Context effects in the comprehension of idioms

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An idiomatic expression is generally conceived of as an expression whose meaning is not deducible from the meanings of its constituents (Katz, 1973). Thus the challenging question for the standard view of literal language comprehension is how do people comprehend idioms. That is, how and when do people derive the idiomatic interpretation of a sentence on the basis of the literal interpretation of the words composing it.

So far, two main hypotheses have been proposed by psycholinguists. Swinney and Cutler (1979) had subjects judge the meaningfulness of idiomatic strings such as break the ice as well as literal strings obtained by changing a part of the idiom, e.g., break the cup. Idiomatic strings were judged faster than their literal counterparts. Swinney & Cutler interpreted this result as showing that idioms are stored in the mental lexicon as individual global items, that their retrieval is initiated as soon as the first word of an idiomatic string is encountered and this occurs in parallel with the computation of the literal meaning.

Gibbs (1980, 1986) proposed an alternative hypothesis, the Direct Access Hypothesis, even though the pattern of his results is consistent with Swinney and Cutler's Lexical Representation Hypothesis. Gibbs presented subjects with short stories ending with an idiomatic expression (e.g., he kept it under his hat). The subjects judged the meaningfulness of a sentence, following the story, paraphrasing either the idiomatic meaning or the literal meaning or an unrelated sentence. The story biased subjects either toward the idiomatic meaning of the sentence or the literal one. Gibbs found that subjects were faster at judging the idiomatic paraphrase than the literal and the unrelated regardless of the type of story. He interpreted the results as demonstrating that people automatically tend to analyze the conventional, idiomatic meaning of idioms and that the literal meaning of the sentence need not be computed at all.

Despite those two studies, evidence supporting one or the other hypothesis is far from clear, primarily because the Lexical Representation Hypothesis and the Direct Access Hypothesis generally lead to the same predictions (Ortony, Schallert, Reynolds & Antos, 1978; Estill & Kemper, 1982; Glass, 1983). There seems to be general agreement that the figurative interpretation of an idiom is formed faster than its literal interpretation, both in and out of context. However, most of the studies cited above employed meta-linguistic judgments of

comprehension processes, and so it is unlikely that such indirect measures could tap the fast processes that underlie language understanding.

More recently, Cacciari and Tabossi (1987) proposed the Configuration Hypothesis. In three experiments using an on-line paradigm (cross-modal lexical priming), they had subjects listen to neutral sentences containing idiomatic expressions. These expressions were idioms that did not have any clear literal counterparts (e.g., shoot the breeze). In experiments 1 and 2, a visually presented target word appeared immediately at the offset of the idiomatic expression, e.g., at heaven in the sentence After the excellent performance the tennis player was in seventh heaven). The target words were either a word related to the idiomatic meaning (HAPPY), or a word related to the literal meaning of the last word (SAINT) or an unrelated control word (UMBRELLA). We found that when the sentence can be predicted as idiomatic early on (as in experiment 1), subjects were faster at deciding on the idiomatically related target than either on the literally associated target or on the unrelated target. But when the string didn't call to mind its idiomatic completion until the very end (as in experiment 2), the decision on the target literally related to the last word was faster than on the idiomatic and on the control targets. In a third experiment, the same idioms and targets of exp. 2 were used but the targets were presented 300 ms after the end of the idiom. The results showed that both the idiomatically related target and the literal one were faster than the control word.

The results of the three experiments --at least for the class of idioms considered-- directly contradict both the Lexical Representation Hypothesis and the Direct Access Hypothesis because they fail to show initial activation of the idiomatic meaning. This suggests that idiomatic interpretations need time to be formed along with persistence of literal interpretation. We suggest that idioms are not stored as separate entries in the mental lexicon, but rather that their meaning is associated with particular configurations of words that become available when sufficient information has been received by the listener. The words participating in the configuration are the same words normally accessed during comprehension.

The amount of input necessary to render the configuration recognizable is suggested by the notion that every verbal phrase idiom has a crucial component, a key, that is more relevant than other constituents for detecting the idiom. The idiomatic string cannot be recognized, that is the configuration cannot emerge, before its key has been accessed from the mental lexicon. One claim of this approach is that there is only a single literal path for processing an idiomatic string until, sometime after the activation of its key, the configuration emerges.

The pattern of results found in the three experiments is

explained as follows. When the key occurs early in the string (as in exp.1), only the idiomatic interpretation is found at the very end of the string. When the key is in the last word (as in exp.2), the configuration is not detected until that last word has been accessed, and so only the literal meaning is facilitated. Only after this point can the configuration be identified and the idiomatic meaning can emerge (as showed by exp.3).

This hypothesis has certain advantages, for instance it is able to account not only for the results of the experiments but also for such phenomena as the syntactic flexibility of idiomatic expressions and for different kinds of idioms. However it also faces of course a number of problems. First it has to characterize in a more formal way notions such as configuration and key. Second it has to deal with the well known effect of context in language comprehension.

The experiment we will present was designed to investigate this latter problem, that is, how context can affect the recognition of an idiomatic expression.

METHOD

Subjects. 37 undergraduates volunteered for the experiment, which lasted about 25 minutes. None of them had previously participated in an experiment of this sort.

Materials. The idioms and targets used were the same as those in experiments 2 and 3, above. They had been selected as follows: A group of forty familiar italian idioms having no possible literal counterpart were chosen. In order to be sure that they were not predictable, the idioms were inserted in low informative sentences (e.g., He sent the person to the devil) which were mixed with 175 literal filler sentences (e.g., The man was leaning on the door). Five list were created, each containing a fragment of each sentence in a random order. Their length varied across the lists so that in list 1 the fragments were in the shortest version (e.g., He sent...) and in list 5 in the longest (e.g., He sent the person to the...). Each list was given to 15 subjects who were requested to complete every sentence in a meaningful way. This procedure allowed us to select 12 idiomatic expressions which were completed idiomatically by not more than 5% of the subjects across the five lists.

