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## A Functional Approach to the Cognitive-Communication Deficits of Closed Head-Injured Clients

*Leila L. Hartley and Amy Griffith*

Galveston Institute of Human Communication  
A Program of the Transitional Learning Community  
Galveston, Texas

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The focal and diffuse brain damage caused by closed head injury (CHI) leaves behind a multitude of neurobehavioral deficits that cut across a broad spectrum of human functioning. This article focuses on the communication disorders which are secondary to deficits in cognitive, executive, and/or linguistic functioning. Cognitive deficits in memory, attention, visual-spatial perception, information processing, and abstract reasoning are readily recognized as common sequelae of CHI (Levin, Benton, & Grossman, 1982; Adamovich, Henderson, & Auerbach, 1985) and as causes of the "disorganized" language (Hagen, 1984) or "language of confusion" (Darley, 1982) reported to be characteristic of this population. More recently, however, greater emphasis has been placed on disruptions of the frontal lobe "executive" functions including initiation, goal setting, planning, and self monitoring, as factors in communication problems (Ylvisaker & Holland, 1985; Lezak, 1987; Hartley, in press). The most commonly identified linguistic deficits after CHI are in visual naming, word fluency, and following complex commands (Levin, Grossman, & Kelly, 1976; Sarno, 1980).

Rehabilitation after severe closed head injury is generally a lengthy, costly process. Although treatment to improve specific component processes such as attention and memory is important, especially during the early stages of recovery, it is unlikely that treatment will restore functioning in all deficit areas. In the majority of cases, these survivors will have long-term, if not life-long, impairments. Health care professionals, then, are charged with the responsibility of enabling these clients to achieve the highest level of daily living independence and most productive lifestyle, given the long-term impairments, in the shortest amount of time. This is particularly true when working with head injured adults who are in the later stages of recovery, persons on Level VII or above on the Ranchos Los Amigos Scale of Cognitive Functioning (Hagen, 1984). A functional perspective to the assessment and treatment of the cognitive-communication deficits is, therefore, of critical importance when working with these clients.

A functional approach differs from the traditional approach to speech, language, and cognitive deficits in several

ways. A functional approach maintains a top-down viewpoint; that is, its orientation is towards the desired end products and real-life outcomes rather than discrete component processes or impairments. Interest is centered on adaptive behaviors typical of everyday life rather than isolated component skills that occur only within a clinical setting. A functional assessment addresses the question "How well does this individual communicate with others in his or her natural environment?" rather than the traditional "What is the individual's digit span, confrontation naming, or word fluency scores?" Overall adequacy, content, and intent of communication are more important for the functionalist than accuracy, mode, or syntactic form. Table 1 contrasts various aspects of traditional versus functional approaches to the assessment of cognitive-communication disorders.

The concept of functional communication presented here is a broad one. It is not restricted to basic expressions of personal needs and simple social phrases; CHI individuals generally possess these skills at this stage. Functional communication here is defined as the communication needed within an individual's daily living, community, and work environments in order to communicate efficiently and appropriately. Defining functional communication in this manner presents a challenge because a clinician must first have knowledge of the functional communication of normal individuals in order to make decisions about the presence of a communication disorder and to determine treatment goals.

Knowledge concerning functional communication can be gathered from a number of different disciplines. From linguistics and speech-language pathology come the terms pragmatics, speech acts, and discourse. Pragmatics concerns the integration of linguistic knowledge and rules governing language use within natural contexts (Bates, 1976; Roth & Spekman, 1984; Prutting & Kirchner, 1987). Speech act theory explains utterances in terms of the intent of the speaker, independent of propositional content or actual grammatical form (Searle, 1969). The term discourse refers to connected speech, a group of utterances related in some manner and treated as a unified whole. The most commonly studied forms

**Table 1. Comparison between traditional and functional approaches to assessment of cognitive-communicative disorders.**

	Traditional	Functional
Units	Component processes, words, grammatical structures	Everyday activities, connected speech, or discourse
Test Setting	Clinic, structured tasks free from confounding effects	Natural contexts
Focus	Narrow: Linguistic skills only	Broad: Considers psychosocial & cognitive factors as well
Scoring	Accuracy, completeness	Adequacy, appropriateness
Purpose	Presence, type, severity of aphasia	Impact of deficits, use of residual strengths, compensatory strategies

of discourse include conversational, narrative, procedural, and expository discourse. In the psychological literature, the terms social skills and interpersonal communication are used. Social skills generally refer to the same phenomena our field labels as speech acts. For example, Goldstein, Sprafkin, Gershaw, and Klein (1980) include giving a compliment, asking a favor, and expressing criticism in their list of social skills. All are also included in Wiig's (1982a) taxonomy of speech acts. At other times in the psychological literature, social skills refer more to nonverbal communication skills (Liberman, 1982; Newton & Johnson, 1984). The term interpersonal communication in the psychological literature covers a diverse range of topics, such as heterosexual relationships and assertiveness (Curran, 1982).

