A Comparison of Picture Descriptions by Family Members of Aphasic Patients to Aphasic and Nonaphasic Listeners

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When faced with communicative failure, speakers have been shown to make a variety of adaptations in their verbal output. For example, Longhurst and Siegel (1973) observed that speakers, when confronted by listener errors resulting from an electronic distortion of their speech in a descriptive task, lengthened their descriptions, reduced their speaking rate, and used more redundant vocabulary. Surprisingly, this phenomenon has been little studied regarding communicating with aphasic individuals. Most studies which addressed this question have focused on how different individuals communicate with an aphasic person (e.g. Larkins, 1980; Gurland, Chwat, and Wollner, 1982), rather than how a given normal speaking individual communicates with normal as opposed to aphasic listeners.

Two studies which have considered modifications in speaking rate made by trained health care providers in speaking to aphasic individuals have yielded different, and somewhat disturbing, results. One by Salvatore, Strait, and Brookshire (1975) reported that both experienced and inexperienced examiners tended to lengthen Token Test commands given to aphasic patients by inserting more pause time within the commands. Furthermore, the examiners tended to insert more pause time for low level than high level aphasic patients. In a second study by Gravel and LaPointe (1982), various health care providers were observed to increase their speaking rate (though not significantly) when conversing with aphasic compared with normal listeners.

The purpose of this study was to determine what, if any, differences existed on a variety of parameters when family members of aphasic individuals described a picture to their aphasic relative and to a nonaphasic listener. The emphasis of this study was on how content was presented, rather than on linguistic characteristics.

METHOD

Subjects. Subjects for this study were the spouses of nine aphasic individuals and the daughter of a tenth. The aphasic individuals ranged from 3 months to 11 years post onset. All of the spouses had resided with their aphasic counterpart since onset; one aphasic woman had resided with her daughter who served as a subject for the last three years. All of the aphasic patients were enrolled in individual and/or group language therapy at the time of their family members' participation in the study.

Procedures. Each of the family members participated in two experimental conditions. In one condition, the family member described three pictures depicting a number of events to their aphasic relative. In the other, the family member described the same three pictures to a normal listener. The

second of the three pictures described in both conditions was the Cookie Theft picture from the Boston Diagnostic Aphasia Examination (Goodglass and Kaplan, 1972). Subjects were instructed to "Tell (first name of listener) everything you see happening in these pictures." Their descriptions of all three pictures were tape recorded in both conditions. The order in which the family members participated in the two conditions was counterbalanced, with one half of the family members first describing the pictures to the normal listener and the other half first describing the pictures to their aphasic relative. At least three days separated the subjects' participation in the two conditions.

One of the authors transcribed each subject's two descriptions of the Cookie Theft picture. A second author verified each transcription, noting any discrepancies. Word-by-word agreement exceeded 99%, and any discrepancies were resolved prior to analysis of the descriptions by mutual agreement. A number of measurements were made on the descriptions of the Cookie Theft picture. Two of the authors independently (1) timed the descriptions, omitting any comments made by the listener, (2) counted the number of content units conveyed according to the method developed by Yorkston and Beukelman (1980), (3) counted the total number of words and the number of different words used in the description, and (4) counted the number of literal and interpretive content units conveyed according to the method developed by Myers and Linebaugh (1980).

Interjudge reliability was assessed for all measurements. The two judges' times were within ± 1 second for all 20 descriptions. The counts of total, literal, and interpretive content units were within ± 1 content unit for 90% of the descriptions. The counts of total words and number of different words were within ± 1 word for all 20 descriptions. In view of the proximity of the two judges' scores on all the measurements, the first judge's scores were used in all subsequent analyses.

For statistical analysis, a number of additional measures were derived from those taken directly from the descriptions. These included (1) words per content unit, (2) content units per minute, (3) words per minute, (4) literal-interpretive ratio (the number of literal content units divided by the number of interpretive content units), and (5) type-token ratio (the number of different words divided by the total number of words). Words per content unit and content units per minute were used as measures of communicative efficiency. Words per minute was used as a measure of speaking rate. The literal-interpretive ratio was included as a measure of the speakers' tendency to add or delete context-dependent content units when speaking to the aphasic listeners. Type-token ratio was included as a measure of the diversity of the vocabulary used, or of language redundancy.

RESULTS

Tables 1 and 2 present the individual and mean scores on the measurements analyzed for the normal and aphasic listeners, respectively. The mean scores on each measurement for the normal versus the aphasic listeners were compared using two-tailed t tests for correlated means.

The comparisons between the mean scores on the measures employed are summarized in Table 3. Comparison of the number of words used to describe the Cookie Theft picture revealed that the subjects as a group used significantly ($t = -2.76$, $p < .03$) more words when speaking to aphasic listeners than

Table 1. Individual and mean values for measures derived from subjects' descriptions to normal listeners.