For each of the 12 idiomatic expressions, a sentence biasing toward the idiomatic meaning was constructed (e.g., After again quarrelling with her boyfriend, she sent him to the devil). Each idiom was paired with three targets to be used as visually presented words during the experiment. The idiomatically related target was obtained by selecting the most frequent word expressing the paraphrase of the idiom given by 15 judges (idiomatic target) (e.g., AWAY); the target related to

the literal meaning of last word of the idiomatic string was obtained asking to a different panel of subjects a word literally associate to it (literal target) (e.g., HORNS); and the third target was an unrelated control (control target) (e.g., TROUT). In order to make sure that the lexical decisions to the twelve idiomatic targets, the twelve literal targets and the twelve controls were comparable in isolation, a pretest was conducted in which the targets were included in a list of 154 words and 154 non-words. The list was presented in four randomized blocks to 20 subjects who performed a lexical decision task on the items. One idiom was discarded because of too long RT to its literal target. The mean reaction times for the idiomatic target words, the literal target words and the control words were 537 ms, 535 ms and 538 ms respectively.

In addition to experimental materials, filler materials were constructed consisting of 60 sentences, not containing idioms, approximately of the same length as the experimental sentences. Half of them were paired with visually presented words and half to visually presented non-words obtained by an orthographical alteration of real words. For six words there was a semantic association with one of the words of the sentences, whereas the remaining were unrelated to the sentences.

The 71 sentences (11 experimental and 60 filler) were recorded, in a random order, on one channel of a tape recorder by a male speaker. On another channel an impulse of 1000 hz, inaudible to subjects, was automatically placed precisely at the offset of the last word of each idiom. For filler sentences, these impulses were placed so as to cover all sentence positions. The impulse caused a word to be displayed on the screen of a micro-computer for 1500 ms, and started a timer which either stopped when the subject pressed the response button (the space bar) or reset automatically after 5 sec.

Each idiom was presented only once, so the three sets of visually presented targets were constructed so that in one set the target paired with an experimental sentence was related to the idiomatic meaning, in another set it was associated to the literal meaning of the last word of the idiom, and in the third it was the control word. The filler targets were the same in the three sets. In each set, there was a total of 11 experimental visually presented targets. Each set was paired with the list of sentences and randomly assigned to an equal number of subjects who acted as their own controls.

Procedure. Subjects were tested individually and sat in a sound-attenuated room in front of an Apple micro-computer screen connected to a tape recorder. They were instructed to perform a lexical decision task on a word that would be displayed on the screen, while listening to a list of sentences. They were instructed to press the space bar with their dominant hand if the letter string was an actual word, and to do nothing otherwise. After ten practice trials, one of the three sets

paired with the list of sentences was presented to each subject. RT to lexical decisions were collected.

Halfway through the experimental session there was a brief interval during which the subject could rest. Subjects were instructed to pay attention to the sentences because at the end of the experimental session they would be asked questions about them. Immediately after the end of the session, subjects were given 20 sentences, each printed on one card. Half of them had been presented during the experiment and half had not, but were derived from sentences actually heard by changing one or more words. Seven subjects who failed to reach a score of 60% of correct recognition were excluded from subsequent analysis.

RESULTS

The mean percentage of errors was .09. In order to reduce extraneous variability, data points plus or minus two standard deviations from the mean RTs of each subject (4.8% of all responses) were excluded from the analysis. The mean RTs of the correct responses for each of the three experimental conditions were: Idiomatic targets 622 ms, literal targets 616 ms and controls 665 ms. The main effect for sentence type was significant both in the analysis by subjects ($F(2,58)=8.11$, $MSe=2646$; $p< .001$) and in the analysis by materials ($F(2,20)=3.80$, $MSe=2871$; $p< .05$). Planned non-orthogonal comparisons showed that idiomatic and literal targets did not differ from each other, and that both were faster than controls (Idiomatic vs Literal: $F(1,58)=0.22$ n.s.; Idiomatic vs Control: $F(1,58)=10.43$ $p< .005$).

DISCUSSION

These findings suggest that context affects the recognition of an idiomatic expression. With neutral sentences, we found that when the idiom key is in the last word of the idiomatic expression, the idiomatic interpretation was not yet formed at the very end of the idiomatic string so only the literal meaning of the key was activated. But when context biased the listener toward the idiomatic interpretation of the sentence, the contextual information acts to facilitate the recognition of the idiomatic expression even though it does not affect access of the literal meaning of the last word in the idiom. The fact that we didn't find a significant difference between the idiomatic and the literal targets does not, of course, imply that they are activated at the same time. Further evidence seems necessary for assessing the time course of the literal and idiomatic interpretation when context orients the listener toward the idiomatic meaning of the sentence.

The Configuration Hypothesis seems to be consistent with these results. It is reasonable in fact to suppose that a

configuration can be pre-activated by biasing contextual information. Thus, the context is effective in speeding up the activation of the idiomatic configuration which otherwise needs time to emerge, as demonstrated by earlier experiments.

Methodologically, the different pattern of results obtained in earlier experiments and in the present one using the same paradigm, and either identical or comparable materials, both in and out of context, suggests that the lexical decision task is indeed sensitive to immediate, perceptual processes without being susceptible to backward priming, at least in sentential contexts.

Theoretically, the present findings cast further doubts on the Direct Access Hypothesis proposed by Gibbs (1980, 1986) since this hypothesis predicts that people will directly access the idiomatic interpretation of a sentence irrespective of its literal analysis or context. Clearly, this was not the case here.

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