Information from these sources has been summarized in a pragmatic framework for understanding functional communication in a previous work (Hartley, in press) and is outlined in Table 2. The three major categories of pragmatic behaviors are nonverbal, interactional, and propositional aspects of communication.

It is often stated that over 90% of what we communicate in interpersonal interactions is through nonlinguistic means of communication - paralinguistics, kinesics, and proxemics. Paralinguistic features are those inherent aspects of vocal production which accompany verbal output, aspects such as loudness, prosody, fluency, and vocal quality. Kinesics is communication through body movement, including facial expression, eye gaze, general body posture, and gestures. The

**Table 2. Categories of pragmatic behaviors.**

Nonverbal Aspects of Communication
Paralinguistics
Kinesics
Proxemics
Interactional Aspects of Communication
Turn-taking
Conversational repair
Speech acts or communicative intents
Propositional Aspects of Communication
Conversational rules
Topic
Cohesion
Complex language forms including narratives, idiomatic expressions, and humor.

perception and use of personal and social space in communication is called proxemics.

The interactional aspects of communication are those which are most typical of the give-and-take of conversational discourse: turn-taking, conversational repair, and speech acts (or social skills). Communication partners take and assign turns in a conversation in such a manner that there are few gaps or overlaps. Conversational repair may be initiated by either the speaker or the listener when the message is unclear. Generally, persons speak with a clear purpose in mind, and a competent communicator is able to use language to accomplish a variety of intents.

The propositional aspects of communication are those parameters dealing with the actual message, its words, meanings, and form. Grice (1975) pointed out that speakers generally follow rules regarding the quantity, truthfulness, relevance, and clarity of their contribution to a conversation. In addition, competent speakers are able to select and introduce new topics which are appropriate and relevant to the context, to maintain a topic, and to make changes in topic. Cohesive ties are words such as personal pronouns, definite articles, and conjunctions, which function to tie the meanings of sentences in a discourse together (Halliday & Hasan, 1976). Use of more complex language forms—jokes, metaphors, idiomatic expressions, proverbs, and narratives—require greater interpretive and conceptual abilities.

Everyday communication requires the ability to use both linguistic and extralinguistic contexts when receiving and sending messages. For example, a speaker must select words, sentence structures, and modes of the communication which are appropriate within the context of a given physical setting, time, and set of participants. Because communication in real

life requires many more skills than purely linguistic skills, a traditional approach should be augmented by a functional approach. The next sections will examine how a functional approach can influence both the assessment and treatment of cognitive-communicative disorders of CHI clients.

## Assessment from a Functional Perspective

### Traditional Assessment Procedures

The basic purposes of a diagnostic evaluation are to determine the presence of a cognitive-communication disorder, the characteristics of the disorder in terms of both component systems and functional limitations, the severity of the disorder, the prognosis for long-term functional improvement and for benefit from treatment, and a plan for treatment, if warranted. Traditional assessment procedures - obtaining a history, informal observation and interview, and formal evaluation of linguistic and cognitive component processes - continue to be vital to complete assessment but should be conducted with a functional viewpoint when dealing with the post-acute CHI client.

Obtaining a good history prior to conducting any testing is particularly important with the head injured population. Premorbid learning disability, substance abuse, and psychiatric and social adjustment problems are not uncommon in this group and will certainly influence the selection and interpretation of tests. The age at which the client was injured is important because young adult clients often have little or no work, or independent living experience to pull from, and full social maturation had not been reached premorbidly. Ongoing medical problems, sensory and motor deficits, and medication should be noted. The degree of family support is often a major factor in long-term functional outcome due to the CHI survivor's need for structure, stability, and guidance. Work and educational histories provide insight into the client's premorbid abilities.

The cognitive-linguistic test battery employed with head injured clients at this level typically consists of portions of adult aphasia batteries, vocabulary tests, neuropsychological tests of memory, attention and perception, and portions of cognitive tests designed for children (Ylvisaker & Holland, 1985; Milton & Wertz, 1986; Hartley, in press). Reliance on traditional standardized test batteries generally leads to overestimation of the abilities of head injured clients (Milton, Prutting, & Binder, 1984). One reason is that head injured clients perform much better on structured clinical tasks than they do in real life. These tests are still needed, but attention should be given to how the task is completed as well as to the final score. In other words, notation should be made of the client's method of approaching a task, use of self-generated compensatory strategies, ability to change behavior after feed-

back from the examiner, and general coping strategies when under pressure.

