Diagnostic and Treatment Implications of an Analysis of Aphasic Adults' Contextual Language Comprehension

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In the normal communication process, people often seem to say one thing yet mean another. For example, a given speaker might produce an utterance such as It's hot in here. In some situations, such as a room in which it is obvious to both speaker and listener that nothing can be done to make it cooler, this statement would probably be literally interpreted as simply a comment about the temperature. However, in a situation in which the speaker and listener share the information that the room can be made cooler, this same statement could serve as a request to open the door, open the window, or turn on the air conditioner. Bascially what we have is a situation in which an utterance varies in its conveyed intent as a function of the context in which it occurs. Upon first consideration, this notion may not seem particularly novel, as it seems intuitively logical to us, as speakers, that the things we say are only correctly interpreted as a function of the context in which we say them. However, this idea becomes important when we consider the fact that the formal assessment of language comprehension in adult aphasia is generally limited to the literal meanings of utterances, which are usually presented in a manner that minimizes the extralinguistic context. This means of assessment does yield information regarding specific deficits in processing language per se. However, it may not give the clinical aphasiologist the most realistic picture of the patient's capabilities outside the testing situation, primarily because this form of approach virtually ignores the pragmatics of language use in more natural, hence, more functionally meaningful, communicative situations.

The purpose of this investigation was twofold. First, we were interested in applying some pragmatic principles of language use to an analysis of aphasic persons' language comprehension abilities. This was implemented by presenting language stimuli that represented natural communicative interactions. In this way, important contextual cues, which serve to convey a speaker's and a listener's intentions or attitudes, were made available. Thus, in addition to linguistic information, information in the form of the environment, the communicative participants' nonverbal behavior, the suprasegmental aspects of speech, and the visual context as a whole, was made available.

Second, we were interested in comparing aphasic persons' contextual language comprehension abilities with comprehension test data obtained from a standard battery of tests designed to assess literal meaning of isolated linguistic stimuli. In exploring this second issue we were able to determine if standard testing presented an adequate assessment of aphasic persons' functional comprehension abilities. We shall discuss two experiments that were designed to address these issues.

METHOD

Subjects

Seven non-neurologically impaired, nonaphasic control subjects and eighteen aphasic adults served as subjects in the two experiments. The aphasic subjects were divided into groups of High Level (HL) and Low Level (LL) comprehension based on whether they scored above or below 60% correct on a battery of standard comprehension tests. The test battery included modified subtests from the Boston Diagnostic Aphasia Examination (Goodglass and Kaplan, 1972), the Porch Index of Communicative Ability (Porch, 1967), the Minnesota Test for Differential Diagnosis of Aphasia (Schuell, 1965), and other less formal tests of auditory comprehension. The standard battery was not constructed specifically for the present study, rather, it was developed about one year before the study was conceptualized. Additional relevant subject information is summarized in Table 1.

TABLE 1

Mean Age, Educational Level, and Coloured Progressive Matrices For Each Subject Group

	$\bar{x}$ age	$\bar{x}$ years education	$\bar{x}$ Coloured Progressive Matrices
HL	45	13.81	25.30
LL	53	10.12	21.63
Controls	49	12.71	28.14

Stimulus Materials

The linguistic stimuli for both experiments consisted of indirect requests. These types of requests represent situations in which the literal interpretation of the utterance is not a request, yet, in a given context, the conveyed intention is a request. For example, let us consider the utterance Can you open the door? Literally this utterance is a question about a listener's ability to open a door. However, unless this statement is addressed to a listener who has both arms in casts, it would probably serve as a request to have the door opened. When an utterance of this type serves as a request it still has the same literal meaning; however, the speaker's intent in producing the utterance differs from the intent corresponding to the literal meaning. We can say that the speaker assumes the literal intent and in doing so conveys a quite different intent.

