1984

Conversational control in non-impaired speakers using augmentative communication systems.

Lynn D. Farrier
The University of Montana

CONVERSATIONAL CONTROL IN NON-IMPAIRED SPEAKERS USING AUGMENTATIVE COMMUNICATION SYSTEMS

By

Lynn D. Farrier

B.A., Communication Sciences and Disorders

University of Montana, 1979

A Professional Paper

Submitted in partial fulfillment of the requirements for the degree of

Master of Communication Sciences and Disorders

UNIVERSITY OF MONTANA

1984

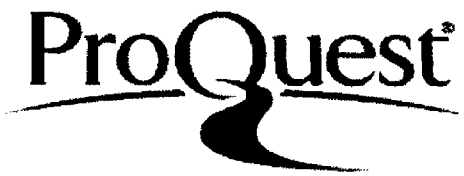
Approved by:

Chairman, Board of Examiners

Dean, Graduate School

June 1, 1984

Date



ACKNOWLEDGMENTS

I wish to express my appreciation to the speech pathology staff at University Hospital and Harborview and Pacific Medical Centers, not only for their participation in the early piloting of this project, but also for their continued support throughout my externship experience. Special thanks go to Pat Waugh, Pat Dowden, and Karen Stanton for providing such excellent models from which to learn. I am especially appreciative of their invaluable clinical feedback and the personal encouragement they offered on so many occasions. My thanks also go to Charlie Traynor for his patience with my computer naïveté and consideration in sharing computer time; to Jeff Slimp and Jim Hughes for graciously offering the use of their Apple systems; and to Tamara Hoover for her incredible efficiency in audio-tape transcription. To Nola Marriner, I offer very special thanks, for contributing her time and talents to the project--for sharing her resources (references, SALT, preliminary coding system) as well as her ideas, many of which formed the basis for the project design.

To Drs. Kathryn Yorkston and David Beukelman, I offer my sincere appreciation for their efforts to further my professional growth in both clinical and research areas. Specifically, I wish to thank Kathy for providing excellent guidance in development of the project, while

simultaneously acknowledging my need to "experience" the process independently. Her fresh perspectives and drive for closure provided renewed energy and motivation during critical periods. To Dave, I wish to express my thanks for providing the opportunity for me to intern at University Hospital--for challenging me to make the "student-professional" transition and for continuing to invest in my future growth. His ability to perceive the overall picture and the long-term implications of an outcome were especially helpful during the final writing stages of the project.

To my externship committee, I am very grateful, for allowing me such flexibility in project design and presentation. Special thanks go to Fran Tucker for her initial input during the planning stages and feedback along the way. To Dr. Chuck Parker, who has served as my advisor and dear friend for many years, I extend my deepest gratitude and utmost respect, for his dedication to the students in the CSD department and his efforts as department chair to maintain an academic and clinical program of the highest calibre. It has been my very good fortune to have such a mentor.

TABLE OF CONTENTS

LIST OF FIGURES

Successful use of communication augmentation systems is often judged in terms of performance on message preparation tasks (Beukelman & Yorkston, 1982, 1980). In the clinical setting, the user is asked to prepare standard messages, with performance being measured in terms of communication rate and accuracy. System selection and modification and user training then continues until accuracy is achieved at the most rapid communication rate possible, given motor control limitations of the user and design characteristics of the system. Although accuracy in communication augmentation system use is an important indicator of competency, clinical experience has taught that it must not be the only measure of communicative success. Observation of communication augmentation system use in natural settings reveals that accurate system operation is not enough to enable users to "hold their own" in social interactions. During interactive exchanges, system users are frequently viewed as responders, simply reacting to their partners' initiations.

Along with accuracy and communication rate, conversational control is a dimension that must be considered when assessing the successful use of a communication augmentation system. Conversational control may be defined as the manner and extent to which an individual directs and restrains communicative interaction. It represents a broad range of behaviors that occur in

interaction including obtaining and maintaining turns, initiating topics, interrupting a partner's turn and changing roles from responder to initiator. A review of the literature reveals numerous attempts to describe the patterns of interaction, and hence, conversational control, of communication augmentation system users and their speaking partners. Turn regulation, topic maintenance (including patterns of initiation and response), communicative functions/intents, grammatical forms, communication modes used, and message transmission rate are among the variables that have been studied (Beukelman & Yorkston, 1980; Buzolich, 1983; Calculator & Dollaghan, 1982; Calculator & Luchko, 1983; Colquhoun, 1982; Culp, 1982; Harris, 1978; Lossing, 1981; Morningstar, 1981; Wexler, Blau, & Dore, 1982). In spite of the variety of measures used, results of these studies suggest a common trend. Non-speaking communication augmentation system users demonstrated minimal conversational control, with speaking partners directing the interactions. Studies consistently described non-speaking individuals as single-word responders, restricted in ability to obtain and maintain turns, to express a range of communicative functions (primarily answering questions or providing information), and to use alternative communication modes optimally. Such patterns were reported EVEN when non-speakers had been reported to demonstrate functional

interaction skills in clinical training sessions (Calculator & Dollaghan, 1982; Calculator & Luchko, 1983).

Several factors have been implicated as contributors to the limited control exerted by non-speaking communication augmentation system users, including lack of conversational experience and dependence on the partner for message interpretation (Culp, 1982; Colquhoun, 1982; Harris, 1982; Morningstar, 1981), cognitive and linguistic impairment (Morningstar, 1981), lack of system proficiency (Buzolich, 1983), and slow rate of message transmission (Beukelman & Yorkston, 1980; Buzolich, 1983; Harris, 1982). The relative importance of each of these factors remains, to a large degree, unexplored.

This project attempted to systematically study two factors which may restrict conversational control abilities of communication augmentation system users: (1) system use which reduces communication rate and delays timing of message delivery and (2) the amount of information that the user possesses. Non-impaired adults and adolescents served as participants so that other factors, such as subjects' language skills, knowledge of interaction rules and strategies, and experience in a variety of social contexts, could be controlled. Pairs of participants interacted in two tasks, during Speaking and Non-speaking conditions. In the Non-speaking Condition, one of the members of each pair used an augmentative communication system. Quantity of

output (proportion of total words produced) and patterns of initiation were used as the primary measures of conversational control.

METHODS

Subjects

Five pairs of non-impaired speakers were selected for participation in this project. They ranged in age from 15 to 26 years. Members of each pair were well-acquainted with one another and matched with their partners in terms of age, educational background, and socioeconomic level. None of the subjects reported a history of communication difficulties. One member of each pair was randomly designated as the subject and the other as the communication partner. All of the subjects reported that they had training in typing skills.