Informal assessment procedures such as behavioral observations and interviewing tend to be underrated by clinicians, but they deserve greater weight when dealing with head injured clients. Like a functional assessment, they focus on global aspects of behavior or adaptive responses to the environment and have direct relevance to determining the client's competence in social and vocational settings. Emotional lability, anxiety, general maturity, initiative, awareness or concern for errors, and compliance to requests can be observed in the clinical setting. Aspects of attention such as arousal, fatigue, distractibility, disinhibition, and ability to sustain and shift attention can be assessed informally. In addition, notation should be made concerning typical response patterns including decreased psychomotor speed, impulsivity, or perseveration. Interviewing the CHI client may provide interesting data regarding memory for biographical information, insight into deficits, and attitude toward rehabilitation. One should always verify information obtained through client interview, however, because these clients are often poor historians and tend to downplay their limitations.

Each of these aspects of a traditional assessment provides information of a functional nature. The results have implications for predicting functional limitations, for determining prognosis for functional recovery, and for generating possible explanations for behaviors seen in everyday activities. They also can guide in the development of compensatory strategies needed for functional activities.

### Functional Assessment Procedures

Assessment from a purely functional viewpoint includes two parts, a needs assessment and an evaluation of everyday performance (Beukelman, Yorkston, & Lossing, 1984). An environmental needs assessment is conducted to determine the cognitive-communicative needs of an individual. This must be done on an individual basis because there is wide variation in the level of functional skills required by "normal" adult lifestyles. For example, a male high school dropout who holds a manual job and whose wife handles all family financial and household affairs has different cognitive-communication needs and demands than a single male attorney or a mother of two small children. In order to determine functional limitations, prognosis, and treatment goals, the speech-language pathologist must find out what situations and roles constitute an individual's everyday life.

An environmental needs assessment can be conducted through an inventory of activities, communication partners, and roles expected from the client or desired by the client within the major life domains of home, community, work, and school. It should consider both current and projected needs. A

sample of a needs assessment inventory for the home environment, taken from Hartley (in press), is given in Appendix A. Information for the needs assessment can be gathered through interview with the client, the family, the employer (if any), or other rehabilitation specialists working with the client.

The actual use of such a needs assessment may depend upon the clinician's work setting. Within a rehabilitation team, the needs and competencies of the client may be ascertained in many of these areas by other team members, particularly the occupational therapist and vocational rehabilitation specialist. However, the speech-language pathologist should use this type of information when planning treatment and setting goals in order to ensure relevance to the individual's own life. Specific ways of utilizing this information will be addressed in the treatment section below.

The second part of the functional assessment is an evaluation of actual performance in everyday activities, or communicative competence. In this, functional, integrative behaviors which require coordination of component skills and systems are assessed in order to determine how well the individual operates, even with an impaired system, in natural communication settings. There are four methods for gathering information about communication performance: (1) observation of communication events over a variety of natural settings, (2) observation of unstructured conversation in a clinical setting, preferably videotaped for later analysis, (3) simulation or role-playing of real life events, and (4) quantitative measures from discourse comprehension and production tasks. No one method is adequate; it is best to combine those approaches which suit the needs of a client, the purpose of the evaluation, and the constraints of the clinician's work setting. Although listening and speaking are intrinsically related to one another in the communication process, they will be discussed separately to outline techniques that emphasize one over the other.

The assessment of everyday listening skills is often given only brief acknowledgement. Yet they are a vital part of functional communication. Approximately 55% of adult verbal communication time is spent listening, as compared with 23% speaking, 13% reading, and 8% writing (Werner, 1975). Good listening skills are necessary tools for problem solving, social growth, and healthy interpersonal relationships. Standardized tests of functional listening skills are rare, but guidelines for assessment in this area can be found in Lundsteen (1979); Backlund, Brown, Gurry, and Jandt (1982); and Boyce and Larson (1983). Aspects of listening which should be considered when examining everyday listening skills are displayed in Table 3.