The stimuli for each experiment were 40 videotaped interactions between two adults which were filmed in four different natural settings. Each stimulus consisted of one adult making an indirect request of another adult. The adult serving as speaker and the adult serving as listener remained constant throughout the stimuli. In each experiment 20 different indirect requests were made by the speaker and each request was presented twice. In one instance the listener responded appropriately by complying with the request and in the other he inappropriately interpreted the literal meaning of the speaker's utterance. All stimulus contexts were constructed such that judgments of appropriateness or inappropriateness could not be made simply on the basis of whether there was

a change in activity. That is, to correctly make judgments, subjects were required to process linguistic as well as nonlinguistic variables.

Design

There were four independent variables of interest in the first experiment. These, as well as some examples of stimuli, are listed in Table 2. Upon inspection of Table 2 it can be seen that the variables included the appropriateness of the listener's behavioral response to the speaker, with appropriate responses being instances in which the listener responded to the speaker's conveyed intent. For example, if the speaker said Can you open the door? the listener said yes and then opened the door. Inappropriate responses, on the other hand, were instances in which the listener responded to the speaker's literal rather than conveyed intent. Again, using the same example, Can you open the door? in the case of an inappropriate response the listener responded as if the speaker had questioned his ability to open the door and would simply answer the question by saying yes. A second variable was the pragmatic type of indirect request--either preparatory, which is a condition that represents an assumption on the speaker's part about the listener's ability to perform an act, or propositional, which is a condition that represents an assumption about the listener's likelihood of performing an act. The third variable was the presence in some stimuli of a surface structure negative element. The inclusion of a negative element did not serve to request that an act not be performed but rather served to convey an additional degree of annoyance or irritation. This permitted a comparison of affirmative versus negative surface structure elements when both serve to convey a request for an act to be performed. The fourth variable was the three subject groups, HL aphasic adults, LL aphasic adults, and non-neurologically impaired control subjects. Thus in the first experiment there were a total of eight conditions with five stimuli presented in each condition.

TABLE 2

Conditions and Examples of Stimuli Utilized in Experiment I

		Request	Response
Appro. Prep.	AC	Can you open the door?	Listener says "yes" and opens the door.
	NC	Can't you answer the phone?	Listener says "yes" and answers the phone.
Appro. Prop.	AC	Will you empty the trash?	Listener says "yes" and empties trash.
	NC	Won't you stop the noise?	Listener says "yes" and stops tapping a pen.
Inappro. Prep.	AC	Can you open the door?	Listener says "yes" and walks away.
	NC	Can't you answer the phone?	Listener says "yes" but continues original activity.
Inappro. Prop.	AC	Will you empty the trash?	Listener says "yes" but changes a light bulb instead.
	NC	Won't you stop the noise?	Listener says "yes" and continues noisy activity.

Appro. = appropriate, Inappro. = inappropriate, Prep. = preparatory, Prop. = propositional, AC = affirmative construction, NC = negative construction.

The second experiment, which is displayed in Table 3, was designed with three independent variables. These again included appropriateness of the listener behavioral response to the speaker as it was presented to the three subject groups. The new variable was the intent conveyed by the indirect request, either positive or negative. As can be recalled, in the first experiment all stimuli conveyed positive intent, even though half the stimuli included negative syntactic elements. However, in the second experiment half the indirect requests conveyed negative intent, not through the use of negative surface elements, but rather, negative intent was indirectly conveyed through contextual manipulation employing the modals should and must. Thus, in this experiment there were a total of four conditions with ten stimuli presented in each condition.

Procedures

For the experimental task each subject was seated before a TV monitor and provided with headphones for the audio stimulus. Subjects were asked to respond with either yes or no, depending on whether they felt that the listener's behavioral response to the speaker was appropriate in each situation. Prior to the first experiment, each subject learned the task with practice stimuli unrelated to the experimental conditions.

TABLE 3

Conditions and Examples of Stimuli Utilized in Experiment II

	Request	Response
Pos.	Will you wash the dishes?	Listener says "yes" and washes dishes.
Appro.	Can you carry the books?	Listener says "yes" and takes books.
Neg.	Must you take the chair?	Listener leaves chair.
	Should you erase the board?	Listener doesn't erase the board.
Pos.	Will you wash the dishes?	Listener says "yes" but doesn't wash dishes.
Inappro.	Can you carry the books?	Listener says "yes" but doesn't carry the books.
Neg.	Must you take the chair?	Listener takes chair.
	Should you erase the board?	Listener erases the board.

