Facilitating Functional Conversational Skills in Aphasia: An Experimental Analysis of a Generalization Training Procedure

Patrick J. Doyle
Karen S. Oleyar
Howard Goldstein

The limited generalization effects observed following syntax training with nonfluent agrammatic aphasic adults has led clinical aphasiologists to select target behaviors based on functional rather than structural response criteria and to employ a variety of generalization-promoting treatment techniques. Specifically, Doyle et al. (1989) developed a treatment program that (1) incorporated multiple trainers, (2) encouraged subject-initiated utterances, (3) employed functional rather than structural response criteria, (4) reinforced various response topographies, and (5) used social reinforcers. Application of this program resulted in the functional use of requests for information by four subjects with chronic Broca's aphasia during conversational discourse interactions with familiar and unfamiliar conversational partners.

In the current investigation, several questions were addressed that arose as a result of our previous work with the training program. First, the effects of providing written topic cues during conversational interactions were examined to assess whether access to specific content facilitated the use of requests for information and self-disclosures. We introduced this variable prior to any training because one interpretation of our previous study was that perhaps we had trained content-specific responses rather than the communicative function of requesting information. Second, the generality of the treatment program was examined by targeting an additional communicative function and by applying the protocol to a subject whose aphasia was significantly more severe than that of our previous subjects. Third, changes in the relative distribution of communicative functions that comprised conversational interactions with unfamiliar conversational partners prior to and following intervention were examined.

Our specific research questions were the following:

1. Will instructions to "ask questions" and "talk about yourself" paired with written topic cues increase the subject's use of personal statements of fact and requests for information during conversations with trainers and unfamiliar volunteers?
2. Will a generalization training procedure increase the subject's use of personal statements of fact and requests for information in conversations with trainers and unfamiliar volunteers?
3. What is the effect of treatment on the relative distribution of targeted and nontargeted communicative functions used during conversational interactions between the subject and unfamiliar conversational partners?

METHOD

PARTICIPANTS

Subjects

The subject was a 58-year-old, right-handed, high-school educated man who was 8 months after onset of a single left MCA stroke when he entered into the study. He had a negative history for psychiatric illness and alcoholism, and he passed a pure-tone audiometric screening at 30 dB HL bilaterally at 500, 1000, and 2000 Hz. His performance on the Western Aphasia Battery met diagnostic criteria for Broca's aphasia, with an aphasia quotient of 53.6. The subject received no other treatment concurrent with his participation in this study.

Volunteers

Thirty-eight hospital volunteers served as conversational participants. The volunteer group consisted of 18 women and 20 men ranging in age from 17 to 82 years (mean 58 years, SD 16.0). None of the volunteers was familiar with the experimental subject or the purposes of the study.

SETTINGS

All treatment sessions were conducted in a quiet room. All baseline and probe sessions were conducted in a nontreatment room and were audiotaped and videotaped through a two-way mirror.

RESPONSE DEFINITIONS AND SCORING

Requests

Requests were defined as utterances that (1) solicited the hearer to affirm, negate, or confirm the proposition of the speaker's utterance or (2) solicited information about the identity, location, or property of an object, event, or situation and met the following minimal criteria: The utterance was (1) intelligible, (2) contained a question morpheme and a content word (e.g., "where home," "work, what kind"), or (3) ended with rising inflection (e.g., "you work").

Statements

Statements were defined as utterances that expressed facts, attitudes, feelings, or beliefs and met the following minimal criteria: The utterance was (1) intelligible and (2) contained a subject and a verb (e.g., "I golf") or (3) a subject and modifier (e.g, "penguins good") or a subject and an object (e.g., "Uncle Frank garden").

Only unprompted utterances that met the preceding criteria were scored correct. Under training conditions, these utterances had to occur within a specified time interval and communicate an unambiguous message as determined by the trainer. Under baseline and generalization conditions, the adequacy of utterances meeting the preceding criteria was determined by conversational participants' provision of information that satisfied a given request or the acknowledgment of a given subject-initiated statement.