Tasks

Pairs participated in two structured interaction tasks:

(1) Direction-Giving: In this task subjects were instructed to give their communication partners directions for reproducing a geometric design which was visible only to the subjects. Figure 1 contains examples of some of the 16 geometric designs used in this project. Designs varied

along five parameters, including color (red, yellow, and blue), shape (circles and squares), number of shapes (1-15), relative size of the shapes, and position of the shapes on the card. A plain, white index card was provided to the partners along with pens of different colors. Partners were not allowed to look at the subjects' designs, nor were the subjects allowed to view the partners' designs as they were being drawn. No other restrictions were placed upon the interaction. Specific instructions are presented in Appendix I.

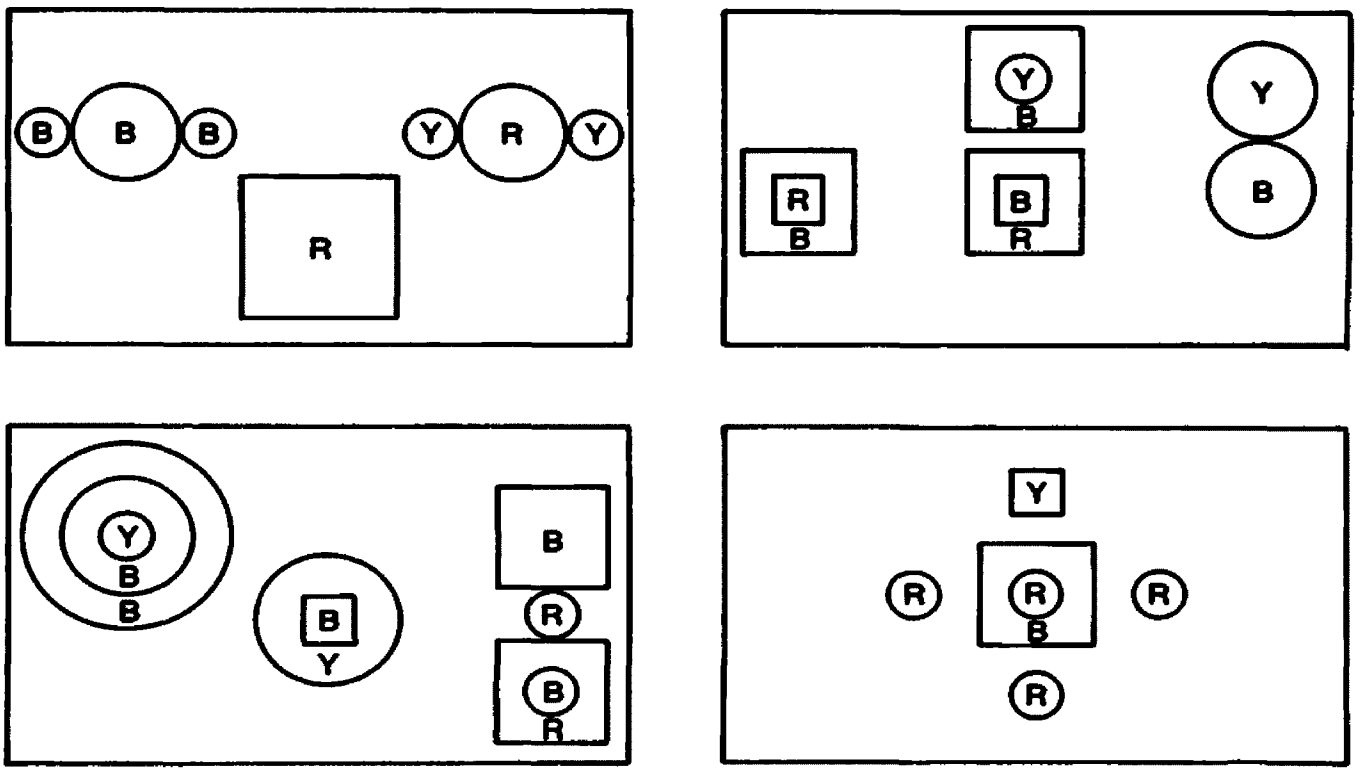


FIGURE 1. Examples of geometric designs used in the Direction-Giving Task.

(2) Decision-Making: The general format of this task was a game in which cards were bought and sold to accumulate a specific number of points. Both the subject and communication partner were provided with a portion but not all of the information needed to make decisions about buying and selling. They were instructed to share as equally as possible in the decision-making. Appendix II contains a detailed description of this task and the instructions given to the participants.

Conditions

Each pair performed the tasks in each of two conditions:

(1) Speaking Condition: Both the subject and the communication partner were allowed to communicate normally using speech and gestures while performing the tasks.

(2) Non-speaking Condition: Subjects were restricted to use of an augmentative communication system, an Expanded Keyboard Memo-writer EL 7001. The Memo-writer was selected for use in this project because of its standard typewriter keyboard arrangement, message editing capabilities (ease of error correction) and printer output. These features were judged to contribute to the ease of operation by subjects with minimal training. Prior to the administration of the tasks, subjects were provided with a

10-15 minute training session consisting of demonstration and practice with the system. They were instructed not to speak during this condition but were allowed to indicate "yes" and "no" gesturally.

Sample Recordings

All interactions were video-recorded in a quiet room, using a Sony AVC-3200 Video Camera, AV-3600 Video-corder, and CVM-192 Video Monitor. Participants sat face-to-face at a table with a screen between them to prevent each from viewing the other's task materials. The screen was low enough to allow each participant to see the other's face. Order of task presentation was randomized within a series of other interaction tasks recorded as part of a larger project. The order of conditions was counter-balanced. Four samples of interaction were obtained for each subject-partner pair (two tasks in two conditions). All samples were at least 10 minutes in length AND contained a minimum of 30 exchanges of turn, in which subjects changed from speaker to auditor.

