Referential Communication Abilities of Aphasic Speakers

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Research in language development and language disorders in the past decade has demonstrated the importance of studying pragmatic aspects of language in addition to its linguistic aspects. However, there have been a limited number of studies which have investigated pragmatic language abilities of aphasic persons. The purpose of this study was to gain information about aphasic speakers' pragmatic language abilities by means of a referential communication task. Referential communication tasks have been used successfully to assess pragmatic language skills in normal and some language disordered populations (Glucksberg, Krauss, and Higgins, 1975; Iwan and Siegel, 1982; Longhurst, 1974; Richardson and Marquardt, 1983; Rosenberg, 1972; Rueda and Chan, 1980).

Referential communication refers to the ability of a speaker to select or identify a target stimulus (referent) from among a set of implicit or explicit alternative stimuli (nonreferents), to communicate this utterance to a listener, and to formulate a new utterance if the listener indicates a misunderstanding (Glucksberg et al., 1975). The referential meaning of a word is that particular meaning which the word represents within the specific context of the nonreferents. Speakers must be able to discern which attributes of the referent distinguish it from the nonreferents, and to communicate this information in an appropriate way to their listener. Research in child development suggests that the development of referential communication depends on linguistic, social and cognitive skills, and that this ability normally is mastered by the early teens (Glucksberg et al., 1975; Rosenberg and Cohen, 1967).

This study was designed to consider the following question about normal and aphasic speakers' performance on a referential communication task: Does presence of aphasia or type of aphasia influence speakers' ability to encode referents, or to respond to indication of communication failure?

Subjects. Twenty-one aphasic subjects (seven nonfluent aphasic, seven fluent aphasic, seven mixed aphasic, and seven non-brain-damaged subjects) participated. All aphasic subjects were at least six months post onset of a single left hemisphere lesion. The examiner and another judge independently categorized aphasic subjects as nonfluent, fluent, or mixed according to fluency of their spontaneous speech, using procedures suggested by Wagenaar, Snow, and Prins (1975).

Experimental Task. In the experimental task, a speaker (aphasic or normal subject) and a listener (the examiner) had identical sets of picture pages (four pictures on a page) in front of them. One of the four pictures (the referent picture) on each page of the speaker's set was specially marked (Figure 1). The speaker's task was to describe the marked picture to the listener so that the listener could point to that picture on her page (the listener could not see the speaker's pictures). On predetermined items, the listener indicated to the speaker that she had misunderstood by saying "What?" or by pointing to the wrong picture. Speakers' initial descriptions and their responses to the listener's indication of communication failure (the "repair" utterance) were audiotaped.