Appro. = appropriate, Inappro. = inappropriate, Pos. = positive intent, Neg. = negative intent.

RESULTS

For the first experiment, the mean number of correct judgments for each of the experimental conditions for each subject group can be found in Table 4. In general, it can be seen that the aphasic subjects performed quite well. Statistical analysis revealed only one significant effect, with the HL group demonstrating more accuracy than the low level group. There were no apparent

differences among the eight conditions in this experiment. The data from the control group were not included in the statistical analysis for this experiment (as well as the next one) because their nearly error-free performance resulted in no variance.

TABLE 4
Mean Number of Correct Judgements for Each Subject Group
In Experiment I

	Appropriate				Inappropriate			
	Preparatory		Propositional		Preparatory		Propositional	
	AC	NC	AC	NC	AC	NC	AC	NC
HL	5.00	4.80	4.90	4.80	4.90	4.80	5.00	5.00
LL	4.75	4.13	4.25	4.38	4.75	4.63	4.63	4.63
Controls	5.00	5.00	5.00	5.00	4.86	4.43	4.86	5.00

AC = affirmative construction; NC = negative construction

The mean number of each subject groups' correct judgments for each of the experimental variables in the second experiment can be found in Table 5. Statistical analysis revealed significant effects for subject groups, appropriateness of the listener's behavioral response to the speaker, and the intent of the indirect request. Specifically, the HL group again demonstrated more accuracy than the LL group. Both subject groups demonstrated more accuracy at correctly judging inappropriate than appropriate responses, and finally, more accurate judgments were associated with requests conveying positive intent than with requests conveying negative intent. In general, it can be seen that aphasic subjects didn't perform as well in this experiment as they did in the first experiment. The results of this second experiment would seem to suggest that, unlike the first experiment, the availability of extralinguistic cues was not sufficient to compensate for aphasic subjects' processing difficulties with the linguistic stimuli. That is, the linguistic conditions in this experiment presented more difficulty for the aphasic subjects than those in the first experiment.

Table 5

Mean Number of Correct Judgements for Each Subject Group
In Experiment II

	Appropriate		Inappropriate	
	Positive	Negative	Positive	Negative
HL	9.90	7.40	9.20	8.50
LL	8.63	5.13	9.13	7.63
Controls	9.86	9.43	9.86	9.71

As mentioned earlier, the first objective of this investigation was to apply some pragmatic principles of language use to an analysis of aphasic adults' language comprehension abilities. The results of both experiments seem to indicate that, with the exception of some requests conveying negative intent, aphasic adults are able to successfully combine linguistic and contextual cues to accurately comprehend many indirect requests.

The second objective of this investigation was to compare comprehension scores on the experimental tasks with those obtained from a standard battery of tests. Results of such a comparison indicated that the aphasic subjects' accuracy in both experiments was much greater than in a mixture of standard tests of auditory comprehension. The proportion of correct scores for each measure are listed in Table 6. As can be seen, the HL aphasic group averaged 76% correct in standard testing while achieving about 95% correct on the experimental tasks. The LL aphasic group scored a mean of 45% correct in standard testing and scored an average of 86% correct on the experimental tasks. Though performance levels on the experimental tasks were superior to levels with the standard battery, correlations were computed for each aphasic group to determine whether a relationship existed between the two measures. The correlations were not significant at the .05 level. We concluded that standard tests of auditory language comprehension do offer a measure of the aphasic person's breakdown in linguistic processing, and they do seem to grossly differentiate HL from LL comprehension. However, standard tests do not adequately reflect aphasic persons' receptive abilities in natural communicative settings.