Analysis

Sequences of 25 consecutive communicative turns were selected from 1 to 10 turns beyond the first 2 minutes of time. In this way, no samples were selected from the initial "warm-up" period, but rather from the middle

portion of each of the video-taped seqments. Samples were transcribed according to the conventions developed by Miller and Chapman (1983) in the SYSTEMATIC ANALYSIS OF LANGUAGE TRANSCRIPTS (SALT). Supplemental to the standard SALT analysis, each communicative turn was coded for conversational control using a discourse analysis system adapted from Blank and Franklin (1980; cited in McKirdy & Blank, 1982). In this system, each participant is seen as assuming two speaking roles through the course of a dialogue. One role is that of a speaker-initiator who puts forth ideas, and the other is that of a speaker-responder who reacts to the ideas that have been put forth. When the speaker is in the initiator role, exchanges are coded as either Obliges or Comments in order to give an indication of "summoning power". An initiation is coded as an Oblige if a response is obligatory, in that there is a clear expectation of a reply. Obliges are usually expressed as questions or commands, and carry greater summoning power. An initiation to which a response is optional is coded as a Comment. Although Comments do not impose demand for a response, responses are not necessarily unexpected. Generally, a responder is assumed to take the initiative to sustain the dialogue. The following is a series of exchanges which have been coded for summoning power. Note that all of the initiations have been coded as either Obliges or Comments:

Subject: "Do you want to buy that one?" (Initiation-Oblige)

TURN 1

Partner: "No, let's think about it." (Response)

TURN 2

Subject: "It looks like we're in trouble now because we can't buy anything else." (Initiation-Comment)

TURN 3

Partner: "You're right, what should we do next?" (Response-Recode)

Note that the partner's response after Turn 3 has been identified as a "Recode". A Recode indicates an instance in which a participant who is in the response mode becomes the initiator. Recodes are considered evidence of conversational control since they reflect instances in which a responder takes over control of the interaction by initiating the next turn.

Using the computerized SALT program, the following data were obtained from each interaction sample:

1. Total Number of Words produced by the subject and by the communication partner,
2. Proportion of the total communicative turns in which the subject was in the Initiation role,
3. Proportion of subject initiations which were Obliges and which were Comments,
4. Proportion of the total communicative turns in which the subject was in the Response role, and
5. Proportion of the subject's responses which were Recoded.

The total duration of each 25-turn interaction sample

was timed. In order to obtain an estimate of communication rates in the Non-speaking Condition, 10 of the longest typed messages were timed and mean typing rates in words per minute (wmp) were calculated for each subject.

Reliability

An indication of intra-judge reliability was obtained by randomly selecting one interaction sample from each Task and Condition and coding the transcript of that sample for a second time, approximately 4-6 weeks after completion of the original coding. Codes were compared turn-by-turn and measures of percent agreement were computed. For the Direction-giving task, percent agreement for the Speaking Condition was 93% and for the Non-speaking Condition, 97%. For the Decision-Making task, percent agreement for the Speaking Condition was 96% and for the Non-speaking Condition, 100%.

RESULTS AND DISCUSSION

Patterns of Interaction: Speaking Condition

A number of measures may be considered to indicate general levels of conversational control. Two such measures, percentage of the total words and percentage of total initiations produced by the subject are illustrated in Figure 2. The points on this scattergraph represent the

performance of the subjects during the condition in which they were allowed to speak. The triangles represent performance on the Direction-Giving Task and the squares represent performance on the Decision-Making Task.

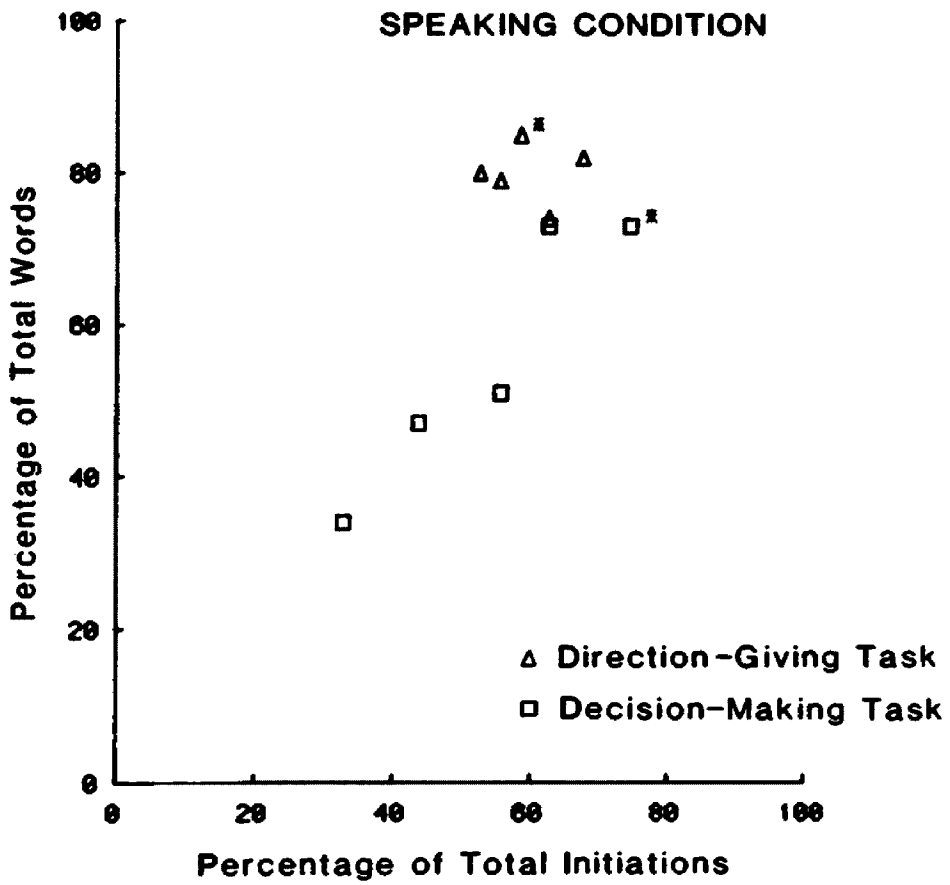


FIGURE 2. Percentage of the total words and initiations produced by the five subjects in the Speaking Condition. Asterisks indicate the performance of Subject #2.

A review of Figure 2 suggests that while performing the Direction-Giving Task, speaking subjects exerted a high degree of conversational control. During this task subjects produced from 74 to 86% of the total words produced by both members of the interactive pair. This result was expected, as the task was designed to provide the subject (versus the partner) with all of the information and thus, increase the subjects' potential for controlling the interaction. The data in Figure 2 also suggest that subjects performing the Direction-Giving Task initiated more frequently than did their communication partners. Subjects produced from 54 to 68% of the total number of initiations in the samples. Note that although this task was designed to give control to the subjects, it was not a completely "one-sided" task. The communication partners were frequently in the initiator role.