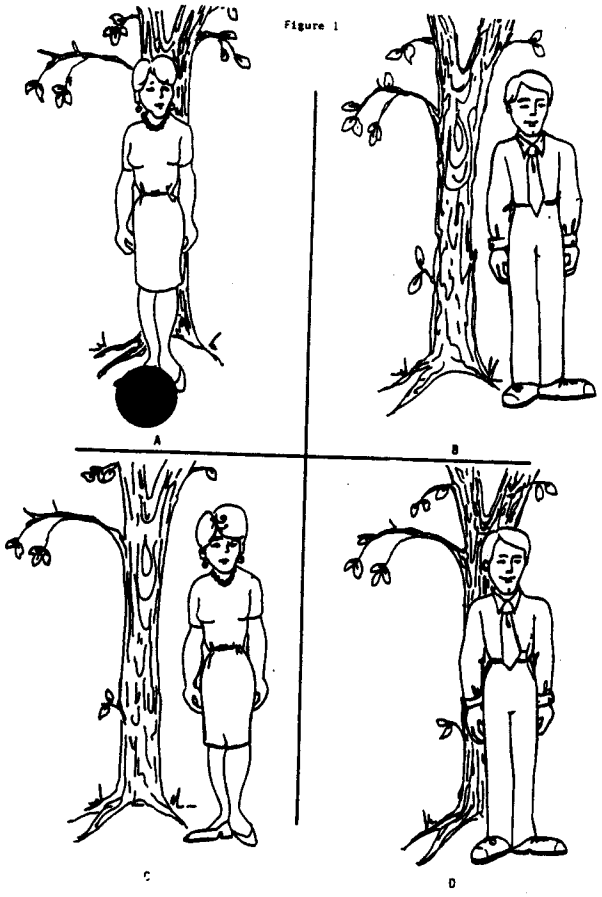

Figure 1. Example of stimulus item from the speaker's set of picture pages.

Audiotapes were transcribed, and counts of number of crucial units, number of words, number of information units, and number of correct information units were made from all initial and repair descriptions. Crucial units were defined as those target words which were necessary for the listener to identify accurately the referent picture. Number of words was a simple count of intelligible whole words. Information units were defined as words which carried meaning but were not necessary for referent identification. Correct information units were intelligible, grammatical, and appropriate to the picture. There were also three ratio measures: 1) efficiency in producing crucial units (calculated by dividing the number of information units by the number of crucial units), 2) efficiency in producing information units, and 3) (calculated by dividing number of words by number of information units, and 3) accuracy in producing information units (calculated by dividing number of information units by the number of correct information units). Also, repair descriptions were compared with initial descriptions and were categorized accordingly (repetition, phonetic revision, semantic revision, syntactic revision, addition, deletion, stress change, and self correction).

RESULTS

Basic Measures. Mean numbers of crucial units, words, information units, and correct information units produced in initial and repair descriptions by all subject groups are presented in Table 1. The nonfluent aphasic group had the lowest mean scores on all measures, and the nonaphasic group had the highest mean scores on all measures except one (number of words). Generally, the mixed and fluent aphasic subjects performed similarly. All subject groups showed a decrement on the four basic measures from initial to repair descriptions.

Table 1. Mean numbers of each basic measure produced in initial and repair descriptions by all subject groups.

GROUP	Number of Crucial Units		Number of Words		Number of Information Units		Number of Correct Information Units	
	Initial	Repair	Initial	Repair	Initial	Repair	Initial	Repair
Nonfluent	2.06	1.88	10.29	7.92	5.75	5.03	5.44	4.82
Mixed	2.11	2.08	17.92	14.19	8.95	7.72	8.48	7.32
Fluent	2.08	1.95	15.32	11.27	8.59	6.70	8.21	6.46
Nonaphasic	2.16	2.03	16.80	11.46	10.32	7.77	10.24	7.70

Results of Newman-Keuls (Groups underlined in common were not different.)

# C.U.	# WDS	# I.U.	# C.I.U.
NA NF MI FL	NF MI FL	NF MI FL	NF MI FL

Repeated measures analyses of variance were performed on all basic measures to determine if differences among subject groups were significant. The analysis on number of crucial units was carried out on all subject groups, however, analyses on number of words, information units, and correct information units were performed without the nonaphasic group, which had a substantially larger within-group variance than any of the aphasic groups.

There was no significant group effect for number of crucial units, suggesting that aphasic subjects and nonaphasic subjects produced similar numbers of those words necessary for referent identification. There was a significant group effect for number of words, number of information units, and number of correct information units. Newman-Keuls multiple comparisons revealed that the nonfluent aphasic group produced fewer words, fewer information units, and fewer correct information units than the mixed aphasic and fluent aphasic subjects did. There were no significant differences between the performance of mixed and fluent aphasic subjects on these three measures.

There was a significant main effect for conditions (initial vs. repair trials) for all four basic measures. There was no significant interaction on any measure. These results indicate that all subjects (including the nonaphasic subjects on the number of crucial units measure) significantly decreased their scores on all measures from initial to repair descriptions.

