COMPREHENDING AND REMEMBERING NOVEL METAPHORS WHILE READING REAL TEXT

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The past five years have witnessed an explosion of research on metaphor. Two critical issues have emerged: Is metaphorical language different in principle from literal language? What is the process of comprehending metaphors?

One extreme position maintains that metaphors are deviant forms of language and therefore require a special comprehension process. According to this view, a word's literal meaning is found to be deviant in the sentence context, is rejected and is subsequently reinterpreted, a two-stage process (C.f., Clark & Lucy, 1975). The other position holds that there is no difference in principle between literal and metaphoric comprehension. Rather, all meaning is constructed based on the text, the context and the reader's pre-existing knowledge (C.f., Rumelhart, 1979). The two-stage model tends to be associated with feature theories of word meaning (e.g., Tversky, 1977; Kintsch, 1974), whereas the single-stage model is associated with schema theory.

Addressing these issues would seem to require that novel metaphors be studied in meaningful context. Unfortunately, few of the studies in the recent literature have done so. The present studies examined the process of comprehending novel metaphors in text and the reader's resulting text concept. One study examined the time course of comprehending metaphors to determine whether readers first access meanings that can be construed as literal or whether they immediately generate contextually-appropriate interpretations. Two other studies examined memory for texts containing metaphors to determine what readers take from the text after they have understood the metaphors.

Materials

All three studies used metaphors that were found in newspapers or magazine stories or modern novels. Prior the the experiment, groups of adult subjects rated

the metaphoricity, novelty, difficulty, predictability, and imagery levels of over 200 metaphors in context. They also interpreted them. A second group of subjects produced synonyms for the metaphoric words out of context.

From this set we selected a smaller set to use in the experiments. These were items for which there was general agreement on interpretation and a consistent synonym. For example, in the sentence, "The letters made my parents, who are rocks, cry," stoics is an appropriate interpretation of rocks. Out of context, boulders is a high frequency synonym. Metaphors were of two types: nominal (as in the rocks example) and predicative, where a verb is used metaphorically. For example, "My son hurled an obscenity from the bedroom." In this case, shouted is an interpretation, whereas threw is a literal synonym.

Subjects

Ninety-six adults between 18 and 40 years of age participated in the three studies (ns for studies 1, 2 and 3 were 18, 16 and 64, respectively). They were solicited through an ad in the Village Voice newspaper, and paid for participating.

Comprehension Study

Procedure. In order to determine whether readers interpret metaphors by first accessing their literal meaning or by directly interpreting the metaphor, a target detection task was used. Targets were metaphors, which occurred in their original contexts (150-250 word excerpts were used). Three types of probes were used: the actual metaphor, its literal synonym and its interpretation. One probe was presented prior to each passage and subjects were instructed to press a key when they detected a word that meant the same as the probe word. Probe type varied within subjects and was counterbalanced across subjects.

Text was presented on a VT52 DecScope video terminal controlled by a PDP-8 computer. A timer was started when the metaphor was displayed and stopped when the reader pressed the key.

If subjects access literal meaning first, their detection latencies should be shorter for synonyms than for interpretations. However, if they directly interpret

the metaphor, this pattern should be reversed.

Results. As shown in Table 1, detection latencies were shorter when probes were literal synonyms than interpretations, F (2, 30) = 35.72, $p < .001$. Predictably, identical word matches were fastest. Also, more targets were missed when probes were interpretations than synonyms, F (2, 30) = 50.74, $p < .001$.

Text Memory Study

Procedure. After finding that readers detect literal aspects of metaphor meaning prior to interpretive aspects, we wanted to determine what information is added to the reader's text concept following the metaphor. A recognition memory procedure was used in which subjects again read text containing a metaphor and judged whether a test word had appeared in the immediately preceding text. Test items were the same words that served as probes in the first study: the metaphor itself, literal synonyms and interpretations. Unrelated words served as controls. Test words were presented at either zero- or five-word lags following the metaphor and within or across clause boundaries.

Results. Recognition errors and decision times are presented in Table 2. Significantly more recognition errors were made to interpretations than to the other three types of test items, F (3, 45) = 2.77, $p < .05$. That is, subjects judged that they had seen the interpretation in the text when they had not. Response times were slower for interpretations and synonyms than for metaphor words themselves, but did not differ from each other, F (3, 45) = 11.52, $p < .001$. No effects were attributable to lag or sentence structure.

Running Memory Study

Procedure. Study three evaluated the contribution of context to the interpretation of the metaphors used in these studies. A running memory procedure used the same metaphor sentences as the previous studies, but out of context. We wanted to determine whether subjects would still confuse test sentences containing the metaphor interpretations with the original metaphors.