Although only the conversational acts of requesting information and making personal statements of fact were targeted for intervention, all utterances of both the subject and the conversational participants were coded during baseline and probe sessions for descriptive purposes according to the following additional categories:

> *Responses: Responses* were defined as utterances that provided information directly complementing prior requests.

> *Ambiguous communicative attempts:* This category included utterances containing intelligible content but whose meaning was uninterpretable.

> *Requests for clarification:* This category included utterances that served to solicit additional information about some portion of the content in the immediately preceding utterance.

> *Unintelligible:* This category included distorted and neologistic utterances.

> *Other:* This category included utterances that served to facilitate the conversational interaction but did not provide additional content, including organizational devices, social greetings, acknowledgments, and repetitive responses.

EXPERIMENTAL DESIGN AND PROCEDURES

A multiple-baseline design across behaviors was used to assess the effects of treatment. The primary dependent variables were the number

of subject-initiated requests for information and subject-initiated personal statements of fact within a 5-minute conversational interaction.

Baseline

During baseline, the subject's ability to request information and to provide personal statements of fact was assessed in 5-minute timed conversations with trainers and unfamiliar volunteers. Each baseline session consisted of two separate 5-minute interactions, one with a trainer and one with an unfamiliar volunteer. Prior to each interaction, volunteers were informed that the purpose of their visit was to give a language-impaired stroke patient practice at conversing with unfamiliar people. They were instructed to give the subject an opportunity to speak as much as he wanted to about whatever he chose and to try to have as natural a conversation as possible. When trainers served as conversational participants, they behaved in a manner consistent with the instructions given to volunteers. The subject was instructed to ask conversational participants questions about themselves and to disclose background information about himself or anything else he chose. Baseline sessions were conducted three times weekly until stable levels of responding were demonstrated for each behavior.

Topic Cues

To assess the effect of providing general content on the subject's ability to request information and to provide statements of fact, topic cues were introduced into the baseline condition. These cues consisted of six general content words (i.e., family, career, home, health, hobbies, and sports) printed on a single 5 by 7-inch index card. In this condition, each item was reviewed with the subject prior to the probe. The subject was then instructed as he was in baseline and told that he could use the card to help him think of things to talk about. All other variables were identical to the baseline condition. Topic cues were withdrawn following three separate probe sessions.

