "The man who makes clothing made a kind of clothing."

Ratcliff's interpretation of his findings depends on a distinction between information in the mental lexicon and that which is part of general knowledge. But, as Forster points out: "How clearly this distinction can be made is very much open to questions, because there is no adequate theory of the contents of the lexicon..."(Forster, 1979)

At this point, we have no sound basis for explaining away the plausibility finding in the first condition of Ratcliff's experiment. The absence of a statistically significant result in the two other conditions might be due to the greater plausibility of sentences like (72) than those like (73), a plausibility difference that might not be lexically based. Further, comprehension time may not be a sufficiently sensitive measure of plausibility to pick up the subtle differences in integrative complexity. Certainly, as Forster suggests, (76) should take longer to process than (75).

(75) The carpenter bought the timber.
(76) The carpenter bought the universe.

Yet "buyer of timber" must be something we infer, or know, about carpenters, not information in our mental lexicon. Consequently, it would not only seem that the distinction between general knowledge and lexical information is hard to maintain, it is also plain that clearly nonlexical information can determine the plausibility and comprehension time of an utterance. In fact, the results of my Experiment III would seem to support Forster's intuition about the relative plausibility and comprehension time of (75) and (76).

In his discussion of Ratcliff's paper, Forster points out that in the contrast between (75) and (76) "we have introduced a further factor, namely, the implausibility of the predicate itself; i.e., it is relatively implausible that anyone could buy a universe." Now I do not know how plausible such a purchase would be, though I suppose that would depend upon how good the salesman is, or how desperately this carpenter needs a universe, or upon what construal "universe" or "bought" should receive (in other words, it would depend on the context). At any rate, it is precisely "implausible" predicates of this kind that characterize the sort of metaphors I studied, though some are certainly more plausible than others.

My results do not help decide the argument between automony and global theories of sentence processing. Nonetheless, as I argued in the review of the literature, the available evidence appears to favor the autonomy theory. My results comport wih the autonomy theory and I have chosen to analyze my results in terms of Forster's (1979) model.

The model of language processing put forward by Forster hypothesizes a series of "dedicated micro-processors" autonomously concerned with lexical, syntactic, and message processing. The message processor "contains a rather mixed set of procedures that convert purely linguistic representation into a conceptual structure representing the intended message." (p.35) The functions of the message processor in Forster's model are distinguished from those of the General Problem Solver (GPS): "Each microprocessor outputs to the next highest (sic) microprocessor and to the GPS. Thus, the GPS is aware of the output of each level of analysis, but after a variable delay." (p.35)

One likely source of the greater complexity of metaphors would be the lexical and syntactic processing stages. The evidence from my study indicates that improbable predication produces the greater complexity, locating the added complexity of some metaphors outside of the lexical and

syntactic stages: the message processor and the General Problem Solver (assuming one distinguishes between those two sub-components) would seem to be the seat of whatever special psycholinguistic complexity is associated with some metaphors.

According to Forster, the message processor performs a wide array of functions, including:

> (a) identifying the referents of the referring expressions, (b) resolving ambiguities, (c) making inferences from the surface structure, and (d) supplying additional information from the lexicon that may be relevant to the interpretation of the sentence.(p.35)

In my earlier review of the findings of the Ortony, et al., I argued that their short-context condition seemed to require that the reader discover (or infer) the referent of the "metaphorical" word or phrase. On Forster's model that would take place within the message processor or SPS. Similarly, the major psycholinguistic complexity of processing the sort of metaphors I studied would seem to enter during message processing; but this sort of complexity is shared by a wide array of sentence types, and is in no way peculiar to the processing of metaphors.

If metaphors were more complex than literals because of their syntactic structure, we could expect the metaphors in the sentences I studied to be more complex than their literal mates regardless of predicate plausibility, and they were not. It seems possible that the lexical and syntactic microprocessors furnish to the message processor, and grammatically organize, lexical information, without regard to selection restriction; next, the message processor interprets this pattern, with the difficulty of the interpretation depending upon predication-plausibility and not grammatical well-formedness. In short, the metaphorical/literal distinction, for whatever considerable value it may have, seems to be psychologically unreal.

The listener/hearer is an agent with a problem to solve (Clark, 1978), with only partial evidence in the form of syntactic and semantic information, linguistic and nonlinguistic context, with which to work. Understanding is the agent's objective, but in order to understand a written or spoken stretch of discourse, the agent must integrate the information between segments and infer other information from context and general knowledge. There seems to be no evidence that understanding metaphors requires a special set of comprehension operations. Some metaphors are relatively easy to understand, others are more difficult. Perhaps so many writers have concluded that metaphors are special

because understanding the richest ones requires the most integrative work. And the special insight that metaphors have been said to offer may have much to do with the inferences that must be made to understand the most vibrant ones.

The implication of my study is not that metaphors are not novel or creative (some of them certainly are); instead, in the course of this project I have developed an appreciation of how novel and creative some "merely literal" language really is.