Three variants were formed of the metaphor sentences. The metaphor words were

replaced by their interpretations or literal synonyms. The third variant was a control in which one word (not the metaphor) was changed to alter sentence meaning. These variants were substituted for a repetition on half the repetition trials. The number of sentences intervening between initial presentation of the metaphor sentences and test sentences was 1, 4, 9 or 19.

Results. Recognition errors are presented in Figure 1. Again, more false recognitions occurred to interpretations than literal synonyms, F (3, 186) = 9.64, $p < .001$. There also was an effect of lag: fewer errors occurred with 1 or 4 intervening items than with 9 or 19, F (3, 186) = 3.29, $p < .05$.

CONCLUSIONS

The target detection task showed that readers access the literal meaning of a metaphor before establishing its contextually appropriate meaning. The finding appears to support a two-stage process, i.e., readers access a literal interpretation, find it deviant, and reinterpret the word to fit the context. However, that interpretation may be hasty. We have no evidence that readers find the metaphors deviant. What is clear is that there is a lexical access stage in which literal aspects of meaning are accessed very quickly. Contextually inappropriate aspects of word meaning are temporarily activated, but are not retained. These data argue against parallel access of the literal and interpretive meanings of metaphors, as suggested by Glucksberg, Gildea and Bookin (1982).

They also argue agains a strict constructivist approach in which the context so constrains possible word meaning that the interpretation is directly accessed, rendering metaphor interpretation no different from non-metaphor comprehension. Ortony (1979) supported this position, based on his finding that with adequate context, sentential metaphors take no longer to process than their literal equivalents. However, some of his sentential metaphors were actually idioms and may involve different processes than novel single-word metaphors.

The pattern of findings from these three studies is consistent with the notion that an abstract core meaning of words used metaphorically is accessed quickly and

serves as the basis for constructing a contextually-appropriate interpretation, a version of the interaction view of metaphor understanding (C.f., Verbrugge & McCarrell, 1977). Core meaning would presumably relate more strongly to the synonym than to the metaphoric interpretation, yielding the target detection and immediate recognition findings. The present design does not allow us to distinguish between this hypothesis and the two-stage comprehension notion.

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Table 1

Target Detection Latencies and Misses for Each Probe Type

	Probe Type		
	Metaphor	Synonym	Interpretation
Latencies[a] (in msec)	990	1365	1634
Number of Misses	.42	1.72	3.23

[a]Correct responses only

Table 2

Recognition Errors and Response Latencies for Each Item Type

	Item Type			
	Metaphor	Synonym	Interpretation	Unrelated
Errors	3.2	2.5	5.0	.6
Latencies[a] (in msec)	1522	1778	1754	1645

[a]Correct responses only

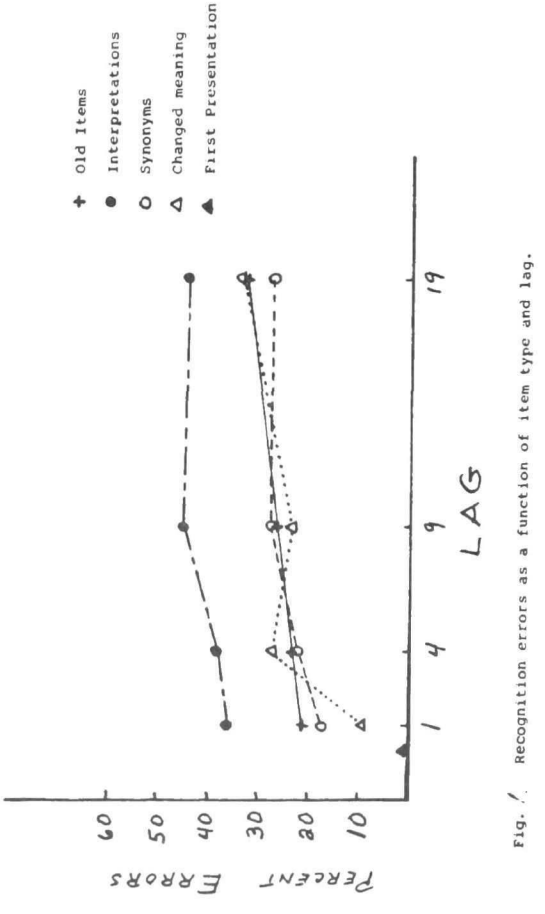

Fig. 1. Recognition errors as a function of item type and lag.