In comparison, patterns of conversational control were somewhat different for the Decision-Making Task. This task was designed to provide equal opportunity for conversational control to the members of the interactive pair. A review of Figure 2 suggests a more variable pattern of control. Subjects produced from 34 to 74% of the total words and initiated from 34 to 76% of the turns. The two measures of conversational control presented in this figure tended to covary with one another, in that subjects who produced a lower percentage of the total words

also tended to initiate less frequently than their partners. This variability among subjects may reflect the opportunity afforded by the Decision-Making Task for the expression of personal interaction styles. In comparison to the highly-structured Direction-Giving Task, the Decision-Making task may more closely reflect natural conversational patterns.

The general measure of proportion of total initiations suggests that speaking subjects consistently controlled the Direction-Giving Task. On the other hand, in the Direction-Giving Task some subjects exerted high degrees of control while others did not. A more detailed analysis of interaction samples confirms these general patterns. Recall that of the two types of initiations, Obliges and Comments, Obliges require obligatory responses, and are indicators of a high level of conversational control. In the Direction-Giving Task, a mean of 90.3% of the subjects' initiations were coded as Obliges. In the Decision-Making Task, only 69.6% of the subjects' initiations were Obliges. Still another indicator of conversational control is the proportion of responses which were recoded. This is the case in which a subject who is in the response mode takes control and becomes the initiator of the next turn. For Direction-Giving, a mean proportion of 66.7% of the subjects' responses were recoded, and thus, became initiations. For Decision-Making, 50.0% were recoded.

Patterns of Interaction: Non-speaking Condition

In the Non-speaking Condition, subjects were restricted to the use of a communication augmentation system which provides only written output after the entire message has been prepared (Expanded Keyboard Memo-writer). Thus, both the subjects' communication rate and timing of message delivery were restricted. Figure 3 presents data reflecting performance in the Non-speaking Condition for the two general measures of conversational control: proportion of total words and proportion of total initiations produced by the subjects. A review of this figure suggests a markedly different pattern of interaction than was observed in the Speaking Condition. There was an overall tendency for subjects to exhibit less conversational control when using a communication augmentation system as compared to their behavior when communicating orally. There is one notable exception to this general pattern. As indicated by the asterisked data point in Figure 3, the performance of one of the subjects (#2) in the Direction-Giving Task was different from the others. This atypical performance will be discussed in some detail later. In terms of general trends, subjects' performance on the Direction-Giving Task reflected a somewhat higher degree of control than performance on the Decision-Making Task, as evidenced by the proportion of

total words and total initiations. For the Direction-Giving Task, four of the five subjects initiated less than 30% of the turns and produced less than 35% of the total words. For the Decision-Making Task, four of the five subjects initiated less than 20% of the turns and produced less than 10% of the total words. Despite the small differences observed between the two tasks, the most salient feature displayed in Figure 3 is the lack of control exhibited by the subjects.

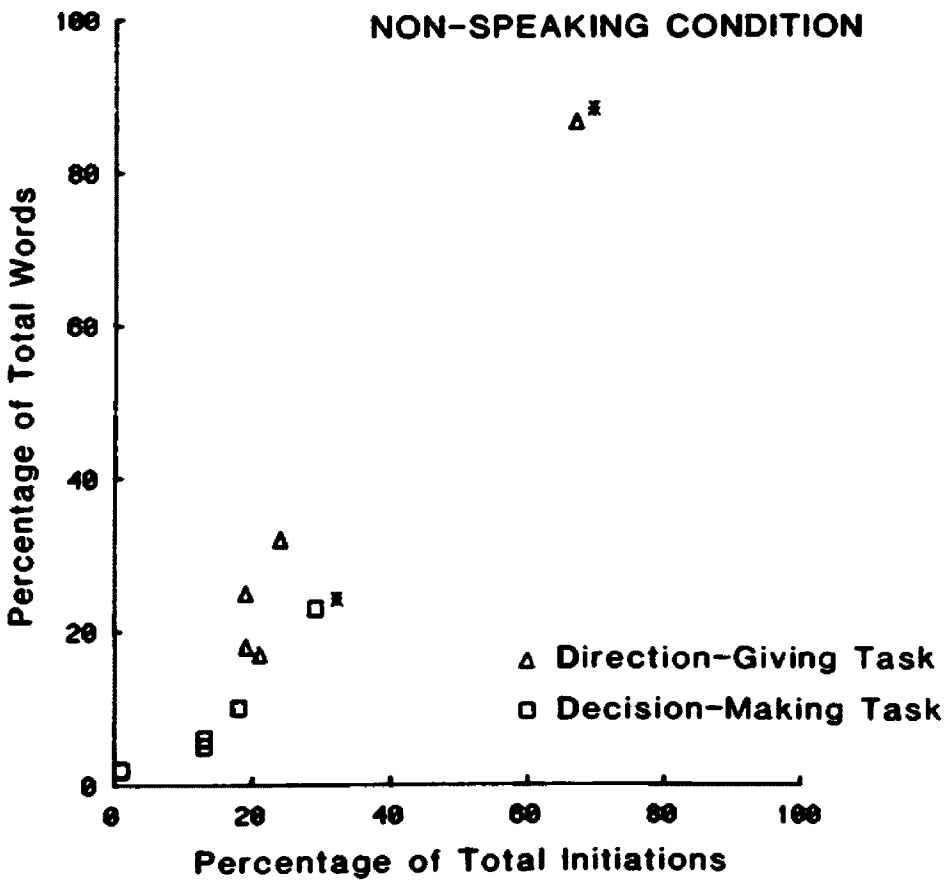


FIGURE 3. Percentage of the total words and initiations produced by the five subjects in the Non-speaking Condition. Asterisks indicate the performance of Subject #2.

Like the general indicators of conversational control just described, more specific measures of interaction patterns showed similiar results. For example, recodes were infrequent. When in the response mode, subjects took control and became initiators only 20% of the time in the Direction-Giving Task and 15% of the time in the Decision-Making Task.

When examining Figure 3, it is apparent that there is a single instance in which a non-speaking subject appeared to be exhibiting high levels of control. Although it is tempting to view this performance as superior or more indicative of normal interaction, caution should be taken in interpreting these data. A number of explanations for this apparently superior performance are possible. One of the most obvious is that this subject was not as restricted in terms of communication rate as other subjects. In order to rule out this possibility, measures of mean typing rates based on the 10 longest messages for each subject were obtained. Results indicated that mean typing rates ranged from 9.2 to 17.0 words per minute (wpm) with the most "controlling" of the subjects achieving a rate of 16.4 wpm. Obviously, even the fastest typists in the subject group did not achieve rates that even approach normal speaking rates (which may excede 170 wpm). Thus, a rapid typing rate does not explain the atypical performance of one of the subjects.

