A Functional Approach to the Cognitive-Communication Deficits of Closed Head-Injured Clients
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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 sequelle 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 approach 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. Instead, it is centered on adaptive behaviors typical of everyday life rather than isolated component skills that occur early 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 disorder.

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 & Kirchhefer, 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

Closed Head Injury

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

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

Table 2. Categories of pragmatic behaviors.

<table>
<thead>
<tr>
<th>Nonverbal Aspects of Communication</th>
<th>Functional</th>
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<tbody>
<tr>
<td>Paralinguistics</td>
<td>Everyday activities, connected speech, or discourse</td>
</tr>
<tr>
<td>Kinesics</td>
<td>Natural contexts</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Interactional Aspects of Communication</th>
<th>Functional</th>
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<tbody>
<tr>
<td>Turn-taking</td>
<td>Everyday activities, connected speech, or discourse</td>
</tr>
<tr>
<td>Conversational repair</td>
<td>Natural contexts</td>
</tr>
<tr>
<td>Speech acts or communicative intents</td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Propositional Aspects of Communication</th>
<th>Functional</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conversational rules</td>
<td>Everyday activities, connected speech, or discourse</td>
</tr>
<tr>
<td>Topic</td>
<td>Natural contexts</td>
</tr>
<tr>
<td>Complex language forms including narratives, idiomatic expressions, and humor.</td>
<td></td>
</tr>
</tbody>
</table>

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, Spatzkin, 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 Wig’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 such as loudness, prosody, fluency, and vocal quality. Kinesics is communication through body movement such as facial expression, eye gaze, general body posture, and gestures. The 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. Orsler (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 & Hasn, 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 & Hofland, 1985; Milton & Wenz, 1986; Hartley, in press). Reliance on traditional standardized test batteries generally leads to overestimation of the abilities of head injured clients (Milton, Pratting, & Bieler, 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 so 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 feedback 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 liability, 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 lifestyle. 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-communicative 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.
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 acknowledgments. 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 (Wemer, 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 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.

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. |

The Pragmatic Protocol developed by Prutting and Keachner (1987) offers an easy way for screening the function-
al communication of CHI clients. Thirty-two pragmatic be-
haviors in the categories of verbal, paralinguistic, and nonver-
bal 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 (Carran, 1982), the
social communication of adolescents (Wig, 1982b), and the
functional communication of adult aphasics (Holland, 1980).
Although the validity of role-playing as an assessment techni-
que 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 per-
suasive 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 quantity 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
in everyday settings. Goal statements such as “To improve

One way of setting up functional long-term goals is to
establish a list of “minimal competencies” or minimal require-
ments 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 competen-
cies 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 compen-
sate 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 com-
municative 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 ac-
tivities of daily living, with vocational specialists, and with
recreational therapists are displayed in Table 4.

Many strategies for compensating for cognitive, com-
municative, 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.

<table>
<thead>
<tr>
<th>Tasks supporting work of Activities of Daily Living Specialist (Occupational Therapist):</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Developing time concepts so that the client can accomplish morning routine in a timely manner.</td>
</tr>
<tr>
<td>2. Developing understanding of spatial and directional terms needed for mobility training.</td>
</tr>
<tr>
<td>3. Categorizing food and household items in preparation of shopping.</td>
</tr>
<tr>
<td>4. Sequencing steps in ADL routines such as washing clothes, taking a shower.</td>
</tr>
<tr>
<td>5. Building money concepts, spelling of numbers, and simple word problems for banking and money management.</td>
</tr>
<tr>
<td>6. Building reading for labels and directions on food packages.</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Tasks for supporting work of Vocational Specialist:</th>
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</thead>
<tbody>
<tr>
<td>1. Developing alphabetizing skills when needed for filing, library, or mail sorting job positions.</td>
</tr>
<tr>
<td>2. Building reading of materials, such as manuals, needed on job.</td>
</tr>
<tr>
<td>3. Developing speaking skills needed for particular job, such as giving directions to children in a day care setting.</td>
</tr>
<tr>
<td>4. Developing ability to understand directions and methods for determining accurate comprehension.</td>
</tr>
<tr>
<td>5. Developing job interview skills.</td>
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<table>
<thead>
<tr>
<th>Tasks for supporting work of Recreational Therapist:</th>
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</thead>
<tbody>
<tr>
<td>1. Use of phone book and newspaper as source of information on leisure activities.</td>
</tr>
<tr>
<td>2. Use of phone to inquire about services, make arrangements.</td>
</tr>
<tr>
<td>3. Use of planning worksheets to determine transportation, times for departure and arrival, and amount of money required.</td>
</tr>
</tbody>
</table>

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.