Subject	Total words	Time (min.)	Number of content units	Words per content unit	Content units per minute	Words per minute	Literal-interpretive ratio	Type-token ratio
1	66	.52	17	3.9	32.7	126.9	1.8	.62
2	57	.40	14	4.1	35.0	142.5	1.0	.72
3	143	1.03	25	5.7	24.3	138.8	1.8	.56
4	39	.28	11	3.5	39.3	139.3	1.2	.79
5	79	.67	11	7.2	16.4	117.9	1.8	.75
6	97	.80	17	5.7	21.3	121.3	1.8	.75
7	76	.42	19	4.0	45.2	180.9	1.7	.72
8	297	1.87	31	9.6	16.6	158.8	1.8	.49
9	120	.88	20	6.0	22.7	136.4	1.5	.62
10	91	.50	24	3.8	48.0	182.0	1.4	.71
$\bar{X}$	106.5	.74	18.9	5.4	30.2	144.5	1.6	.67

Table 2. Individual and mean values for measures derived from subjects' descriptions to aphasic listeners.

Subject	Total words	Time (min.)	Number of content units	Words per content unit	Content units per minute	Words per minute	Literal-interpretive ratio	Type-token ratio
1	62	.52	16	3.9	30.8	119.2	1.0	.71
2	95	.80	15	6.3	18.8	118.8	.9	.73
3	159	1.15	25	6.4	21.7	138.3	1.8	.58
4	57	.45	16	3.6	35.6	126.7	2.2	.68
5	100	.75	17	5.9	22.7	133.3	1.8	.61
6	83	.57	12	6.9	21.1	145.6	1.4	.72
7	101	.58	22	4.6	37.9	174.1	2.1	.59
8	290	2.38	30	9.7	12.6	121.8	2.3	.38
9	155	1.47	22	7.1	14.9	105.4	1.8	.49
10	127	.78	22	5.8	28.2	162.8	2.1	.55
$\bar{X}$	122.9	.95	19.7	6.0	24.4	134.6	1.7	.60

to normal listeners. The subjects did not, however, include significantly more content units in their descriptions to aphasic listeners. These results are reflected in 9 of the 10 subjects using more words per content unit when speaking to aphasic listeners. The difference between the means for words per content unit fell short of statistical significance ($t = -2.06$, $p = .07$).

Table 3. Means, standard deviations, and significant differences for measures derived from subjects' descriptions to normal and aphasic listeners.

	Normal	Aphasic	t	Significance
Total words	106.5 (73.39)	122.9 (68.07)	-2.76	$p < .03$
Number of content units	18.9 (6.39)	19.7 (5.44)	-0.76	n.s.
Words per content unit	5.4 (1.92)	6.0 (1.77)	-2.06	$p = .07$
Time (min.)	0.74 (0.46)	0.95 (0.59)	-2.68	$p < .03$
Content units per minute	30.2 (11.55)	24.4 (8.47)	2.38	$p < .05$
Words per minute	144.5 (22.66)	134.6 (21.23)	1.61	n.s.
Literal-interpretive ratio	1.6 (0.29)	1.7 (0.49)	-0.95	n.s.
Type-token ratio	0.67 (0.09)	0.60 (0.11)	2.57	$p = .03$

Subjects used significantly more time ($t = -2.68$, $p < .03$) to describe the Cookie Theft picture to aphasic than to normal listeners. This difference in time is reflected in the significantly ($t = 2.38$, $p < .05$) lower mean number of content units per minute for aphasic than for normal listeners. The greater time taken did not, however, offset the greater number of words used in describing the picture to aphasic listeners. Thus the difference between the group means for words per minute was not significant.

For literal-interpretive ratio, no significant difference was observed between the group means. For type-token ratio, however, subjects achieved a significantly higher ratio ($t = 2.57$, $p = .03$) for normal listeners than for aphasic listeners. This indicates that subjects used a lower proportion of different words in describing the picture to aphasic listeners. That is, they were more redundant in their language when speaking to aphasic listeners.

DISCUSSION

The results of this study show that family members of aphasic patients include as much information in describing a novel situation to their aphasic relative as they do in describing the situation to a nonaphasic listener. The major exception of note was the inclusion of a personalized reference by a few of the subjects when describing the scene to their aphasic relative. For example, one wife, having surveyed the Cookie Theft picture, said, "Joe, this looks like something that would happen to me." It seems likely, however, that inclusion of such personal references would be common to narratives presented to highly familiar listeners in general and is not peculiar to those presented to aphasic relatives.