Training

The subject received treatment three times a week (Tuesday, Wednesday, and Thursday) for a total of 104 treatment sessions. Each session consisted of 20 opportunities (trials) to produce the targeted communicative function. Training was conducted by one of two different therapists randomly assigned within each week. Statements were trained initially, followed by requests. An additional phase of treatment was then conducted in which both behaviors were trained concurrently.
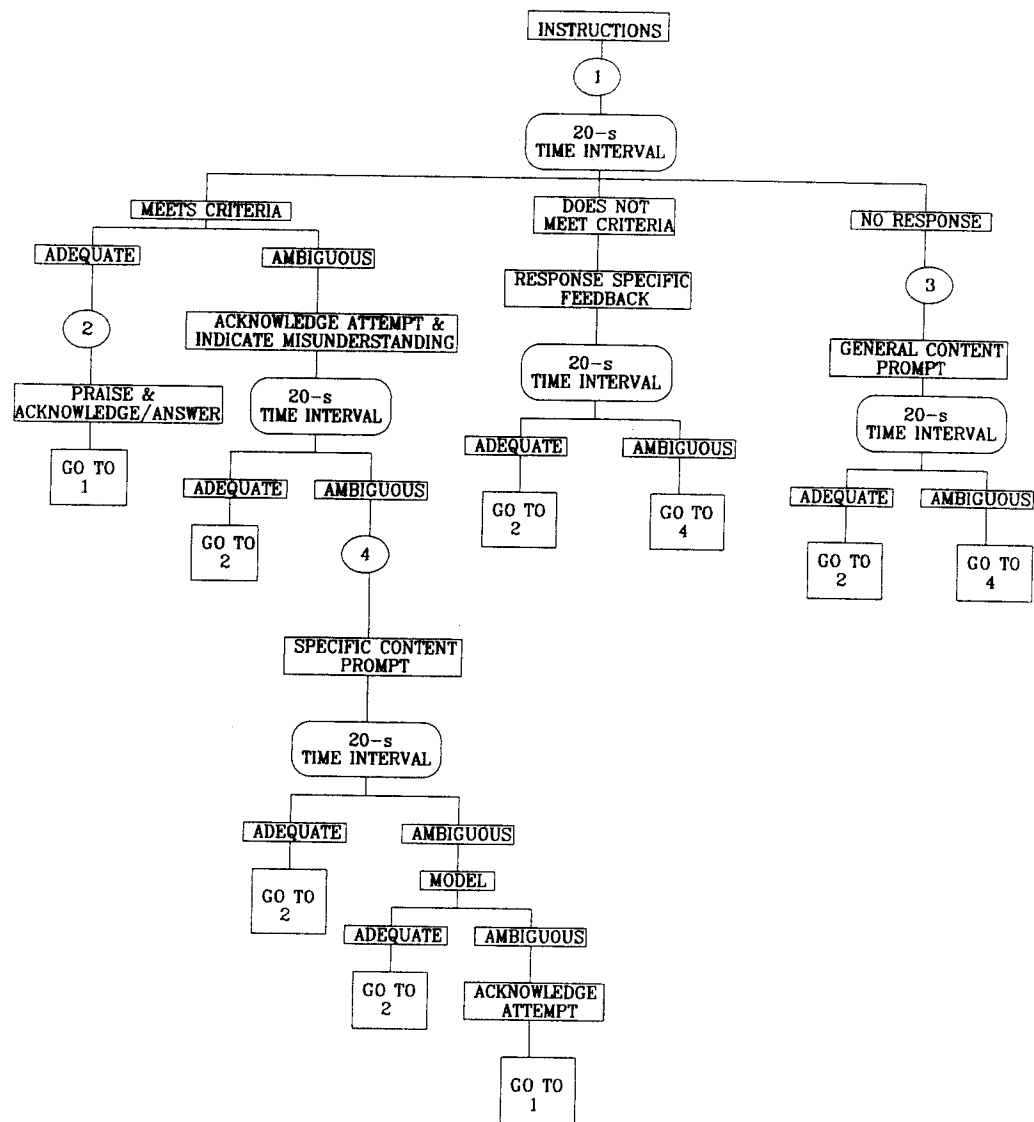
Fig. 22-1. Flow diagram of the training procedure.

A flow diagram of the training procedure is shown in Figure 22-1. This figure reveals that with training statements, each session began with an *instruction* (i.e., "tell me about yourself or anything else you want to talk about"). If within a *20-second interval* following these instructions the subject responded in a manner that *met the criteria* for "statements" and the utterance was *adequate* (i.e., communicated an unambiguous message), the trainer *praised* the subject, *acknowledged* the information provided, and the next trial began.

When the subject initiated an *ambiguous* utterance, the trainer *acknowledged* the subject's *attempt* to provide information, *indicated misunder-*

standing, and allowed another *20-second interval* for the subject to produce an adequate statement. If within the second *20-second interval* the subject's response remained *ambiguous,* the trainer provided a *specific content prompt.* If the subject responded *adequately* following the specific content prompt, the trainer *praised* the subject and *acknowledged* the information provided. If following the *specific content prompt* the subject's response was still *ambiguous,* the trainer *modeled* an adequate statement for the subject to imitate. Following the subject's repetition of the model, the next trial began. When the subject initiated an utterance that was unintelligible, perseverative, or otherwise *did not meet the criteria* for the communicative function being trained, *response-specific feedback* was provided. When a subject provided *no response* within the initial 20-second interval, the trainer provided a *general content prompt* and proceeded as above depending on the adequacy of the subject's response. When requests were trained, instructions were given to ask questions about the conversational partner or any other topic, and procedures similar to those described above were employed.

