

Comprehension of Idiomatic Expressions  
by Right-Hemisphere-Damaged Adults

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STATEMENT OF THE PROBLEM

Clinical observation has suggested that many patients with unilateral right cerebral hemisphere (RH) damage have a literal-minded, concrete response to situations, events, and conversations (Collins, 1976; Gardner, 1979; Myers, 1979). In addition, they appear to have difficulty responding to extralinguistic cues. This deficit, combined with their tendency to relate more readily to the denotative rather than to the connotative aspects of language, may prevent them from adequately grasping intended or implied meanings embedded in an utterance.

By its very nature, figurative or metaphoric language serves as a useful tool for investigating a subject's ability to comprehend intended meaning. Winner and Gardner (1977), for example, found that RH subjects were more impaired than aphasic subjects in a task requiring them to match a spoken metaphor to one of four pictures. Among the four picture choices was one in which the metaphor was appropriately represented and one in which it was depicted literally. RH subjects chose significantly more literal pictures than did normal controls or aphasic subjects.

The purpose of this study was to further investigate the ability of brain damaged subjects to comprehend intended meaning by investigating their response to idioms, a particular class of figurative speech. Idioms were chosen for several reasons. First, they are used often enough in everyday speech to be considered part of a subject's general knowledge. Second, an idiomatic expression must be taken as a whole to be understood—that is, the meaning can not be derived from breaking it down into its constituent elements. Finally, the meaning of an idiom can not be understood from its fundamental or surface linguistic structure alone. Clearly, idioms are sophisticated symbols whose meaning transcends a superficial or literal reading. The idioms used in this study were placed in a story context in order to represent as closely as possible their use in natural conversation. Response categories were designed to factor out the effects of context.

METHOD

Three subject groups were tested: Group 1 consisted of six nonaphasic adults with unilateral RH damage. Group 2 consisted of six aphasic adults with unilateral left hemisphere damage. Group 3 consisted of six neurologically unimpaired control subjects. All subjects were right handed and the three groups were matched for age and education. The neurological findings in the brain-damaged subjects were verified by CT scans.

Task. The test stimuli consisted of five two-sentence stories similar to the sample below. Each story ended with a common idiomatic expression.

Jim knew that the office accounts were wrong by about 1000 dollars because of mistakes he had made. For weeks he hesitated to show the account books to the boss, but finally he decided he had to go in and just face the music.

The meaning of the story could be comprehended only through an accurate interpretation of the idiom. The stories were read aloud to the subject with as many repetitions as requested while he looked at an array of five pictures. His task was to point to the picture that best represented what happened in the story.

Response Categories. The response categories varied according to contextual setting and idiom interpretation. The correct choice (CC) depicted the appropriate interpretation of the idiom and placed the events in the correct setting (Figure 1). The foil pictures permitted the following error types: 1) Correct context-Literal interpretation (CL) in which the setting of the story was depicted accurately, but the idiom was represented in a literal way (Figure 2); 2) Wrong context-Correct interpretation (WC) in which the setting was wrong, but the idiom was accurately interpreted (Figure 3); 3) Wrong context-Literal interpretation (WL) in which the setting was wrong and the idiom was interpreted literally (Figure 4); and 4) Correct context-Opposite interpretation (CO) in which the setting was accurately depicted, but the opposite interpretation was given to the idiom (Figure 5).



Figure 1. Correct context - Correct interpretation (CC): The setting and the idiom interpretation are correct.



Figure 2. Correct context - Literal interpretation (CL): The setting is correct, but the idiom is interpreted literally.

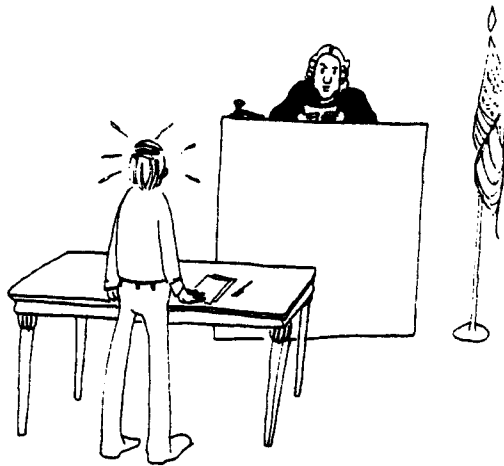


Figure 3. Wrong context - Correct interpretation (WC): The setting is incorrect, but the idiom is interpreted accurately.



Figure 4. Wrong context - Literal interpretation (WL): The setting is incorrect, and the idiom is interpreted literally.