APPENDIX A

PRE-TEST I and II

MATERIALS AND INSTRUCTION

Instructions: In this booklet you will find paragraphs of various lengths followed by an underlined sentence. What we want is your judgment of how well the underlined sentence follows from the paragraph. Please place an X in the space on the scale that best reflects your judgment of how well the underlined sentence follows from the paragraph. The scale will look like this at times:

doesn't follow__:__:__:__:__:__:__follows well

At other times, the scale will look like this:

follows well__:__:__:__:__:__:__doesn't follow

In other words, the terms "doesn't follow" and "follows well" can appear on either the right or left hand side of the scale. For that reason, you have to read each scale carefully before indicating your judgment. You can expect that some of the underlined sentences will not follow from their paragraph, that some will follow well. Therefore, feel free to use the entire scale to indicate your judgments. However, place only one X on each scale.

For example, for the paragraph-sentece pair that follows,

> Children learn about values from their parents. They watch their parent's behavior more carefully than they listen to their words.
>
> Birds are tourists.

doesn't follow_X_:__:__:__:__:__:__follows well

We have placed an X in the "doesn't follow" end of the scale, reflecting our judgment that the underlined sentence is unrelated to the paragraph above it. For the same paragraph, the underlined sentence

Parents are models for their children.

follows well__:_X_:__:__:__:__:__doesn't follow

might be rated as indicated above. (Notice that the terms are on the reverse end of the scale compared to the first scale). For that same paragraph, the underlined sentence

Parents are important to their children.

doesn't follow__:__:__:_X_:__:__:__follows well

might be rated halfway between the two poles.

Let's examine one more set of examples.

> From the top of a modern skyscraper, the people on the sidewalk look like small black spots moving about. From the 100th floor, the pedestrians below areseen as little crawling specks.
>
> The people below are ants.

follows well X : : : : : : doesn't follow

In the case above, we have indicated our judgment that the underlined sentence follows well. From the same paragraph, if the underlined sentence were

> the trees are weeping.

doesn't follow X : : : : : : follows well

it might be rated as indicated. Finally, the sentence

> The people below are happy.

follows well : : : X : : : doesn't follow

might be given the above rating. Of course, for all these examples, your rating might be different from the ones shown.

Please try to rate each paragraph/underlined sentence pair. Make certain which end "follows well" and "doesn't follow" are on for each scale. And please place your X clearly within one of the provided spaces. Move through the booklet at a comfortable pace. There is no time limit.

If you have any questions, I will try to answer them.

SAMPLE MATERIALS: PRE-TEST I

1. The desert is one of nature's wonders. When one looks across a large desert one sees sand to the horizon. The desert, an almost limitless body of sand, is swept by windstorms which move the sand in waves.

   The desert is an expanse of sand.

   follows well __: __: __: __: __: __: doesn't follow

2. Before labor unions appeared, workers had almost no rights and were at the mercy of employers, following whatever orders were given. In a way, workers were the property of the companies for which they worked, and were not free to run their lives.

   The workers were slaves to their employers.

   doesn't follow __: __: __: __: __: __: follows well

3. Poverty produces a feeling of hopelessness in the poor. The hunger of poverty gives birth to a grim view of the future. The whole family of poverty conditions--disease, poor housing, malnutrition--result in the outlook that the future will be no better.

   Hopelessness is the result of poverty.

   follows well __: __: __: __: __: __: doesn't follow

4. The day before you is clear, yet to be lived. The choices you make will determine what kind of a day it will be.

   A restaurant's kitchen is a hot place.

   doesn't follow __: __: __: __: __: __: follows well

5. Every morning and evening, commutors are crammed into subway cars. They are pushed up against one another in the poorly ventilated cars.

Commutors are crowded on the cars.

follows well __: __: __: __: __: __: doesn't follow

6. Evidence by itself does not make a good argument. The evidence must be joined by an organization that provided a framework. Without clear organization holding the argument together, the argument is without form and the parts have not coherent relation to each other.

Organization is the skeleton of an argument.

doesn't follow __: __: __: __: __: __: follows well

7. The editor must be an expert because he must cut out the undesireable sections without harming the desireable one.

The good editor is a careful surgeon.

follows well __: __: __: __: __: __: doesn't follow

8. When the first winter snow falls, the grimy city streets are hidden beneath the clean covering of brilliant white.

Snow is a fresh coat of paint on the streets.

doesn't follow __: __: __: __: __: __: follows well

9. Without the grounding in imagination, poetry will never really thrive but will more likely wither and die.

Imagination is the capacity necessary for writing poetry.

follows well __: __: __: __: __: __: doesn't follow

10. Death marks the end of life, and its arrival is a kind of signal that the drama of life is over.

Self-confidence is the basis of creativity.

doesn't follow __: __: __: __: __: __: follows well

11. My lawnmover is powerful and hard to control. It makes a loud, roaring noise as it chews up the vegetation. My lawnmover is forceful, even vicious, as it ranges over its territory, moving under its own power.

My lawnmover is a dangerous machine.

follows well __: __: __: __: __: __: doesn't follow

12. While the tree trunk is perpendicular to the ground, the branches are skinnier and horizontal to the ground.

The branches are the arms of a tree.

doesn't follow __: __: __: __: __: __: follows well

13. For most people, emotional depression is not a permanent state; it is a temporary state relative to the higher emotional ground that surrounds it. From this perspective, depression is a low point into which the person descends and out of which he emerges.