Generalization Probes

Generalization probes were identical to baseline probes. Following every third treatment session (once a week), a generalization probe was conducted.

DESCRIPTIVE ANALYSES

Changes in the proportionate use of communicative functions were examined by sampling the first nine baseline probes and the last nine generalization probes in which unfamiliar volunteers served as conversational participants. For each 5-minute conversation, proportionate use of all communicative functions was calculated. These values were then averaged across each phase.

RELIABILITY

Audio recordings of all conversational interactions were orthographically transcribed into a microcomputer. A second observer was then provided with the completed transcript and the corresponding audio recording and struck out any errors in transcription that changed the communicative function of the utterances. These utterances were not

scored and represented less than .5 percent of all utterances transcribed throughout the study.

Interobserver reliability was determined in two ways for the dependent variables. First, point-to-point reliability was determined by having independent judges score all utterances within a sample (i.e., all communicative functions of both the subject and the conversational participant). Second, point-to-point agreement was determined for only the subject's requests and statements within a sample. Percentage of agreement was determined by dividing the number of agreements by the number of agreements plus disagreements and multiplying by 100. These procedures were conducted on a random sample of 35 percent of trainer and volunteer probes across all phases of the study.

The mean interobserver agreement for all utterances coded within a sample was 87 percent, with a range of 72 to 100 percent. The mean interobserver agreement when considering only the subject's requests and statements was 97 percent, with a range of 67 to 100 percent.

RESULTS

TRAINING DATA

The data in Figure 22-2 represent the mean number of subject-initiated statements and requests during 20-trial training sessions. Data are averaged across every third session (i.e., each week of training). These data show that the subject improved from an average of 1 to an average of 13 unprompted, adequate statements per training session over 10 weeks of treatment (28 sessions). The data for requests reveal that the subject improved from an average of 2 to an average of 15 unprompted, adequate requests per training session over 17 weeks of treatment (52 sessions). During the final phase of training (8 weeks/24 sessions), the subject averaged from 3 to 10 statements and from 7 to 10 requests per session.