A review of the video-tape of the task that was controlled by the non-speaking subject (#2) suggested a more plausible explanation. It was apparent that his communication partner was a patient individual who gave the subject extensive message prepartation time. The partner seldom attempted to interrupt in order to speed up the communication interaction. It should be noted that this subject also tended to maintain a high degree of control in the Speaking Condition as well as in the Non-speaking Condition. The asterisked data in Figure 2 represent the performance of this subject.

This tendency toward extensive time allowances for the most controlling of the subjects is reflected in Figure 4 which illustrates the total duration of the 25-turn samples of performance obtained in the two experimental tasks in both the Speaking and Non-speaking Conditions. A review of this figure suggests that the durations of the 25-turn samples were shortest in the Speaking Condition. Further, it is apparent that Subject #2 whose performance suggested a "normal" pattern of conversational control, as measured by the proportion of words and patterns of initiation, maintained this control at the expense of efficiency. Note that for both experimental tasks, the duration of this subject's samples were the longest. In fact, nearly 18 minutes were required to obtain a 25-exchange sample in the Direction-Giving Task.

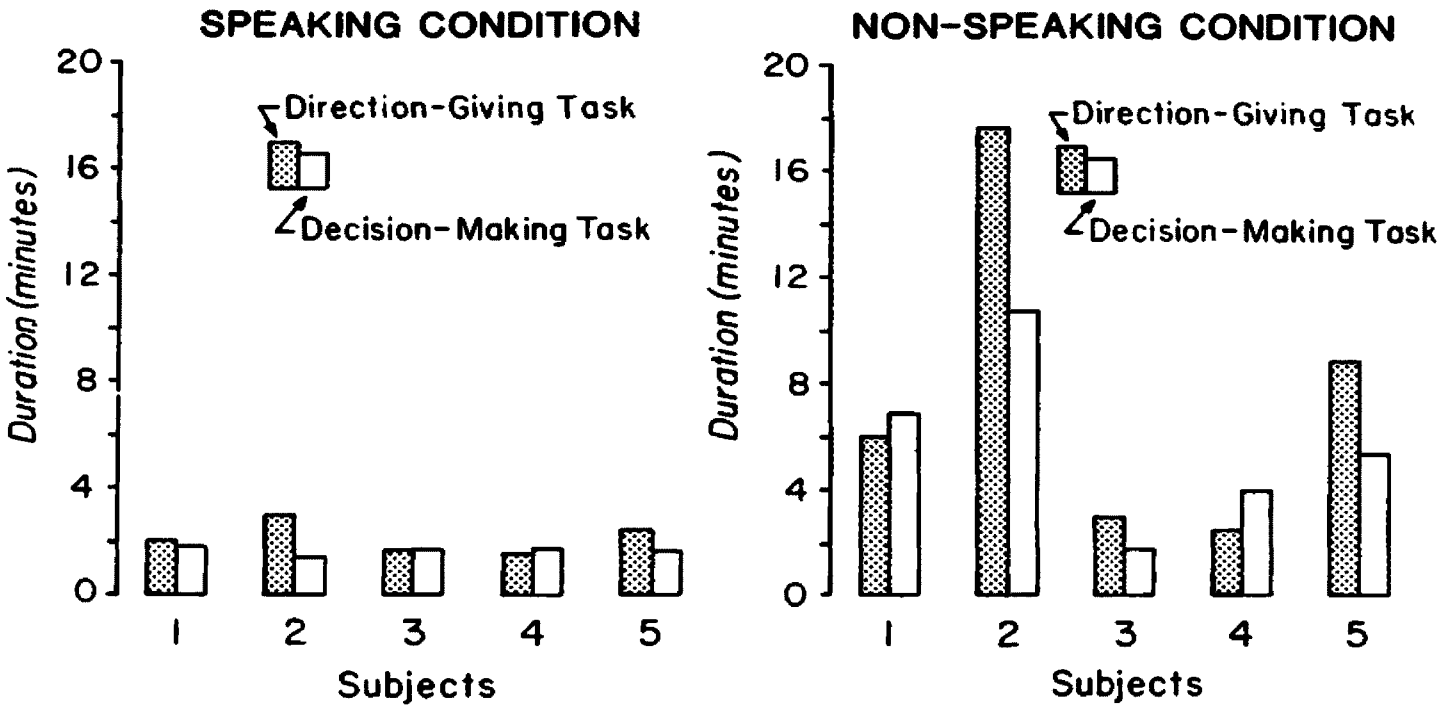


FIGURE 4. Total duration of the 25-exchange samples for the Speaking and Non-speaking Conditions.

Sample Size

In order to confirm that a 25-turn sample is representative of a larger sample, 50-exchange samples obtained from one of the partner pairs were compared to the 25-exchange samples obtained from the same pair. Results of this comparison are presented in Figure 5. Examination of this figure suggests that for two measures of interaction (proportion of total words and proportion of initiations), patterns were similiar for the short and longer samples. This was the case for both the Direction-Giving Task and the Decision-Making Task.