Depression is a psychological condition.

follows well __: __: __: __: __: __: doesn't follow

14. Plowing a field or digging a ditch can be just the soothing medicine needed by an anxious man or woman.

Hard work is relaxation for the nervous person.

doesn't follow __: __: __: __: __: __: follows well

15. A philosopher doesn't understand a problem immediately. In his mind he must imagine solutions, let them grow, then reap them.

Understanding is the philosopher's harvest.

follows well __: __: __: __: __: __: doesn't follow

16. The guilty conscience is in pain, and an effective rationalization, by explaining away responsibility, offers relief from pain.

Pain is an undesireable experience.

doesn't follow __: __: __: __: __: __: follows well

17. The style of the brushstrokes, along with the color choices, are singular to the trained observer, and therefore uniquely identify the painter.

Color and brushstroke are a painter's characteristics.

follows well __: __: __: __: __: __: doesn't follow

18. If you watch carefully you will notice that pedestrians move along the sidewalk according to rules. Usually, they keep to the right.

Spring is a flower's beginning.

doesn't follow __: __: __: __: __: __: follows well

19. An automobile engine will not operate for long unless oil is pumped through it, reaching its critical parts. If the car's engine loses too much oil, through a leak, for example, it will soon malfunction.

Oil is an engine's blood.

follows well __: __: __: __: __: __: doesn't follow

20. The industries around the lake use it as a dumping ground for all sorts of waste, and it has begun to stink. The lake is now seriously polluted, unsafe for drinking and swimming, and useful for nothing but a holding tank for the liquid wastes.

The lake is polluted.

doesn't follow __: __: __: __: __: __: follows well

21. Spring is the early phase of the year. Beyond it lies the summer, fall, and winter, the later phases. The spring is a period when things are beginning to grow and gather strength and are still new.

A sidewalk is the pedestrian's highway.

follows well __: __: __: __: __: __: doesn't follow

22. Each morning, since I am very sensitive to the light, I am awakened by the sun as it rises over the trees. I need nothing mechanical to wake me up, since I can be sure the sun will get me up on time.

The sun disturbs my sleep.

doesn't follow __: __: __: __: __: __: follows well

23. The dense jungle vegetation is easily penetrated by the sounds of drums by which information is sent and received.

Drums are the telegraph of the jungle.

follows well __: __: __: __: __: __: doesn't follow

24. Our poor neighborhoods take children as their raw material and produce adolescents and adults addicted to heroin, methadone, and other narcotic drugs.

Our poor neighborhoods are factories for drug addicts.

doesn't follow __: __: __: __: __: __: follows well

25. Now, for having purchased a gas guzzler fifteen years ago, he was made to suffer as the as cars inched toward the expensive fuel.

The long gasoline line seemed a harsh consequence.

follows well __: __: __: __: __: __: doesn't follow

26. Those who already have a lot of money, in some way, seem to magically pull more money toward them.

The wealthy are magnets for money.

doesn't follow __: __: __: __: __: __: follows well

27. A poet is an artist whose material is words. The poet shapes his mass of word-images into the finished object.

A poet is a sculptor of new ideas.

follows well __: __: __: __: __: __: doesn't follow

28. The national economy rises, slowly reaches a peak, plunges sharply, only to head up another hill before dropping again. So the economy is not steady for long. There are repeated dips, then rises which build suspense for the horrible drop ahead.

The economy is a roller coaster.

doesn't follow __: __: __: __: __: __: follows well

29. Generally, owls have dark bodies but reflective eyes which seen to sparkly brilliantly in the moonlight as they perch in trees.

The owl's eyes are diamonds suspended above the branches.

follows well __: __: __: __: __: __: doesn't follow

30. The restaurant's kitchen was small, and the flame of the gas burners made the space, and everything within, quite hot.

A new day is a fresh opportunity.

doesn't follow __: __: __: __: __: __: follows well

31. Because the shop is tiny, all the activity at the doorway creates a mobbed appearance, with shoppers squeezing by one another.

The store is a beehive.

follows well __: __: __: __: __: __: doesn't follow

32. The lake was smooth and still, and the hot midday sun was reflected brightly on it, as were the trees on shore.

The lake was a mirror.

doesn't follow __: __: __: __: __: __: follows well

33. When self-confidence increases, so does creativity. But creation uses up self-confidence, and the self-confidence must be restored.

Death is the final moment of life.

follows well __: __: __: __: __: __: doesn't follow

34. The public schools are the scene of brutal attacks upon teachers by students, with all kinds of weapons used.

The public schools are war zones.

doesn't follow __: __: __: __: __: __: follows well

35. A carpenter uses a clamp to hold materials, so he can use his hands to hold his tools.

The carpenter's clamp is his third hand.

follows well __: __: __: __: __: __: doesn't follow

36. When society imposes censorship, it denies freedom to certain ideas, restricting them to a certain place.

Censorship is the suppression of an idea.

doesn't follow __: __: __: __: __: __: follows well

37. The conscience is a force which gives the go-ahead to some actions while stopping others, thereby directing the child's movement. In a way, the conscience in an internalization of the laws of society, condoning a child's legal acts, disallowing the rule-violating acts.

The child's conscience is a traffic cop.

follows well __: __: __: __: __: __: doesn't follow

38. When a sailboat's sails are in place, a strong wind will move it along, pushing it through the water. A sailboat is driven by the wind. When it blows, the boat goes; without wind, it stops.