Ratio Measures. Means for ratio measures representing efficiency in producing crucial units, efficiency in producing information units, and accuracy in producing information units in initial and repair descriptions are presented in Table 2. Inspection of this table reveals the nonfluent aphasic group to be most efficient in producing crucial units, and the nonaphasic group to be most efficient and accurate in producing information units.

Repeated measures analyses of variance were performed on all ratio measures to determine if differences among subject groups were significant. Only aphasic groups were included in the analysis on efficiency in producing crucial units because of large variance in the nonaphasic group. Results of

Table 2. Means for each ratio measure computed for initial and repair descriptions produced by all subject groups.

GROUP	Efficiency in Producing Crucial Units[1]		Efficiency in Producing Information Units[1]		Accuracy in Producing Information Units[2]	
	Initial	Repair	Initial	Repair	Initial	Repair
NONFLUENT	2.80	2.69	1.79	1.57	1.06	1.04
MIXED	4.23	3.71	2.00	1.84	1.05	1.05
FLUENT	4.16	3.48	1.77	1.76	1.05	1.04
NONAPHASIC	4.78	3.89	1.57	1.49	1.01	1.01

Results of Newman-Keuls (Groups underlined in common were not different.)

Eff. C.U.: NF MI FL

Eff. I.U.: NA NF / FL MI

Acc. I.U.: NA NF MI FL

[1] 1.0 = maximum efficiency

[2] 1.0 = complete accuracy

these analyses and Newman-Keuls multiple comparisons revealed significant differences among subject groups, with the nonfluent subjects demonstrating significantly greater efficiency in producing crucial units than the mixed and fluent aphasic subjects. Mixed aphasic subjects were not significantly different from fluent aphasic subjects on this measure. All groups significantly increased their efficiency in producing crucial units from initial to repair descriptions.

The nonaphasic group was included in the analyses performed on efficiency in producing information units and accuracy in producing information units because the within-group variances for all subject groups were similar. On the efficiency in producing information units measure, there were significant group and conditions main effects, and no significant interaction. These results, along with Newman-Keuls multiple comparisons, suggest that nonaphasic subjects were significantly more efficient in producing information units than either mixed aphasic or fluent aphasic subjects were. Nonfluent aphasic subjects were significantly more efficient than mixed aphasic subjects on this measure. All groups significantly increased their efficiency in producing information units from initial to repair descriptions.

Analyses performed on the ratio measure accuracy in producing information units (with the nonaphasic group included) revealed significant differences between subject groups, but no significant differences between initial and repair descriptions for any group. Results of Newman-Keuls multiple comparison tests suggest that nonaphasic subjects were significantly more accurate in producing information units than any group of aphasic subjects was. None of the aphasic groups differed significantly from each other on this measure.

Categorization of Repair Descriptions. Means for each type of revision used in repair descriptions by all subject groups (nonfluent aphasic, mixed aphasic, fluent aphasic, and nonaphasic) are presented in Table 3. Generally, the mixed aphasic and fluent aphasic groups produced similar numbers of each type of revision in repair descriptions. Nonfluent aphasic subjects used more

repetitions than other aphasic subjects, but less than the nonaphasic group. For all groups, deletions and additions were the most frequent revision categories, and self corrections were used least. However, all aphasic groups used more self corrections than the nonaphasic group did.

Table 3. Means for each type of revision used in repair descriptions by all subject groups (nonfluent aphasic, mixed aphasic, fluent aphasic, and nonaphasic).

	REPETITIONS	SEMANTIC	SYNTACTIC	ADDITION	DELETION	STRESS CHG.	SELF CORR.
NONFLUENT	9.71	6.43	6.43	11.00	15.71	13.29	4.29
MIXED	3.29	12.71	8.86	20.43	24.14	14.00	3.14
FLUENT	5.43	12.71	8.43	20.00	20.29	11.43	3.57
NONAPHASIC	11.14	10.57	8.71	14.00	20.28	12.43	.86

Results of Newman-Keuls (Groups underlined in common were not different.)