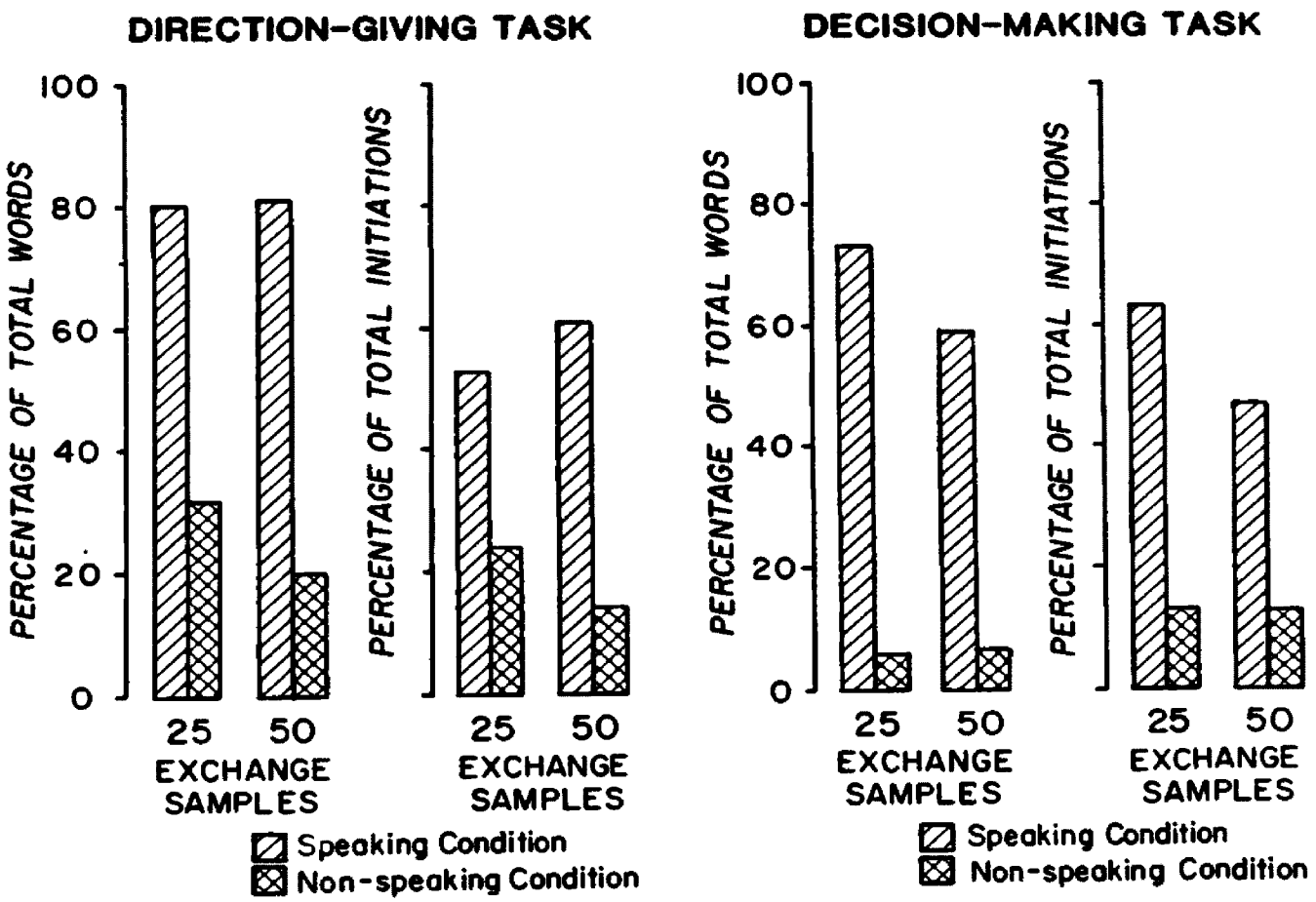


FIGURE 5. Comparison of 25- and 50-exchange samples for Subject #1.

IMPLICATIONS

Although this project examined the performance of non-impaired subjects and their communication partners, the results provide insights into the performance of non-speaking individuals. The most striking feature of the data is the degree of change in patterns of interaction that occurred when a communication augmentation system is used. Restriction of individuals' message preparation rate and timing capabilities appeared to have a dramatic impact on their ability to control the interaction. The data suggest how powerful the limiting factors of reduced rate and timing are, even for normal communicators.

By selecting non-impaired subjects for study, attempts were made to eliminate a number of the explanations of poor conversational control abilities that have been suggested in impaired populations. The subjects in this study demonstrated their abilities to actively participate in interactions and to apply the rules of conversational turn-taking and turn maintenance when they spoke. Further, they attempted to apply these rules in the condition in which they were not allowed to speak. In fact, at times their turn-taking and turn-maintenance signals were anything but subtle. Some subjects rapped on the table; some obviously ignored interrupting questions; some indicated "stop" with an outstretched arm and palm to the

face of their partners, signalling for silence. Their vocabulary, spelling, and language formulation skills did not appear to limit their abilities to perform the experimental tasks, nor was their participation seemingly limited by a lack of information. In one of the experimental tasks they were given all of the pertinent information and thus, were provided with opportunity for even greater control than their partners (Direction-Giving Task). Yet, despite their communication skills and the greater opportunity for control, subjects found it easier to relinquish control to their communication partners in the majority of interactions studied. They appeared to do so in an effort to maintain communicative efficiency.

Barring major technological advances, restricted communication rates may be a "fact of life" for the majority of severely physically disabled, non-speaking individuals. In this study, use of communication augmentation restricted both message preparation rate and timing capabilities. Since rate of production may continue to be restricted for non-speaking individuals, a critical avenue for future research exploration may be in the area of maximizing timing capabilities, or increasing the ability to deliver a message promptly.

Non-speaking individuals' control of interaction might be facilitated if they could more actively involve their partners in the communication process. When there was no

feedback until the message was completed, partners in this study appeared to do one of two things. Either they "tuned out" and occupied themselves with time-filling activities such as doodling with the drawing supplies, or they interrupted the message preparation with a series of questions in an effort to accelerate the interaction. Both of these behaviors interfered with the non-speaking individual's attempts at control. Buzolich (1983) noted that non-speaking subjects were more easily able to regulate communication turns using an alphabet speller as compared to a Handi-Voice 120. With the alphabet spellers, each unit of information was immediately decoded by the communication partners. Use of the Handi-Voice, however, required the partners to wait until the entire message was encoded before it could be delivered. As in the present study, communication partners had to be willing to endure the long silence during message preparation and delivery. A number of communication augmentation systems provide continuous visual display to partners as messages are being prepared. Future research might explore the possible effects of continuous feedback on timing capabilities and the potential for conversational control.

Control of interactions may also depend on timely and rapid communication of a small number of conversational control devices, or conversation "grabbers". These rather stereotyped phrases might serve a number of functions

related to regulation of turns. For example, the phrase, "Wait, I have something to tell you," might serve to obtain a turn. Other phrases might serve to offer the turn to the communication partner, as with the example, "What do you think of that?". Calculator and Luchko (1983) noted the use of two such phrases in training a nonvocal adult to regulate partner interruptions and topic changes. Many communication augmentation systems have the capability for storage and quick retrieval of whole phrases in addition to letter-by-letter message preparation. The impact of such rapidly retrievable phrases on maintenance of conversational control might be another important area to be explored.