The wind is a sailboat's power.

doesn't follow __: __: __: __: __: __: follows well

39. A blind man's dog can see obstacles ahead, thus helping the blind man avoid dangers he can not see. His dog can see when a car or train is coming, allowing a blind man to travel safely.

A blind man's dog is his guide.

follows well __: __: __: __: __: __: doesn't follow

40. The Redwood tree grows to incredible heights and it towers over everything else that lives in the forest. The Redwood tree is very tall compared to the other things in the woods, dwarfing its neighbors.

Redwood trees are the skyscrapers of the forest.

doesn't follow __: __: __: __: __: __: follows well

41. Strip-mining is a form of violence committed on the trees and hills, from which the land never completely recovers.

Strip-mining is a rape of the landscape.

follows well __: __: __: __: __: __: doesn't follow

42. The billboards seem unnatural eruptions, marring the loveliness of the terrain. They deface the natural appearance of the rolling hills.

Billboards are all over the landscape.

doesn't follow __: __: __: __: __: __: follows well

43. The big, overweight man rolled unstoppably through the assembled crowd of people, plowing into whatever was in his way.

A happy thought is a helpful thing.

follows well __: __: __: __: __: __: doesn't follow

44. A sense of humor is the best protection against an insult. If you can laugh at insults, they won't harm you.

A sense of humor is armor against insults.

doesn't follow __: __: __: __: __: __: follows well

45. This upward progression offered by the school system provides those who take advantage of it the likelihood of prestige and good salaries.

The educational system is a staircase to success.

follows well __: __: __: __: __: __: doesn't follow

46. The Rolls Royce automobile stands apart from ordinary cars. It is a masterpiece of design and execution of the first order.

The Rolls Royce is the Rembrandt of automobiles.

doesn't follow __: __: __: __: __: __: follows well

47. A burglar might have to break a closed window, perhaps triggering a burglar alarm. But an open window encourages his criminal act.

A carpet is a covering for the floor.

follows well __: __: __: __: __: __: doesn't follow

48. Our memory includes a representation of our past experiences, and if we want to explore our past, our memory is a good guide.

Our memories are a record of our past.

doesn't follow __: __: __: __: __: __: follows well

MATERIALS FROM PRE-TEST II

Billboards are everywhere as you travel across America. They protrude from the hills and fields, disturbing the beauty of the landscape. The billboards seem unnatural eruptions, marrring the loveliness of the terrain. They deface the natural appearance of the rolling hills.

Billboards are warts on the landscape.

follows well__:__:__:__:__:__:__doesn't follow

An automobile engine will not operate for long unless oil is pumped through it, reaching its critical parts.

Oil is an engine's precious blood.

doesn't follow__:__:__:__:__:__:__follows well

A sense of humor is the best protection against an insult. If you can laugh at insults, they won't harm you. A sense of humor acts as a defensive barrier which prevents an insult from penetrating to your ego.

a sense of humor is protection against insults.

follows well__:__:__:__:__:__:__doesn't follow

When self-confidence increases, so does creativity. But creation uses up self-confidence, and the self-confidence must be restored.

Death is the final moment of life.

doesn't follow__:__:__:__:__:__:__follows well

Every day, on the way to market, commuters are gathered together and squeezed against one another on the poorly ventilated subway cars. The commuters are herded aboard the cars and transported toward their destination under conditions not really suitable for human beings.

Commuters are crowded on the cars.

follows well__:__:__:__:__:__:__doesn't follow

The industries around the lake dump all sorts of foul wastes into it, and it has begun to stink. The lake is now seriously contaminated, unsafe for drinking and swimming, and useful for nothing but a holding tank for the liquid wastes.

The lake is a cesspool.

doesn't follow__:__:__:__:__:__:__follows well

Strip-mining is a form of violence committed on the trees and hills, from which the land never completely recovers.

Strip-mining destroys the landscape.

follows well__:__:__:__:__:__:__doesn't follow

The small store is surrounded by many office buildings whose workers do their shopping there, with crowds of them coming in and out.

the store is a bee hive.

doesn't follow__:__:__:__:__:__:__follows well

Poverty produces a feeling of hopelessness in the poor. The hunger of poverty gives birth to a grim view of the future. The whole family of poverty conditions -- disease, poor housing, malnutrition -- result in the outlook that the future will be no better.

Hopelessness is a child of poverty.

follows well__:__:__:__:__:__:__doesn't follow

Somehow, rich people must have a quality which invisibly draws money to them, making them richer still. those who already have a lot of money, in some way, seem to magically pull more money toward them.

The wealthy are attracters of money.

doesn't follow__:__:__:__:__:__:__follows well

Plowing a field or digging a ditch can be just the soothing medicine needed by an anxious man or woman.

Hard work is relaxation for the nervous person.

follows well__:__:__:__:__:__:__doesn't follow

Today, our public schools are less places of learning than battlegrounds between students and teachers, and students and students.

The public schools are war zones.

doesn't follow__:__:__:__:__:__:__follows well

When a society imposes censorship, it denies freedom to certain ideas, restricting them to a certain place. Censorship is a denial of liberty, a limiting not only of what can be expressed, but where ideas can go.