The most naturalistic method for assessing listening skills would be to observe the client in a variety of everyday settings, especially in conversations with more than one person or in

**Table 3. Listening skills utilized in everyday activities.**

1. Detecting the speaker's purpose (e.g., to inform, to persuade, or to ask a favor).
2. Detecting and remembering of main ideas or points.
3. Making inferences, drawing conclusions from information given.
4. Detecting relevant versus irrelevant bits of information.
5. Realizing when important aspects of a message are missing.
6. Remembering the sequence or organization.
7. Detecting fact versus opinion.
8. Following oral directions.

group situations. Checklists are helpful for guiding observations of attending and listening behaviors (Hartley, in press). A second method would be through use of audio or videotaped stimuli from everyday life, such as a newscast, commercial, weather report, excerpt from a TV program or a conversation, and followed by questions to assess comprehension. Either real or simulated phone calls can be used to determine comprehension of messages, primarily the detection of important wh-information. Other tasks can be devised to measure comprehension of spoken directions and textual material such as paragraph-length narrative or expository discourse.

The client's ability to be a critical listener and to use compensatory strategies when breakdowns occur should be considered. In other words, does the client recognize when important information is missing or when there is ambiguity? Does the client ask for clarification, repetition, or for the speaker to slow down when needed? Are written aids used spontaneously when memory is impaired?

The clinician should never make judgments regarding the everyday speaking abilities of a client based on the results of one clinical testing session or observation of one type of activity. CHI individuals are highly variable in their performance, depending on the complexity of the activity and their own effort, fluctuating attention, and fatigue. Although the ideal way for assessing spoken communication is to observe and measure conversational abilities across a number of natural settings with different communication partners, this is generally not clinically feasible. One way of accomplishing this is to have someone very familiar with the client complete an inventory such as ones found in Goldstein et al. (1980) and Wiig (1982a). However, these observations are limited to only the use of social skills, or communicative intents.

The Pragmatic Protocol developed by Prutting and Kirchner (1987) offers an easy way for screening the function-

al communication of CHI clients. Thirty-two pragmatic behaviors in the categories of verbal, paralinguistic, and nonverbal aspects of communication are judged as appropriate or inappropriate based on a fifteen minute sample of the client's conversation with a familiar person. This protocol has been found reliable and also successful in delineating aspects of communication impaired after head injury (Milton et al., 1984). Ehrlich and Sipes (1985) adapted the protocol into a rating scale to measure pre- and post-treatment of their head injured clients but did not establish the reliability of their scale.

Role-playing has been employed to assess psychological aspects of interpersonal communication (Curran, 1982), the social communication of adolescents (Wiig, 1982b), and the functional communication of adult aphasics (Holland, 1980). Although the validity of role-playing as an assessment technique has been debated, it can provide insight into real life skills without leaving the clinical setting.

The final technique for assessing speaking abilities is through the elicitation of discourse and subsequent analysis. The production of narrative, procedural, expository, and persuasive discourse require different organizational patterns and impose different demands on the client's cognitive, executive, and linguistic systems from those of conversational speech (Mentis & Prutting, 1987). Measures which can be taken are: (1) the quantify and fluency of verbal output, (2) the accuracy, quantity, and organization of the semantic content, and (3) the use of cohesive ties. Differences between CHI speakers and normal speakers have been found in each of these areas (Hartley, Jensen, & LaPointe, 1984; Mentis & Prutting, 1987).

## Treatment from a Functional Perspective

One way to maintain a functional perspective in the treatment of the cognitive-communicative disorders of CHI clients is by setting up functional long-term communication goals. To do this, the clinician must consider the desired outcomes that will allow the client to communicate appropriately and effectively in everyday settings. Goal statements such as "To improve confrontation naming" or "Client will be able to give antonyms with 90% accuracy" may be legitimate goals for a speech-language pathologist who has an understanding of how to build compensatory strategies for anomia and an appreciation of the functional vocabulary needs of the client. However, such goals often lack face and social validity to the client, the family, or funding/referral sources because relevance to the client's everyday communication competence is not readily apparent.

One way of setting up functional long-term goals is to establish a list of "minimal competencies" or minimal requirements that a client should achieve in order to have functional communication and to be ready for dismissal. This concept is borrowed from public school systems which have established

minimal competencies for students at various grade levels. Suggestions for minimal cognitive-communication competencies in the areas of listening/language comprehension and speaking are given in Appendix B. A functional assessment would have identified the areas of functional listening and speaking which are impaired, and the minimal competencies provide a method for stating treatment goals based on these findings.