GENERALIZATION DATA

The data in Figure 22-3 represent the number of subject-initiated adequate statements and requests during 5-minute conversational interactions with trainers and unfamiliar partners. These data reveal low and stable base rates with topic cues alone having no effect on the subject's ability to request information or provide personal statements of fact.
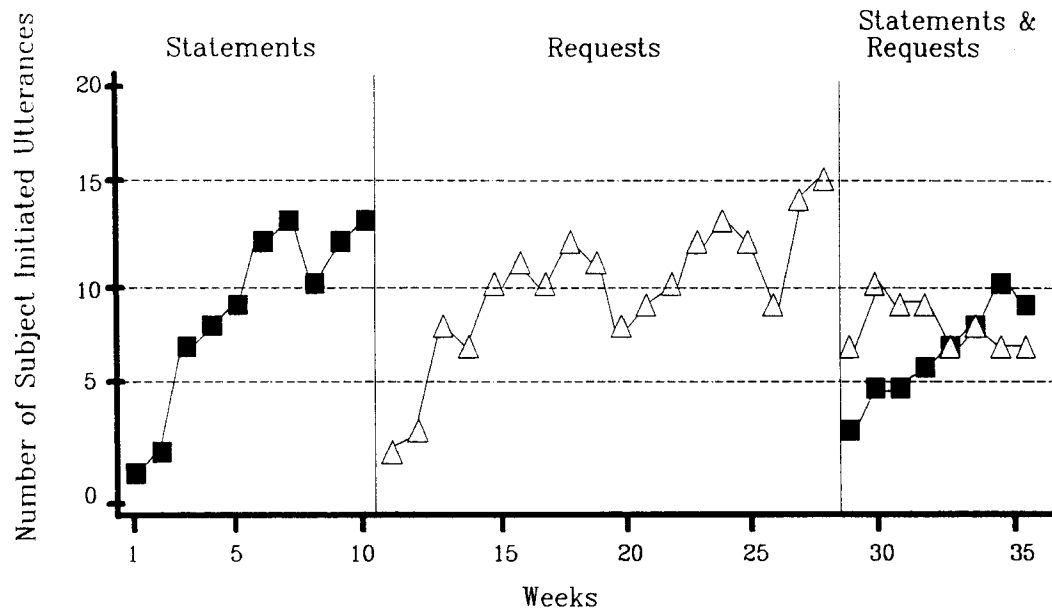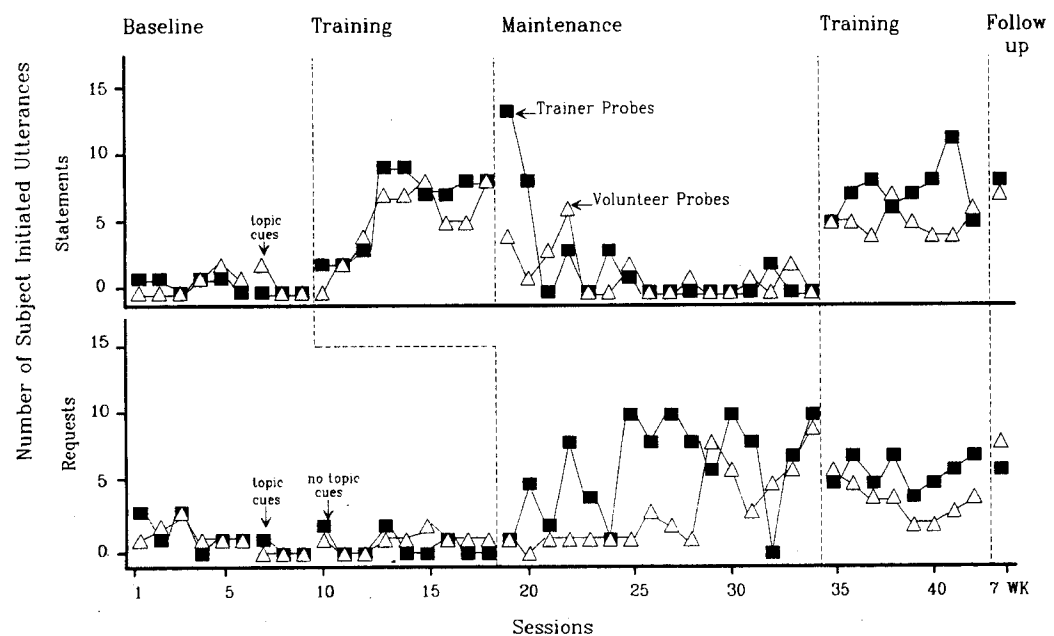
TRAINING DATA

Fig. 22-2. Mean number of subject-initiated adequate statements and requests during 20-trial training sessions. Data are averaged across every third treatment session.

Fig. 22-3. Number of subject-initiated adequate statements and requests during 5-minute conversational interactions with trainers and unfamiliar conversational partners.

Following the initiation of treatment, rapid and marked effects were observed for statements during both trainer and volunteer probe conditions, while no effects were observed for the use of requests.

Following the initiation of treatment on requests, effects were evident in the trainer probe condition but delayed and less robust in the unfamiliar volunteer condition. Concurrently, the effects of treatment on statements returned to baseline levels in both trainer and volunteer probe conditions.

During the final phase of training, in which both behaviors were trained concurrently, generalization effects well above baseline levels were observed for each targeted communicative function in both trainer and volunteer conditions.

DESCRIPTIVE DATA

Figure 22-4 shows the subject's and volunteers' mean proportionate use of communicative functions in 5-minute conversational discourse samples during baseline and generalization probes. The figure reveals that the subject's use of requests and statements combined increased from 5 to 34 percent. Also, the subject's ambiguous communicative attempts decreased from 30 to 6 percent.