Censorship is the suppression of an idea.

follows well__:__:__:__:__:__:__doesn't follow

The big, overweight man rolled unstoppably through the assembled crowd of people, plowing into whatever was in his way. The wise among the group jumped out of his way, since his massiveness, power, and momentum, made him a considerable force.

A happy thought is strong medicine.

doesn't follow__:__:__:__:__:__:__follows well

Before labor unions appeared, workers had almost no rights and were at the mercy of employers, following whatever orders were given.

The workers were slaves to their employers.

follows well__:__:__:__:__:__:__doesn't follow

A poet is an artist whose material is words. The poet shapes his mass of word-images into the finished object.

A poet is a creator of new forms.

doesn't follow__:__:__:__:__:__:__follows well

APPENDIX B

EXPERIMENT I

INSTRUCTIONS AND MATERIALS

This experiment is concerned with language comprehension, and there are two parts to the experiment. In this part, you will hear sentences over the earphones. If you look in front of you, you will notice that there is a button labelled "UNDERSTOOD". After you hear each sentence over the earphones, I want you to press the "UNDERSTOOD" button as soon as you understand the sentence you have heard. After you press the button, there will be a short pause, then you will hear the next sentence and I want you to press the button when you understand that sentence.

It is important that you press the button as soon as you understand the sentence, but do not press the button before you have understood it.

Sometimes a sentence will be followed by a simple question about it. In that case, simply indicate "yes" or "no" on the sheet provided, and say your answer out loud as you do.

I will explain how the second part of the experiment works after we are finished with the first part. O.K. Let's go. Please put on the earphones.

In this part of the experiment, you will hear an incomplete sentence fragment over the earphones, and your job is to think up a sensible completion for the fragment. Your complete think up a sensible completion for the fragment. Your complete sentence should make sense. Please be careful not to cough or clear your throat during part of the experiment, and please begin to speak only when you have a completed sentence in mind.

For example, you might hear the following words over the earphone:

Although the man ran quickly...

And you might respond: "he lost the race."

Or perhaps: "the tree still hit him"

So remember, listen for the sentence fragment, think up a sensible sentence completion, and as soon as you have one, say it out loud. O.K. let's begin.

MATERIALS FROM EXPERIMENT I

Literals	Metaphors
Censorship is the suppression of an idea.	Censorship is the imprisonment of an idea.
Understanding is the philosopher's goal.	Understanding is the philosopher's harvest.
Oil is an engine's lubricant.	Oil is an engine's blood.
Redwood trees are the tallest things in the forest.	Redwood trees are the skyscrapers of the forest.
A blind man's dog is his guide.	A blind man's dog is his eyes.
Commuters are crowded on the cars.	Commuters are cattle on the cars.
The public schools are dangerous places.	The public schools are war zones.
The lake was reflective.	The lake was a mirror.
The economy goes up and down.	The economy is a roller coaster.
Our poor neighborhoods are responsible for drug addiction.	Our poor neighborhoods factories for drug addicts.
The rising sum disturbs my sleep.	The rising sun is my alarm clock.
Our memories are a record of our past.	Our memories are a map of our past.

APPENDIX C

EXPERIMENT II

INSTRUCTION AND MATERIALS

You will be hearing a series of passages through the earphones. Sometimes you will hear a sentence by itself; sometimes there will be a paragraph followed by a sentence. In all cases, I want to press the button as soon as you understand the final sentence. When a sentence follows a paragraph, you are to understand it in the context of the paragraph which comes before it.

At the beginning of each paragraph sentence set you will hear the word "READY" so that you won't be surprised when the sentence or paragraph begins. You shouldn't push the button after the paragraph but only after the sentence which follows the paragraph or stands alone. There will be a "BEEP" before each of these sentences.

Again, the word "READY" announces that a passage is about to begin. Remember that you are to indicate your understanding by pressing the button after those sentences which follow a "BEEP", and if an item begins with a paragraph, you are to use that paragraph as the context for the sentence which follows it.

It is very important that you press the button as soon as you understand the sentence, but not before you understand it. You aren't supposed to decide whether you agree or disagree with the sentence; all that is necessary is that you understand it.

Sometimes, after you have pressed the "UNDERSTAND" button, you will hear the word "QUESTION" over the earphones, followed by a simple question. The question will be about the item you have just hear and should be answered out loud with a "yes" or "no" and indicated on the sheet of paper provided.

After you answer a question, you will hear the word "READY" indicating a new item is about to begin.

Any questions before we practice a little?

MATERIALS FOR EXPERIMENT II

FORM "E"

The desert is one of nature's wonders. When one looks across a large desert one sees sand to the horizon. The desert, an almost limitless body of sand, is swept by windstorms which move the sand in waves.

The desert is an ocean of sand.

The lake is now seriously contaminated, unsafe for drinking and swimming, and useful for nothing but a holding tank for the liquid wastes.

The lake is polluted.

Censorship is the imprisionment of an idea.

Hard work can have a calming effect. The man or woman who is high-strung can find peace in a day's work. Plowing a field or digging a ditch can be just the soothing medicine needed by an anxious man or woman.

Hard work is relaxation for the nervous person.

Strip-mining is a form of violence committed on the trees and hills, from which the land never completely recovers.

Strip-mining rapes the landscape.