A second finding of this study parallels that of previous studies which have documented reduced communicative efficiency between aphasic and nonaphasic interactants. While those studies (e.g. Yorkston, Beukelman, and Flowers, 1980; Linebaugh, Kryzer, Oden, and Myers, 1982) have focused on the aphasic individual as sender, this study cast the aphasic persons in the role of receiver. Two aspects of our data demonstrated reduced communicative efficiency. First, the family members used more words to convey essentially the same amount of information to their aphasic relatives as they did to the nonaphasic listeners. This is similarly reflected in the greater mean number of words per content unit for aphasic than for nonaphasic listeners. Second, family members took more time to convey the information to their aphasic relatives than to nonaphasic listeners with a consequent reduction in the number of content units conveyed per minute. Thus, reduced communicative efficiency is reflected both in the amount of language and in the amount of time used to transmit equal amounts of information.

Analysis of the speaking rates used by family members revealed a nonsignificant trend toward reduced rate when speaking to the aphasic listeners. Eight of the ten subjects spoke at a slower rate when addressing their aphasic relative. Of these, four reduced their rate by at least 20 words per minute and a fifth by 13 words per minute. Two subjects, however, increased their speaking rates (by 16 and 24 words per minute, respectively) when speaking to their aphasic spouses.

Comparison of type-token ratios (TTR) derived from the descriptions to the two listener groups revealed greater redundancy in the vocabulary used to describe the Cookie Theft picture to aphasic than to nonaphasic listeners. Caution must be exercised in interpreting these results because TTR is influenced by sample length. Longer samples generally yield lower TTRs than do shorter ones. This factor is especially important in the present study, where, for seven of the ten subjects, the description to the aphasic listener was longer than that given to the nonaphasic listener. We deemed deriving our TTRs from the total samples to be valid, however, because of the distribution of content units in the descriptions. That is, we believe that TTRs calculated on some limited portion of one or both descriptions would be even more influenced by an uneven distribution of content units, and hence the vocabulary used to convey them, than by the differences in sample length.

The differences between the TTRs suggest that family members of aphasic patients make adjustments in their language output when addressing an aphasic relative. This finding is in accord with several studies which have reported a variety of speaker groups spontaneously modifying their verbal output when speaking to children (Broen, 1972; Phillips, 1973; Holzman, 1974; Sachs and Devin, 1976; Berko-Gleason, 1977). With this as impetus, we have undertaken a transformational analysis of the language used by the family members. Analysis of the five pairs of descriptions completed to date has revealed that family members tend to use a lower proportion of complex to simple transformations when speaking to their aphasic relatives than when speaking to nonaphasic listeners. That is, they reduced the syntactic complexity of their language.

Answers to a number of questions raised by the findings of this study may have a significant impact on our clinical practice. First, are adjustments in language complexity and speaking rate made by family members related to the nature and severity of the patient's auditory comprehension deficits or are they reflective of some generic simplification of language used with

children, foreigners, and other such listeners? Furthermore, do these adjustments enhance the aphasic listener's comprehension of the description? The use of more redundant language (Gardner, Denes, and Weintraub, 1975) and less complex syntax (Shewan and Canter, 1971) might be expected to have a facilitatory effect, but the effects of using more language in general and taking more time without substantially slowing the rate of speaking might be inconsequential or even counterproductive.

Second, how well do these results generalize to more interactive forms of communication? It seems reasonable to assume that the adjustments made by family members will be more "breakdown" specific, and hence more effective, when there is more listener feedback than that observed in the narrative format. But this, like so many other hypotheses which will be generated at this conference, remains to be tested.

Third, it remains uncertain whether the subjects in this study arrived at the adjustments they made on their own or if they had been influenced by counseling they had received. Again turning to the developmental side of the language input literature, we find both adult (Siegel, 1967) and child (Marinkovich, Newhoff, and MacKenzie, 1980) speakers spontaneously simplifying their language after a period of interaction with language-impaired children. Might we not expect as much of family members of aphasic patients? Might we seek even finer, patient-specific adjustments from some family members? Must we intervene at all? Or, given sufficient exposure, will most family members make appropriate adjustments spontaneously?

Finally, one may ask if adjustments in language input to aphasic patients made by family members and others with whom the patient interacts affect the patient's recovery of language. Presumably, all among us who ascribe even minimal efficacy to stimulation treatment approaches would answer in the affirmative. From this point, and acknowledging that interactions with a Speech and Language Pathologist constitute but a small percentage of the language exposure of our patients, we can readily create scenarios in which patients' recovery is not well served, perhaps even inhibited, by exposure to language which is prevailingly either too complex or overly simplified. Conversely, patients' recovery may be enhanced by greater exposure to language which is tuned to their current level of performance within natural communicative situations. Our colleagues treating language-impaired children now widely employ programs for training those in the children's environment. Some preliminary efforts have been made to assess the effects of modifying interactant behaviors on aphasic patients (e.g. Goodkin, Diller, and Shah, 1973; Florance, Rabidoux, and McCauslin, 1980). The results of these studies have for the most part been encouraging. We would, therefore, suggest that the nature of family members' language input to aphasic patients is an area worthy of continued pursuit.

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