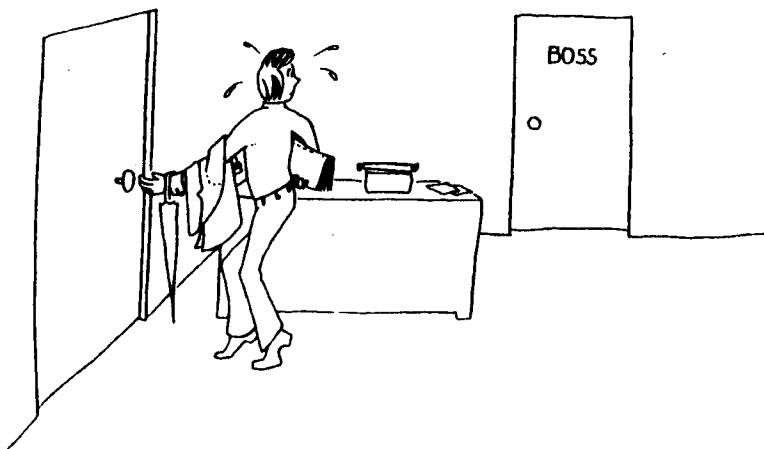


Figure 5. Correct context - Opposite interpretation (CO): The setting is correct, but the opposite interpretation of the idiom is selected.

## RESULTS

The results of this study were analyzed for the frequency with which each of the response types was chosen by the subjects (see Table 1). Twenty-seven percent of RH subjects' responses were accurate in both context and idiom interpretation (CC). Thirty-seven percent of their responses were in the correct context-literal interpretation (CL) class. Of their remaining responses, 13% fell into the wrong context-correct interpretation (WC) class, 20% into the wrong context-literal interpretation (WL) class, and 3% into the correct context-opposite interpretation (CO) class. Eighty-seven percent of the aphasic subjects' responses were of the CC type, while 97% of the control subjects' responses were in the same category. Only 3% of the aphasic and control subjects' responses fell into the CL category.

Table 1. Percent of each response type chosen by the subjects.

	CC	CL	WC	WL	CO
RH subjects	27	37	13	20	3
LH subjects	87	3	3	0	7
Controls	97	3	0	0	0

To achieve more meaningful comparisons among the three groups, the response types were pooled according to both contextual and idiomatic elements (see Table 2). CC, CL, and CO response types were combined into a single group in which the subject's response to context was appropriate regardless of his response to the idiom. Response types WC and WL were pooled into a single group denoting inappropriate response to context. Response types CC and WC were pooled to form a single group representing a response to the idiom, regardless of response to the context; and response types CL and WL were pooled to form a single group representing a literal response to the idiom, regardless of response context.

Table 2. Frequency of occurrence of pooled response types.

	CC+CL+CO	WC+WL	CC+WC	CL+WL
RH subjects	20	10	12	17
LH subjects	29	1	27	1
Controls	30	0	29	1

A Chi square analysis of the distribution of the pooled response types was carried out ( $X^2 = 53.20$ ) and found significant at the .001 level of confidence. This result indicates that the three groups of subjects included in this study did not represent a single population. Inspection of the pooled responses reveals that RH subjects made significantly more literal

responses to idioms than did either the aphasic or control subjects. In addition, RH subjects inappropriately responded to context substantially more often than did either of the other groups.

In order to determine if significant differences existed between right hemisphere damaged subjects' tendency to select the correct as opposed to the wrong context, and the correct as opposed to the literal interpretation of the idiom, the procedure for post hoc analysis of I x K tests of homogeneity described by Marascuilo and McSweeney (1977) was employed. Both the difference between cells CC + CL + CO and WC + WL and the difference between cells CC + WC and CL + WL were significant at the .05 level of confidence. These findings indicate that the RH subjects selected the correct context significantly more often than the wrong context. In addition, they selected the literal depiction of the idiom significantly more often than the correct depiction.

## DISCUSSION

These results support the hypothesis that patients with RH damage are less adept at comprehending figurative speech than normal controls even when supportive contextual cues are available. Not only did the RH group have significantly more errors than normal controls or aphasic subjects, but their errors demonstrated a literal interpretation of the material. This difficulty in transcending literal meaning suggests a disorder in grasping the intention or implication behind more sophisticated and subtle language use.

The findings are in concert with the results of Winner and Gardner (1977), but appear on first glance to be at odds with the results of a study by Stachowiak *et al.* (1977). Stachowiak and his colleagues investigated text comprehension in aphasic, RH damaged, and normal controls through the use of short stories read to subjects who were required to choose which one of five pictures was appropriate to the story. Each story consisted of six sentences, one of which contained an idiomatic expression. Among the response categories was a picture that represented a literal interpretation of the idiom. The RH group and normal controls did not differ significantly from each other and had significantly fewer errors of any type than did aphasic subjects.