A philosopher doesn't understand a problem immediately. In his mind he must imagine solutions, let them grow, then reap them. The philospher's period of preparation is critical. The ideas would be premature if taken too soon. In time, the idea is ripe.

Understanding is the philosopher's harvest.

A sailboat is driven by the wind. When the wind blows, the sailboat goes; without wind, it stops.

The wind is a sailboat's power.

Imagination is the capacity necessary for writing poetry.

The economy is a roller coaster.

Poverty produces a feeling of hopelessness in the poor. The hunger of poverty gives birth to a grim view of the future. The whole family of poverty conditions -- disease, poor housing, malnutrition -- result in the outlook that the future will be no better.

Hopelessness is a consequence of poverty.

The conscience is a force which gives the go-ahead to some actions while stopping others, thereby directing the child's movement.

The child's conscience is a controlling influence.

Evidence by itself does not make a good argument. The evidence must be joined by an organization that provides a framework.

Organization is the skeleton of an argument.

Redwood trees are the tallest things in the forest.

Our poor neighborhoods take children as their raw material and produce adolescents and adults addicted to heroin, methadone, and other narcotic drugs. With its unemployment, crime, and illiteracy, poor neighborhoods are fully equipped to turn out narcotic addicts as finished products.

Our poor neighborhoods are factories for drug addiction.

The carpenter's clamp is his third hand.

A blind man's dog can see obstacles ahead, thus helping the blind man avoid dangers he can not see. His dog can see when a car or train is coming, allowing a blind man to travel safely.

A blind man's dog is his guide.

A poet is an artist whose material is words. The poet shapes his mass of word-images into the finished object.

A poet is a sculptor of new ideas.

Every morning, since I am very sensitive to the light, I am awakened by the sun as it rises over the trees. I need nothing mechanical to wake me up, since I can be sure the sun will get me up on time.

The sun is my alarm clock.

There are no telephone lines in the jungle. But, through the use of drums, the inhabitants of the jungle can get their message across. The jungle's dense vegetation is easily penetrated by the sound of drums, by which information is sent and received.

Drums are a communication system in the jungle.

A sense of humor is armor against insults.

Our memory includes a representation of our past experiences, and if we want to explore our past, our memory is a good guide.

Our memories are a map of our past.

Color and brushstroke are a painter's characteristics.

Every day, on the way to market, commuters are gathered together and squeezed against one another on the poorly ventilated subway cars. The commuters are herded aboard the cars and transported toward their destination under conditions not really suitable for human beings.

Commuters are crowded on the cars.

APPENDIX D

EXPERIMENT III

INSTRUCTIONS AND MATERIALS

There are 28 items on the two pages in front of you. Each one starts with a word or phrase which you should view as the beginning of the sentence. For each item, please select either choice "A" or "B", depending on which one most plausibly completes the sentence. Circle your choices. Don't go back over your decision.

MATERIALS FOR EXPERIMENT III

1. The box
   a. was full.
   b. typed rapidly.

2. The desert
   a. is an expanse of sand.
   b. is an ocean of sand.

3. Commuters
   a. are crowded on the cars.
   b. are cattle on the cars.

4. Color and brushstroke
   a. are a painter's fingerprints
   b. are a painter's characteristics.

5. Drums
   a. are the telegraph of the jungle.
   b. are a communication system in the jungle.

6. The toothpaste
   a. was on the brush.
   b. ate the rock.

7. A poet
   a. is a creator of new forms.
   b. is a sculptor of new ideas.

8. A blind man's dog
   a. is his guide.
   b. is his eyes.

9. Redwood trees
   a. are the tallest things in the forest.
   b. are the skyscrapers of the forest.

10. Organization
    a. is the structure of an argument.
    b. is the skeleton of an argument.

11. The bird
    a. flew away.
    b. drove away.

12. Hopelessness
    a. is the child of poverty.
    b. is a consequence of poverty.

13. Imagination
    a. is the soil in which poetry grows.
    b. is the capacity necessary for writing poetry.

14. The wind
    a. is a sailboat's power.
    b. is a sailboat's engine.

15. The educational system
    a. is a means to success.
    b. is a staircase to success.

16. The electronic calculator
    a. helped the accountant.
    b. cleaned the rug.

17. The lake
    a. is polluted.
    b. is a cesspool.

18. The sun
    a. is my alarm clock.
    b. disturbs my sleep.

19. The economy
    a. is a roller coaster.
    b. goes up and down.

20. Censorship
    a. is the imprisonment of an idea.
    b. is the suppression of an idea.

21. Strip mining
    a. rapes the landscape.
    b. destroys the landscape.

22. Understanding
    a. is the philospher's harvest.
    b. is the philospher's goal.

23. The child's conscience
    a. is a controlling influence.
    b. is a traffic cop.

24. Our poor neighborhoods
    a. are responsible for drug addition.
    b. are factories for drug addiction.

25. The carpenter's clamp
    a. is this third hand.
    b. holds things for him.

26. A sense of humor
    a. is armor against insults.
    b. is protection against insults.

27. Our memories
    a. are a map of our past.
    b. are a record of our past.

REFERENCE LIST

Austin, J.L. How to do thing with words. Cambridge, Mass.: Harvard University Press, 1975.