Volunteers' use of statements and requests remained relatively stable across phases. A comparison of the subject's and volunteers' distributions during generalization probes reveal relatively similar proportions of communicative function use, with only 7 percent of the subject's utterances being noncommunicative.

DISCUSSION

The major purpose of this study was to replicate the findings of Doyle et al. (1989) in a subject whose aphasia was significantly more severe than previously treated subjects and to establish the effectiveness of the program for training personal statements of facts. The results indicated that the subject was able to use the targeted behaviors functionally in an unstructured conversational discourse condition with both trainers and unfamiliar conversational partners at levels well above baseline performance.

Methodologically, the present investigation is very similar to the Thompson and Byrne (1984) investigation. In each study, requesting information and providing personal statements of fact were targeted for
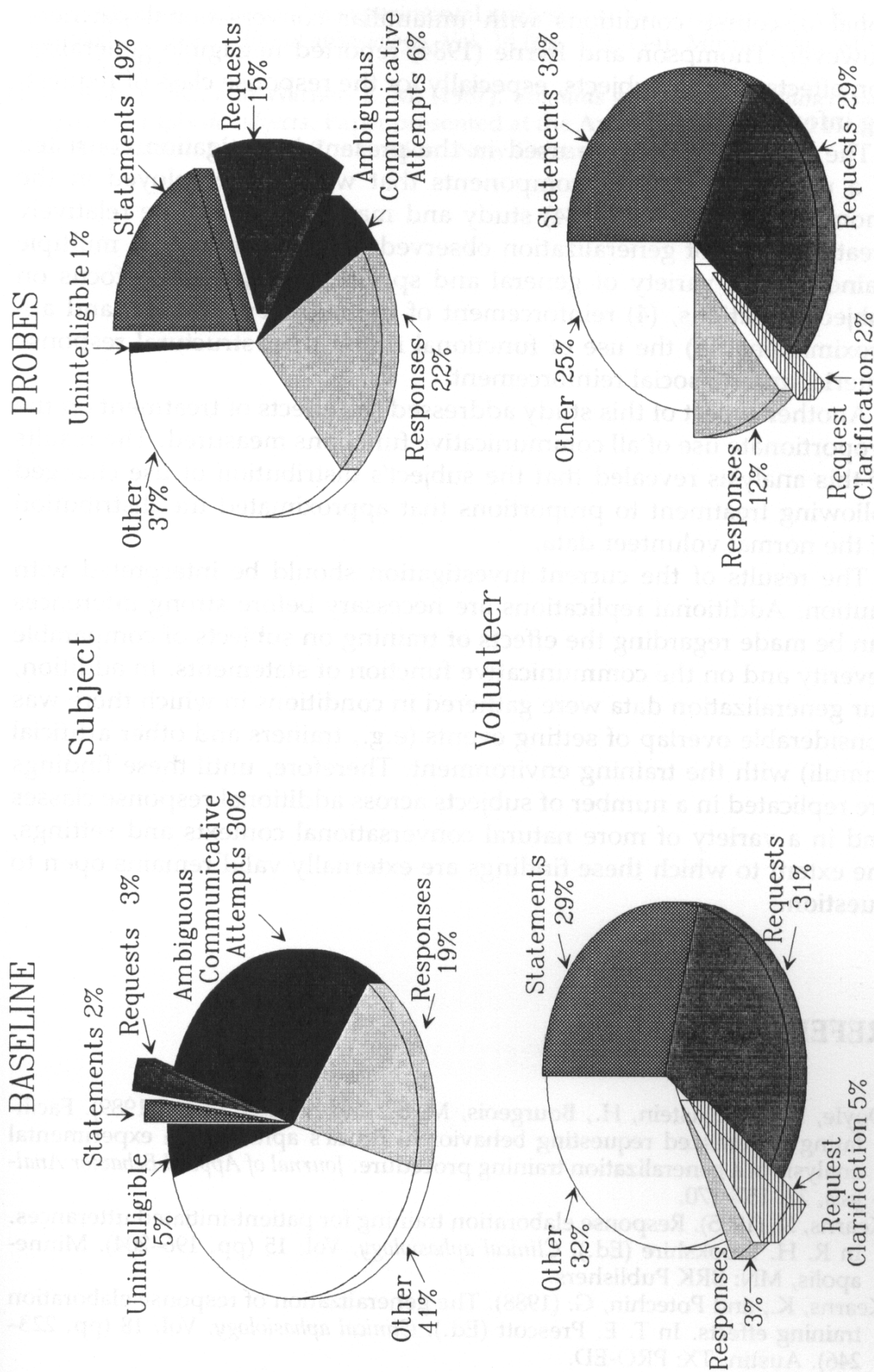
PROBES