However, the stimuli used by Stachowiak *et al.* differed substantially from the stimuli used in the present study. The third sentence in the Stachowiak stories directly explained the events of the story and was crucial for comprehension of the text. This sentence was followed by a fourth sentence containing an idiomatic expression which served only to amplify the information contained in the preceding (3rd) sentence. Since the purpose of the Stachowiak study was an investigation of text comprehension, idioms were used as a means of making the material redundant. The idiom itself was defined in the third sentence.

Our purpose was to determine if RH subjects could comprehend figurative language used in context. Hence, the meaning of the story stimuli depended entirely on the ability to comprehend the figurative expression. Other sentences set the events in context, but did not contain the outcome of those events as did the third sentence in the Stachowiak material.

A second inference may be drawn from the tendency of our RH subjects to select the literal depiction of the idiom. Faced with a problem in comprehending connotative language, these subjects may have attempted to

interpret the idiom in an analytic fashion—breaking it down into its constituent elements. This strategy may have resulted in their selecting the picture which corresponded to the meaning of the sum of the individual words, rather than to the meaning of the idiom taken as a whole.

The tendency of the RH subjects to respond incorrectly to context was not surprising. Previous testing had revealed that all of the RH subjects had essentially normal auditory comprehension, so it seems unlikely that this finding is indicative of an auditory comprehension deficit. Studies by Myers (1979) and by Myers and Linebaugh (1980) have demonstrated that RH subjects have difficulty perceiving contextually conveyed relationships. This impairment may have diminished RH subjects' capacity to associate verbal and pictorial presentations of the context. In addition, since 60% of their contextually inaccurate responses also contained a literal interpretation of the idiom, one could infer that the processing load imposed by the idiom task exacerbated their difficulty in processing contextual information.

The findings of this study help to clarify some of the problems that RH patients may have in functional communication. Their predilection for literal meaning suggests that they have trouble comprehending implication and intention. Furthermore, their responses suggest that, while strategies employing the linguistic system may be an effective means of compensating for some RH deficits, they may be counterproductive with others—notably in the comprehension of connotative meaning.

RH patients have also been found to respond in a limited manner to context. Conversely, aphasic patients have been reported to benefit substantially from context (Wilcox, Davis, and Leonard, 1978; Williams and Canter, 1981). The results of this study suggest that aphasic patients may be better than RH patients at employing contextual information. Despite impaired language, aphasic patients may be more responsive to the illocutionary force of an utterance or what is meant by what is said. RH patients, who are unable to effectively use contextual information, may be more responsive to what is said than to what is meant.

#### REFERENCES

- Collins, M. The minor hemisphere. In R.H. Brookshire (Ed.), Clinical Aphasiology: Conference Proceedings, 1975. Minneapolis, MN; BRK Publishers, 1975.
- Gardner, H. The role of the right hemisphere in the organization of linguistic materials. A paper presented at the meeting of the International Neuropsychological Society, Dubrovnik, Yugoslavia, June, 1979.
- Marascuilo, L.A. and McSweeney, M. Non-Parametric and Distribution-Free Methods for the Social Sciences. Monterey: Brooks/Cole Publishing Co., 1977.
- Myers, P.S. Profiles of communication deficits in patients with right cerebral hemisphere damage. In R.H. Brookshire (Ed.), Clinical Aphasiology: Conference Proceedings, 1979. Minneapolis, MN: BRK Publishers, 1979.
- Myers, P.S. and Linebaugh, C.W. The perception of contextually conveyed relationships by right brain-damaged patients. A paper presented to the annual convention of the American Speech-Language-Hearing Association. Detroit, November, 1980.

Stachowiak, F.F., Huber, W., Poeck, K. and Kerschensteiner, M. Text comprehension in aphasia. Brain and Language, 4, 177-195, 1977.

Wilcox, M.J., Davis, G.A., and Leonard, L.B. Aphasics' comprehension of contextually conveyed meaning. Brain and Language, 6, 362-377, 1978.

Williams, S.E. and Canter, G.J. On the assessment of naming disturbances in adult aphasia. A paper presented to the 11th annual Clinical Aphasiology Conference. Kerrville, Texas, May, 1981.

Winner, E. and Gardner, H. The comprehension of metaphor in brain-damaged patients. Brain, 100, 719-727, 1977.