Beardsley, M.C. Metaphor. In P. Edwards (Ed.), Encyclopedia of Philosophy (vol. 5). New York: Macmillan, 1967.

Beardsley, M.C. The metaphorical twist. Philosophy and Phenemonological Research, 1962, 22, 293-307.

Bickerton, E. Prolegomena to a linguistic theory of metaphor. Foundations of Language, 1969, 5, 34-52.

Black, M. More about metaphor. In A. Ortony, Metaphor and thought. New York: Cambridge Universiy Press, 1979.

Black, M. Models and metaphors. Ithaca, New York: Cornell University Press.

Cairns, H.S.

Current issues in research and language comprehension. In Recent Advances in Language Science. (In press)

Cairns, H.S., Cowart, W., and Jablon, A.D. Effects of prior context upon the integration of lexical information during sentence processing. Journal of Verbal Learning and Verbal Behavior, 1980, in press.

Cairns, H.S. Effects of bias on the processing and reprocessing of lexically ambiguous sentences. Journal of Experimental Psychology, 1973, 97, 335-343.

Cairns, H.S. and Foss, D.J. Falsification of the hypothesis that word frequency is a unified variable in sentence processing. Journal of Verbal Learning and Verbal Behavior, 1971, 10, 41-43.

Cairns, H.S. and Hsu, J.R. Effects of prior context upon lexical access during sentence comprehension: A replication and reinterpretation. Journal of Psycholinguistically Research, 1980, 9, 1-8.

Cairns, H.S. and Kamerman, J.D. Lexical information processing during sentence comprehension. Journal of Verbal Learning and Verbal Behavior, 1975, 14, 170-179.

Chase, W.G. and Clark, H.H. Mental operations in the comparison of sentences and pictures. In L.W. Gregg (Ed.), Cognition in learning and memory. New York: Wiley, 1972.

Cohen, J.L. and Margalit, A. The role of inductive reasoning in the interpretation of metaphor. In D. Harman and D. Davidson (Eds.), Semantics of natural language. Dordrecht-Holland: D. Reidel Company, 1972.

Chomsky, N. Degrees of grammaticalness. In J.A Fodor and J.J. Katz, The structure of language: Readings in the philosophy of language.Englewood Cliffs, New Jersey: Prentice-Hall, Inc. 1964.

Chomsky, N. Syntactic structures. The Hague: Mounton, 1957.

Clark, H.H. and Lucy, P. Understanding what is meant from what is said: A study in conversationally conveyed requests. Journal of Verbal Learning and Verbal and Verbal Behavior, 1975, 14, 56-72.

Conrad, C. Context effects in sentence comprehension: A study of the subjective lexicon. Memory and Cognition, 1974, 2, 130-138.

Cowart, W. 1981, Principals Of logical form, and a pronoun-induced bias in sentence processing - Linguistics Society of America, N.Y. 1981.

Forster, K.I. Levels of processing and the structure of the language processor. In W.E. Cooper and E.C.T. Walker (Eds.), Sentence processing. New York: Wiley, 1979.

Forster, K. I. Priming and the effects of sentence and lexical context on naming-time = Evidence for autonymous lexical processing. Quarterly Journal of Experimental Psychology, 33A, pp. 465-495, 1981.

Forster, K. I. and Olbrei, I. Semantic hueristics and syntactic analysis. Cognition, 1973, 2, 319-347.

Foss, D.J. and Jenkins, C.J. Some effects of context in the comprehension of ambiguous sentences. Journal of Verbal Learning and Verbal Behavior, 1973, 577-589.

Gordon, D. and Lakoff, G. conversational postulates. In Papers from the Seventh Regional Meeting, Chicago Linguistic Society, 1971.

Grice, H.P. Logic and conversation. In P. Cole and J.L. Morgan (Eds.), Syntax and semantics, Vol. 3; Speech acts. New York; Seminar Press, 197541-58.

Harnish, R.M. Logical form and implicature. In J.A. Fodor and J.J. Katz (Eds.), An integrated theory of linguistic ability, 1976.

Harris, R.J. Memory for metaphors. Journal of Psycholinguistic Research, 1979, 8, No. 1, 61-71.

Harris, R. Comprehension of metaphor: a test of a two-stage processing model. Bulletin of the Psychonomic Society, 1976, 321-324.

Hawkes, T. Metaphor. London: Methuen & Co. Ltd., 1972.

Herbart, J.H. [Letters and lectures on education.] Translated by H.M. Felkin and E. Felkin. London: Sonneschein, 1898.

Holmes, V.M., Arwas, R., and Garrett, M.F. Prior context and the perception of lexically ambiguous sentences. Memory and Cognition, 1977, 5, 103-110.

Honeck, R.P. Interpretive versus structural effects on semantic memory. Journal of Verbal Learning and Verbal Behavior, 1973, 12, 448-455.

Honeck, R.P., Reichmann, P., and Hoffman, R.R. Semantic memory for metaphor: The conceptual base hypothesis. Memory and Cognition, 1975, Vol. 3(4), 409-415.

Jakobsen, R. Concluding statement, linguistics and poetics. In T.A. Sebeok (Ed.), Style in language. New York: M.I.T. Press, 1960.

Johnson, M.G. A cognitive feature model of compound free association. Psychological Review, 1970, 77, 282-293.