Table 6

Proportion Correct on Standard Comprehension Tasks and Experimental Tasks

	Standard		Experimental	
HL Group	.87		.99	
	.84		.95	
	.81		.92	
	.79		.95	
	.78		.90	
	.74		.95	
	.73		.99	
	.70		.87	
	.69	$\bar{x}$ = 76.20	.95	$\bar{x}$ = 94.50
	.67	SD = 6.68	.98	SD = 3.89
LL Group	.58		1.00	
	.55		.83	
	.54		.88	
	.51		.83	
	.49		.93	
	.40		.74	
	.31	$\bar{x}$ = 45.25	.89	$\bar{x}$ = 86.13
	.24	SD = 12.33	.79	SD = 8.18

Conclusions

The reported results have important clinical implications. First, it appears that formal assessment procedures fall short of giving us information about an aphasic person's functional comprehension abilities. In fact, they seem to paint the picture bleaker than it need be. We do not mean to suggest that these tests are useless, for they do indeed provide us with important information regarding linguistic processing. However, linguistic processing is only

one aspect of the total communication process, and much of the time we all rely on other contextual cues when we engage in a communicative interaction. That is, the context in which we say things constitutes the heart of the process of communication. Therefore, it makes little sense to delete nonlinguistic context from our assessment procedures used with aphasic individuals. In consideration of this it would seem worthwhile to direct our comprehension assessment batteries towards analyzing the entire dynamic process of communication. In this way it would seem that the most meaningful picture of an aphasic person's communicative competence could be drawn.

Such an approach to assessment would also extend to the treatment process. For example, if our treatment goal is to improve a patient's functional comprehension abilities, we would want to provide, not only auditory stimuli, but auditory stimuli in conjunction with contextual stimuli resembling those that are available in natural conversation. In addition to having a patient identify pictures corresponding to spoken sentences, we might also want to employ role-playing situations designed to have a patient understand such things as what time her next doctor appointment is, or perhaps arranging a time for a plumber to come to her house. The specific task is not especially important, as it would almost certainly vary from patient to patient. What is important is the idea of presenting the task in a manner so as to represent what one would actually encounter in the world. This would mean an emphasis on the entire communicative process, not just the linguistic aspect of it in isolation.

To sum up, we are not suggesting that we discard all common methods of treating and assessing comprehension deficits. Rather, we are attempting to direct attention to the fact that linguistic stimuli in isolation represent only one aspect of the dynamic communicative process, and that to obtain the clearest picture of functional comprehension abilities we need to consider the important role that context plays in the communicative process.

References

Goodglass, H. and Kaplan, E. The Boston Diagnostic Aphasia Test. Philadelphia: Lea and Feluger, 1972.

Porch, B. Porch Index of Communicative Ability. Palo Alto, California: Consulting Psychologists Press, 1969.

Schuell, H. Minnesota Test for Differential Diagnosis of Aphasia, Minneapolis: University of Minnesota Press, 1965.

Discussion

Q: Do you think it's the right hemisphere acting that causes the superior performance with context?

A: Possibly.

Q: Was there any one particular type of stimulus item that created difficulty?

A: Only in the sense that the requests conveying negative intent and particularly those in the inappropriate condition in the second experiment posed the most difficulty for all aphasic patients.

Q: Do you think it's a time factor creating the difficulty? What I'm really after is a statement such as Should you erase the board?, might an accurate judgment relate to whether or not it was a time factor? It would seem that this type of item might be erroneous.

A: There is in fact a problem with indirect requests using the modal should and that's the one you've noted. The reason we felt relatively confident that it wouldn't necessarily be a time factor is because the normal controls didn't seem to have problems processing those requests. So we did feel like the context was appropriate and therefore any errors with this type of item were due more to the fact that the subjects were aphasic than to the erroneous nature of the requests.

Q: How were the contextual stimuli presented to the patients?
A: On videotape. We videotaped the two adults in four different natural settings which included a kitchen, an office, a living room, and a hallway. Each of the stimuli were approximately thirty seconds in duration.

Q: So everyone got the same thing?
A: Yes.