Results of this study may also have implications for training non-speaking individuals to use communication systems more effectively. There is a natural tendency to use normal patterns of interaction as a model for what non-speaking individuals are hoped to achieve. The performance characteristics of Subject #2, the most controlling of the subjects in this study, illustrates how cautious clinicians must be in applying the normal model to non-speaking individuals. A "normal" pattern of control is possible when control is measured in terms of the quantity of output (proportion of the total words) and patterns of initiation. However, the price that must be paid for that control is loss of efficiency. This trade-off illustrates

a dilemma faced by non-speaking individuals. Without nearly normal communication rates, it may not be possible to have both control and efficiency.

With this in mind, training may productively focus on selection of patterns of interaction suited to the specific communication needs of the moment. In emergencies, efficiency is obviously foremost, and therefore, relinquishing control to a speaking partner may be the most effective strategy. In other situations, such as in classroom discussion, the active participation that comes about only when conversational control is shared may take priority over efficiency. Rather than attempting to teach non-speaking people to approximate "normal" interaction patterns, clinicians might instead teach strategies for compensating for the efficiency-control trade-offs.

REFERENCES

Beukelman, D., & Yorkston, K. Communication interaction of adult communication augmentation system use. Topics in Language Disorders, 1982, 2(2), 39-54.

Beukelman, D., & Yorkston, K. Nonvocal communication: Performance evaluation. Archives of Physical Medicine and Rehabilitation, 1980, 61, 272-275.

Blank, M., & Franklin, E. Dialogue with preschoolers: A cognitively-based system of assessment. Applied Psycholinguistics, 1980, 1, 127-150.

Buzolich, M. Interaction analysis of augmented and normal adult communicators. Unpublished doctoral dissertation, University of California, San Francisco, 1983.

Calculator, S., & Dollaghan, C. The use of communication boards in a residential setting: An evaluation. Journal of Speech and Hearing Disorders, 1982, 47(3), 281-287.

Calculator, S., & Lucko, C. Evaluating the effectiveness of a communication board training program. Journal of Speech and Hearing Disorders, 1983, 48(2), 185-191.

Colquhoun, A. Augmentative communication systems: The interaction process. Paper presented to the American Speech, Language, and Hearing Association Convention, Toronto, 1982.

Culp, P. Communication interactions--nonspeaking children using augmentative systems and their mothers. Paper presented to the American Speech, Language, and Hearing Association Convention, Toronto, 1982.

Harris, D. Communicative interactive processes involving nonvocal physically handicapped children. Topics in Language Disorders, 1982, 2(2), 21-38.

Harris, D. Descriptive analysis of communication interaction processes involving nonvocal severely physically handicapped children. Unpublished dissertation, University of Wisconsin, Madison, 1978.

Lossing, C. A technique for the quantification of nonvocal communicative performance by listeners. Unpublished masters thesis, University of Washington, Seattle, 1981.

Lossing, C., Yorkston, K., & Beukelman, D. Quantification of non-vocal communication performance in natural settings. Archives of Physical Medicine and Rehabilitation (in press).

McKirdy, L., & Blank, M. Dialogue in deaf and hearing preschoolers. Journal of Speech and Hearing Research, 1982, 25(4), 487-499.

Miller, J., & Chapman, R. SALT: Systematic Analysis of Language Transcripts. Madison, WI: Language Analysis Laboratory, Waisman Center on Mental Retardation and Human Development, University of Wisconsin, 1983.

Morningstar, D. Blissymbol communication: Comparison of interaction with naive versus experienced listeners. Unpublished paper, University of Toronto, Toronto, 1981.

Wexler, K., Dore, J., & Blau, A. Conversational functions of the nonvocal/vocal dyad. Short course presented to the American Speech, Language, and Hearing Association Convention, Toronto, 1982.

APPENDIX I

INSTRUCTIONS FOR THE DIRECTION-GIVING TASK

INSTRUCTIONS FOR THE DIRECTION-GIVING TASK

The following instructions were read aloud to each pair in the Speaking Condition. They were specifically addressed to the subjects:

> "You will be given a card with a geometric design. You must give your partner directions for drawing the same design on his/her blank card. You may not show your partner the card you have or look at his/her card. Otherwise, you and your partner may interact in any way you would like to perform the task. This task has no time limit. Do you have any questions?"

For the Non-speaking Condition, the instructions were modified to read:

> ". . . You and your partner may interact in any way you would like to perform the task, except you may not speak or use any gestures except for shaking or nodding your head. . ."

APPENDIX II

DESCRIPTION AND INSTRUCTIONS FOR THE DECISION-MAKING TASK

DESCRIPTION AND INSTRUCTIONS FOR THE DECISION-MAKING TASK

A set of 12 1 1/2" x 2 1/2" cards, each depicting one hand-drawn geometric shape (6 squares and 6 circles, 2 each of a different color: red, yellow, blue) was randomly and equally distributed between the partners and the subjects. Twelve from a set of 21 3" x 5" cards, containing all paired combinations of the smaller cards, were selected at random and placed in three rows of four cards on the left side of a 12" x 36" cardboard display. The display was positioned in full view of both pair members. Each row of cards was assigned a different point value, either 1, 2, or 3 points. The target score (14 points) was specified above the display board. Figure 1A provides a representation of the task set-up.

The following instructions were read to each pair:

> "This is a task in which you will be asked to make joint decisions. Both of you will be given six cards, each containing a single design. You may use these cards to purchase any of the larger cards you see displayed on the board. Once you have purchased a card it will be moved under the SOLD sign, and the smaller cards you each contribute will be placed behind it. If you purchase cards on the top row you will receive three points, middle row, two points, and bottom row, one point. The 'objects of the game' are to share information about the cards that you hold, to jointly make decisions about which cards to purchase, and to accumulate the exact number of points you see in the target square (14). You may buy back any of the large cards under the the SOLD sign. If you buy a card back, the small cards you contributed toward its purchase will be

given back to you randomly, and points will be subtracted from your score. I will keep a running tally on the chalkboard of the points that you have. This task has two rules: 1) you may not show your partner the cards you hold, and 2) you each must contribute one of your cards toward each purchase. You are encouraged to use any interaction styles you think will help you perform this task. Please share as equally as possible in the decision-making. There is no time limit. Do you have any questions?"