A second way to conduct treatment with a functional perspective is to use the input from the environmental needs assessment to target the cognitive-communication skills needed in current and projected real life environments and to develop strategies that will permit the individual to compensate for his/her impairments in everyday activities. The needs assessment should suggest therapy tasks and materials which have relevance to clients' functional needs. For example, a client with acquired dyslexia was indifferent toward workbook drills and adult remedial texts which had been utilized in previous rehab settings. An environmental needs assessment indicated that relearning how to be a parent to her three-year-old child was an important goal for her. Therefore, children's books were brought in and used in her reading training, and her motivation increased significantly. She experienced a tremendous boost to her self-esteem when she was able to read aloud to her daughter for the first time since her injury.

When working as a member of a rehabilitation team, the speech-language pathologist should coordinate treatment with other team members to ensure that the client has the communicative abilities to benefit from each treatment area and that long-term functional goals will be attained as efficiently as possible. Examples of how the speech-language pathologist can interface with occupational therapists working on activities of daily living, with vocational specialists, and with recreational therapists are displayed in Table 4.

Many strategies for compensating for cognitive, communicative, and executive deficits require good language skills. For example, clients with memory problems need to record all appointments and upcoming events on a calendar and mark off each day on the calendar. They may need a checklist as a reminder of their morning housekeeping routine or a list of duties to be completed at work. They need to keep a written shopping list. Clients with initiation problems need to follow an hour-by-hour written schedule or checklists to keep moving from one activity to another. A problem-solving plan for working through possible solutions and outcomes may help some individuals with concrete thinking.

Speech-language pathologists play an important role in building the skills necessary for the use of these strategies and in implementing the skills. However, the CHI client needs to be an active participant in the development of any compen-

**Table 4. Tasks to support the work of other rehabilitation specialists.**

<p>Tasks supporting work of Activities of Daily Living Specialist (Occupational Therapist):</p> <ol style="list-style-type: none"><li>1. Developing time concepts so that the client can accomplish morning routine in a timely manner.</li><li>2. Developing understanding of spatial and directional terms needed for mobility training.</li><li>3. Categorizing food and household items in preparation of shopping.</li><li>4. Sequencing steps in ADL routines such as washing clothes, taking a shower.</li><li>5. Building money concepts, spelling of numbers, and simple word problems for banking and money management.</li><li>6. Building reading for labels and directions on food packages.</li></ol> <p>Tasks for supporting work of Vocational Specialist:</p> <ol style="list-style-type: none"><li>1. Developing alphabetizing skills when needed for filing, library, or mail sorting job positions.</li><li>2. Building reading of materials, such as manuals, needed on job.</li><li>3. Developing speaking skills needed for particular job, such as giving directions to children in a day care setting.</li><li>4. Developing ability to understand directions and methods for determining accurate comprehension.</li><li>5. Developing job interview skills.</li></ol> <p>Tasks for supporting work of Recreational Therapist:</p> <ol style="list-style-type: none"><li>1. Use of phone book and newspaper as source of information on leisure activities.</li><li>2. Use of phone to inquire about services, make arrangements.</li><li>3. Use of planning worksheets to determine transportation, times for departure and arrival, and amount of money required.</li></ol>
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satory strategies. He or she must see the functional importance of the strategies in order to utilize them. When building these strategies, therapy tasks need to be specifically related to the outcome goals the client has established. These clients often lack insight into the need for planning and use of compensatory strategies. In the initial stages, then, the client may need to be allowed to fail (e.g., go to the store without a list and suffer the consequences if unable to prepare the desired meal) in order to establish a basis for working with the clinician on these strategies. Once the client has mastered the skills needed for employment of the strategy within the clinical setting, additional steps must be taken to ensure that the strategy will be utilized in daily activities.

Achieving functional communication skills is of extreme importance for head injured clients. It is often the social acceptability of an individual's behavior and not physical limitations on activities of daily living that determine the quality of residential care for a head injured client. Social isolation has been reported as one of the most common and most devastating long-term sequelae of severe head injury (Oddy, 1984). More recently, Brooks et al. (1988) found that there was a relationship between failure to return to work and lower communication skills.

Traditional approaches to the assessment and treatment of cognitive-communicative disorders are inadequate by themselves. Traditional tests and treatment goals based on them often lack social and face validity. Too little is done to ensure the generalization of newly acquired component skills to a client's everyday communication. Functional approaches must be incorporated into clinical practices when working with head injured clients at the later stages of recovery. After all, the effectiveness of speech-language therapy can only be judged in terms of how it improves the quality of an individual's life, and how it increases his/her ability to fully participate in independent living, social, and work activities.

Address all correspondence to:  
Leila L. Hartley, Ph.D.  
Galveston Institute of Human Communication  
Transitional Learning Community  
1528 Postoffice Street  
Galveston, TX 77550

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