Repetitions	Semantic	Syntactic	Addition	Deletion	Stress	Correction
N.S.	N.S.	N.S.	NF MI NA FL	N.S.	N.S.	NF MI FL NA

Types of repair strategies used by the four subject groups were subjected to one-way analysis of variance. There were significant differences among groups on two of the seven repair categories (additions and self corrections). Results of follow up tests on additions indicated no significant differences between nonaphasic subjects and aphasic subjects. However, fluent aphasic subjects made significantly more additions than nonfluent aphasic subjects. Followup tests on self corrections showed no significant differences among aphasic groups. However nonaphasic subjects made significantly fewer self corrections than nonfluent aphasic subjects.

SUMMARY AND CONCLUSIONS

Aphasic subjects, regardless of type of aphasia (nonfluent, fluent, or mixed), encoded referents in a referential communication task as effectively as nonaphasic subjects. Aphasic speakers were able to determine which attributes in the referent picture were crucial in distinguishing the referent from the nonreferent pictures, and to communicate these descriptions to a listener. Although all aphasic subjects were able to identify and communicate the necessary words for performance in the referential task, nonfluent aphasic subjects had significantly lower scores than mixed and fluent aphasic subjects did on those measures which quantified how they described referent pictures (e.g. number of words, number of information units). There was only one measure which clearly differentiated the nonaphasic subjects from the aphasic subjects--accuracy in producing information units. Nonfluent, mixed, and fluent aphasic subjects did not differ significantly on this accuracy measure.

Presence or type of aphasia did not significantly influence responses to communication failure. All subject groups demonstrated decrements on all measures from initial to repair descriptions. There were significant group differences on only two of the seven revision categories. Nonfluent aphasic subjects used more self corrections than fluent subjects, and fewer additions than nonaphasic subjects.

Referential communication tasks, which are dependent on linguistic, cognitive, and social skills, have been used to assess pragmatic language skills in normal and some disordered populations. The results of this study suggest that although subject groups differed on some efficiency and accuracy measures, the referential communication skills of aphasic speakers are generally not significantly different from normal speakers. This information supports other recent reports by Gurland, Chwat, and Wollner (1982), Holland (1982), Prinz (1980), and Schienberg and Holland (1982) (among others) that describe preserved pragmatic language abilities in aphasic individuals' communicative interactions. This growing body of literature reminds us that aphasic persons have important communication abilities which could be utilized during the treatment process.

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DISCUSSION

Q: Did you have an explanation for why the revision scores dropped?

A: No, I didn't really talk about why. Obviously it was one of the significant findings for all groups and for all measures. All the scores dropped and the efficiency and accuracy increased. It is the way the normal subjects responded too.

Q: I'm not sure this is an idea why the repair scores dropped but it did occur to me that it might be. What criteria did you use for feigning misunderstanding?

A: We decided that in order to do statistics we wanted the same number of repair descriptions from everyone. It was a random situation where I either responded "what" or pointed incorrectly. Most of the subjects responded as if they really believed that I had misunderstood, but there were a number that looked at me like I was kind of weird. I was uncomfortable with that part of the design, but we felt like we needed to do that in order to control the numbers to be used.

Q: I think it was interesting that it was the higher level aphasic people that didn't believe the situation. It occurs to me that their repairs may have been less effective because they really didn't quite believe that you didn't understand them and they have taken less time or have been less effective in making the repair.

A: I did have two different types of repair responses. I either said "what" or I pointed incorrectly. What I am presenting here today is a small part of the data. There seem to be some interesting responses to the two different types of failure indication. They responded differently when I pointed incorrectly than when I said "what."

Q: I'm not sure how generalizable this is, but we've done a similar study with dysarthric people trying to find out if they change their intelligibility and we found that only the moderately impaired were the ones who were able to change their responses in a communication failure situation. The mildly involved people were probably so mildly impaired that it didn't matter. The severely involved people couldn't do it. The moderately impaired people were the ones who actually did change their responses and become more intelligible with contingent queries.