The following modification was made to the instructions for the subjects in the Non-speaking Condition:

" . . . You are encouraged to use any interaction styles you think will help you perform this task, except you (subjects) may not speak or use gestures except for shaking or nodding your head. . . "

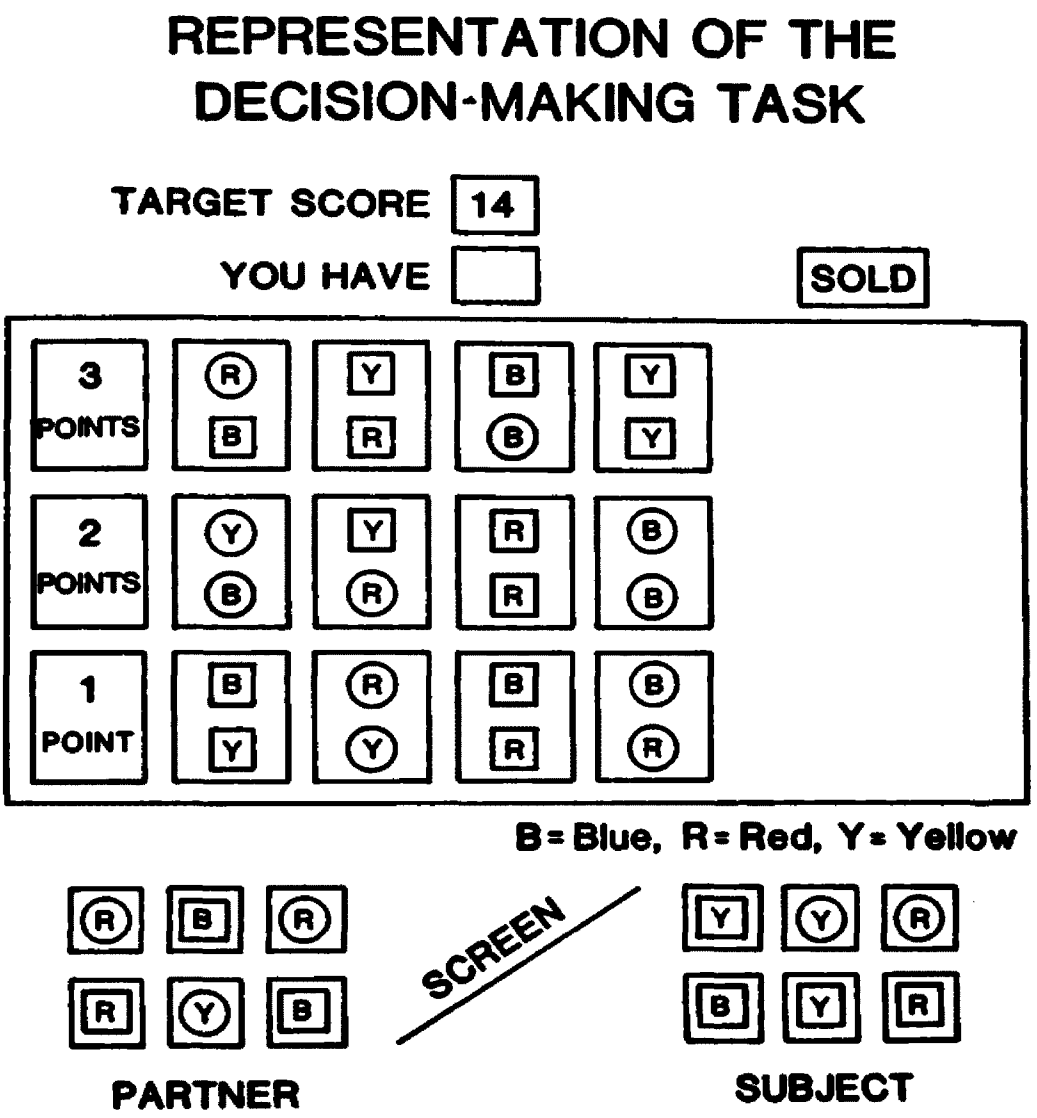


FIGURE 1A. Representation of the Decision-Making Task.

ADDENDUM

This study was a part of a larger project supported by a grant from the National Institute of Handicapped Research, U.S. Department of Education, awarded to the Department of Rehabilitation Medicine, University of Washington, Seattle. The manuscript was prepared in its present form for submission to the International Society for Augmentative and Alternative Communication in April, 1984, for journal publication. Drs. Kathryn Yorkston and David Beukelman of the Department of Rehabilitation Medicine and Nola Marriner of the Department of Speech and Hearing Science made major contributions, and in that publication will be listed as secondary authors.

Although not reported here, the study included the piloting of two additional interaction tasks. One of the tasks was similar to the Direction-Giving Task, in that partners were required to reproduce designs based on information provided by the subjects. However, in this task partners were instructed to ask questions of subjects in order to obtain the information. Subjects were restricted to answering with single word responses or head nods/shakes. This additional restriction on communicative output theoretically simulated the communicative limitations of many non-speaking, physically-disabled individuals. The other task reversed the roles of the

partners and subjects, wherein information was provided to the partners, and the subjects were required to ask questions in order to obtain it. Partners were restricted to single-word answers or gestural yes/no responses, with the purpose of assessing the subjects' skills in requesting information, as well as providing them with maximal opportunity for control. For several reasons, including inadequate sample size and difficulty in controlling task complexity, these tasks were eliminated after initial piloting. Although they may not provide useful information when used with non-impaired speakers, their potential value in assessing the communicative skills of non-speaking individuals with limited motoric capabilities is worthy of further investigation.

The coding system introduced in this study represents a preliminary attempt at development and application of a system for transcribing and analyzing interaction between non-speaking communication augmentation system users and their speaking partners. In addition to the codes presented in this paper, the original system included subcategories for types of Obliges and Responses, and rules for transcribing simultaneous turns and "technical" versus "communicative" turns. Since its piloting in this study, the system has been simplified by Marriner (personal communication) for potential implementation as an on-line clinical assessment tool. Initial measures of inter-judge

reliability using the revised system appear to show high percentages of agreement (80-90%), although further reliability testing is necessary.

Additional measures of interaction obtained in the present study were total number of verbal and gestural utterances, turn length in number of words, and total numbers of specific types of Obliges (affirmative/negative, restricted choice, unrestricted) and Responses (adequate, inadequate, ambiguous, elaborative), as defined in the coding manual (Marriner, Yorkston, & Farrier, unpublished manuscript). Results of these measures were consistent with the results of measures presented in this paper, and supported the conclusions presented in the discussion. For publication purposes, these results have not been reported, but are available by contacting the writer. It is the writer's intent that these data be presented in published form at some future time. Readers who are interested in obtaining the data prior to that time are invited to contact the writer in care of Kathryn M. Yorkston, Ph.D., Department of Rehabilitation Medicine, University of Washington, Seattle, WA 98195.