Statements 19%

Requests 15%

Unintelligible 1%

Ambiguous Communicative Attempts 6%

Other 37%

Responses 22%

Subject

Statements 32%

Requests 29%

Request Clarification 2%

Other 25%

Responses 12%

Volunteer

BASELINE

Statements 2%

Requests 3%

Ambiguous Communicative Attempts 30%

Unintelligible 5%

Responses 19%

Other 41%

Statements 29%

Requests 31%

Request Clarification 5%

Other 32%

Responses 3%

Fig. 22-4. Subject's and volunteers' mean proportionate use of communicative functions in 5-minute conversations during baseline and generalization probes.

intervention and dependent measures were obtained during conversational discourse conditions with unfamiliar conversational partners. However, Thompson and Byrne (1984) reported negligible generalization effects in their subjects, especially for the response class of requesting information.

The training procedure used in the present investigation consisted of a number of specific components that were not employed in the Thompson and Byrne (1984) study and may account for the relatively greater degree of generalization observed. These included (1) multiple trainers, (2) a variety of general and specific prompts, (3) a focus on subject initiations, (4) reinforcement of the subject's attempts and approximations, (5) the use of functional rather than structural response criteria, and (6) social reinforcement.

Another aspect of this study addressed the effects of treatment on the proportionate use of all communicative functions measured. The results of this analysis revealed that the subject's distribution of use changed following treatment to proportions that approximated the distribution of the normal volunteer data.

The results of the current investigation should be interpreted with caution. Additional replications are necessary before strong inferences can be made regarding the effects of training on subjects of comparable severity and on the communicative function of statements. In addition, our generalization data were gathered in conditions in which there was considerable overlap of setting events (e.g., trainers and other artificial stimuli) with the training environment. Therefore, until these findings are replicated in a number of subjects across additional response classes and in a variety of more natural conversational contexts and settings, the extent to which these findings are externally valid remains open to question.

REFERENCES

Doyle, P. J., Goldstein, H., Bourgeois, M. S., and Nakles, K. O. (1989). Facilitating generalized requesting behavior in Broca's aphasia: An experimental analysis of a generalization training procedure. *Journal of Applied Behavior Analysis, 22,* 157–170.

Kearns, K. (1985). Response elaboration training for patient-initiated utterances. In R. H. Brookshire (Ed.), *Clinical aphasiology,* Vol. 15 (pp. 196–204). Minneapolis, MN: BRK Publishers.

Kearns, K., and Potechin, G. (1988). The generalization of response elaboration training effects. In T. E. Prescott (Ed.), *Clinical aphasiology,* Vol. 18 (pp. 223–246). Austin, TX: PRO-ED.

Thompson, C. K., and Byrne, M. (1984). Across setting generalization of social conventions in aphasia: An experimental analysis of "loose training." In R. H. Brookshire (Ed.), *Clinical aphasiology*, Vol. 14 (pp. 132–144). Minneapolis, MN: BRK Publishers.

Thompson, C. K., and Warner, E. M. (1987). *Stimulus generalization of functional responses in aphasic subjects*. Paper presented at the American Speech and Hearing Association National Convention, New Orleans, Louisiana.