Johnson, M.G. and Malgady, R.G. Some cognitive aspects of figurative language: Association and metaphor. Journal of Psycholinguistic Research, 1979, 8, no. 3.

Johnson, M.G., Malgady, R.G., and Anderson, S.J. Some cognitive aspects of metaphor interpretation. Paper presented at the meetings of the Psychonomic Society, Boston, 1974.

Katz, J.J. Semi-sentences. In J.A. Fodor and J.J. Katz, The structure of language: Readings in the philosophy of language. Englewood Cliffs, New Jersey: Prentice-Hall, 1964.

Kintsch, W. The representation of meaning in memory. Hillsdale, New Jersey: Lawrence Erlbaum Associates, 1974.

Kintsch, W. Notes on the structure of semantic memory. In E. Tulving and W. Donaldson 9eds.), Organization of meaning. New York: Academic Press, 1972.

Levin, S.R. The semantics of metaphor. Baltimore, Maryland: John Hopkins University Press, 1977.

Mack, D. Metaphoring as speech act: Some happiness conditions for implicit similes and simple metaphors. Poetics, 1975, 4, 1975, 221-256.

Malgady, R.G. and Johnson, M.G.G. Modifiers in metaphors: Effects of constituent phrase similariy on the interpretation of figurative sentences. Journal of Psycholinguistic Research, 1976, 5, 43-52.

Marslen-Wilson, W.D., Tyler, L.K., and Seidenberg, M. Sentence processing and the clause-boundary. In W.J.M. Levelt and G.B. Flores D'Arcais (eds.), Studies in sentence perception. New York: Wiley, 1978.

Mathews, R.J. Concerning a 'linguistic theory' of metaphor. Foundations of Language, 1971, 7, 413-425.

Miller, G.A. Images and models, similes and metaphors. In A. Ortony (Eds.). Metaphor and thought. Cambridge: Cambridge University Press, 1979.

Mooij, J.A.A. A study of metaphor. Amsterdam: North-Holland, 1976.

Morton, J. The integration of information in word recognition. Psychological Review, 1969, 60, 329-346.

Ortony, A., Schallert, D.L., Reynolds, R.E., and Antos, S.J. Interpreting metaphors and idioms: Some effects of context on comprehension. Journal of Verbal Learning and Verbal Behavior, 1978, 17, 465-477.

Pollio, H.R. and Burns, B.C. The anomaly of anomaly. Journal of Psycholinguistic Research, 1977, 6, 247-260.

Price, J.T. Linguistic competence and metaphorical use. Foundations of Language, 1974, 253-256.

Reddy, M.J. A semantic approach to metaphor. In Chicago Linguistic Society Collected Papers, 1969, 241-251.

Reinhart, T. On understanding poetic metaphor. Poetics, 1976, 5, 383-402.

Richards, I.A. Principles of literary criticism. Oxford: 1936.

Schuberth, R.F. and Eimas, P. Effects of context on the classification of words and nonwords. Journal of Experimental Psychology: Human Perception and Performance, 1977, 33, 27-36.

Schvanaveldt, R.W., Meyer, D.E., and Becker, C.A. Lexical ambiguity, semantic context, and visual word recognition. Journal of Experimental Psychology: Human Perception and Performance, 1976, 2, 243-256.

Searle, J.R. Metaphor. In A. Ortony (Ed.), Metaphor and thought. Cambridge: Cambridge Universiy Press, 1979.

Slobin, D.I. Grammatical transformation and sentence comprehension in childhood and adulthood. Journal of Verbal Learning and Verbal Behavior, 1966, 5, 219-277.

Swinney, D.A. Lexical access during sentence comprehension: (Re)Consideration of context effects. Journal of Verbal Learning and Verbal Behavior, 1979, 18, 645-660.

Tanenhaus, M.K., Leiman, J.M., and Seidenberg, M.S. Evidence for multiple stages in the processing of ambiguous words in syntactic contexts. Journal of Verbal Learning and Verbal Behavior, 1979, 18, 427-440.

Tyler, L.K. and Marslen-Wilson, W.D. The online effects of semantic context on syntactic processing. Journal of Verbal Learning and Verbal Behavior, 1977, 16, 683-692.

Verbrugge, R.R. and McCarrell, N.S. Metaphoric comprehension: Studies in reminding and resembling. Cognitive Psychology, 1977, 9, 494-533.

Wilson, N.L. Linguistic butter and philosophical parsnips. The Journal of Philosophy, 1967, 64, 55-67.

Werner, A. A linguistic approach to metaphor. Lisse/Holland: Peter de Ridder Press, 1975.

Winograd, T. Understanding natural language. Cognitive Psychology, 1972, 3, 1-191.

Yates, J. Priming dominant and unusual senses of ambiguous words. Memory and Cognition, 1978, 6, 636-643.

Ziff, P. On understanding "understanding sentences." In J.A. Fodor and J.J. Katz (Eds.), The structure of language: Readings in the philosophy of language. Englewood Cliffs, New Jersey: Prentice-Hall, 1964.

REFERENCE NOTES

1. Cairns, H.S. Autonomous theories of the language processor. Unpublished manuscript, 1980 (Available from the author: Dean of Research and Graduate studies, Queens college, C.U.N.Y. Flushing, New York, 11367