

Behavioral Considerations in Traumatic Brain Injury Rehabilitation

Although head injured individuals as a group display heterogeneous deficits, taken alone, each of these deficits (i.e., social skills deficits, motoric impairment, etc.) can be found in other populations that have been treated successfully using behavioral techniques.

Behavioral approaches, for example, have: (a) improved muscle and upper extremity strength, (b) reduced spasticity, and (c) increased muscle movement, range of motion, and the use of wheelchairs in physically disabled clients (Gouvier, Cottam, Webster, Beissel, & Wofford, 1984). The dysarthric speech and vocal quality of aphasia patients have been improved, as well as their word finding problems; unintelligible language, and perseverative speech have been decreased through behavioral techniques (Ince, 1976). Behavior analysis also has been employed to teach daily living (Cuvo, & Davis, 1983), social, and vocational skills (Wesolowski, & Zencius, 1994). Additionally, aggression, non-compliance, lack of motivation, anxiety, and depression have been treated successfully by behavior therapy (Craighead, Kazdin, & Mahoney, 1976; Lietenberg, 1976; Goldstein, & Ruthven, 1983).

Although head injured individuals can experience the above disabilities in varying combinations, a behavioral approach to rehabilitation appears promising, especially in view of its successful applications to populations with similar disabilities, a view expressed by Goldstein and Ruthven (1983), as well as, Levin, Benton, and Grossman (1982). Selected aspects of a behavioral model relevant for traumatically head injured clients will be highlighted in this document.

Behavioral Assessment and Goal Setting Issues:

Head injured individuals often receive psychological and neurological evaluations that indicate which regions of the brain have been affected by trauma and to what degree (Lynch, & Mauss, 1981). Tests also provide information regarding specific cognitive processes that have been impaired. And, as this author has experienced, although such assessments impart critical information, they have little utility with respect to revealing the ways in which these deficits are interfering with clients' day-to-day functioning, and seldom are they used to develop meaningful rehabilitation plans. The individual's past knowledge, skills, work history, family situation, and treatment since trauma all contribute in a unique way to the patient's present functioning. A thorough assessment of head injured individuals should include a behavioral assessment. This assessment can help pinpoint those behaviors that are maintained by environmental contingencies as well as evaluate the functional consequences of organic damage (Goldstein, & Ruthven, 1983; Prigatano, 1986).

The behavioral assessment could include interviewing, naturalistic observation, or analogue techniques. An interview often is functional for establishing an initial identification of possible target behaviors. Subsequently, naturalistic observation using standard behavioral recording techniques could help determine the functional consequences of behavioral excesses and deficits identified in the interview (Levin, et al.,

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1987). Naturalistic observation should evaluate all areas of daily living (e.g., orientation, meal planning, cooking, shopping, social, leisure, telephone, academic, self-care skills, etc.). In the vocational area, many prerequisite skills could be examined that may affect job performance (e.g., staying on task, being on time, communicating appropriately with others, and recognizing and responding to authority figures). Behavioral goal setting could follow. Analogue and self-report techniques (e.g., role playing, questionnaires, self-monitoring and recording) may have limitations because they require participatory skills that are often lacking in traumatically injured patients (Goldstein, & Ruthven, 1983; Levin, 1982); however, some evidence in their successful use will be discussed below.

Several issues should be highlighted with respect to the application of behavioral assessment with traumatically head injured patients. First, it is important to discriminate whether patient performance problems reflect a skill deficit, or are a function of either environmental contingencies or organic problems. Prior to head trauma, the social, vocational, daily living, speech, motor, and other adaptive skills of patients are assumed to be within normal limits, but subsequent to acute care, head injured patients often display idiosyncratic patterns of behavioral excesses or deficits (Horton, & Barrett, 1988). It is essential, therefore, that a behavioral assessment discriminate whether the performance problems of head injured patients reflect a skill deficit or whether the behavior is in their repertoires but environmental factors influence its unacceptably high or low rate of occurrence (Mager, & Pipe, 1971). Clinicians often claim that head injured patients “lack motivation” and/or are lazy. With this perception clinicians may assume incorrectly that the formerly competent patient does not have a skill deficit, but is unmotivated. In contrast, patients without speech or physical impairments who “look good” also may be deceiving and, in fact, have skill deficits and need retraining. In both of these situations clinicians inappropriately may implement a contingency management plan rather than a skill training program (Malec, 1984).

Still other head injured patients may have maintained adaptive skills in their behavioral repertoires and their lack of observed performance should not suggest the necessity of skill training. These clients may need a contingency management program to provide discriminative stimuli and consequences for appropriate responding (Turner, Green, & Braunling-McMorrow, 1990). If clinicians do not discriminate whether patients’ performance problems reflect skill deficits or environmental factors, ineffective or inefficient programs may be developed.

Another behavioral assessment issue that bears mention for head injured patients is to remember the “A” in the “ABCs” of behavior analysis. Frequently, exclusive focus is placed on measuring the topography of the maladaptive behavior and then manipulating consequences to reduce its occurrence. Knowledge of antecedents can help behavior therapists control these cues or possibly predict or prevent the occurrence of the maladaptive behavior (Wesolowski, & Zencius, 1994).

Additionally, the stimuli that are discriminative for others in society may not be for head injured patients. For example, patients often do not respond appropriately to social cues in interpersonal situations. They may need more cues as well as additional feedback to

respond in a socially appropriate manner (Fowler, 1981). Also, these patients may have difficulty chaining responses in daily living or vocational tasks. Some clinicians would attribute these discrimination or chaining difficulties to patients' memory difficulties (Lam, McMahon, Priddy, & Gehred-Schultz, 1988).

Yet another aspect of behavioral assessment and goal setting is worth emphasizing. Often, head injured patients are placed in a large state facility, nursing home, rehabilitation center, or small group residential program in a community setting for treatment. After completing their rehabilitation, these patients frequently will return to their home and families in a different environmental setting. Problems with skill generalization and maintenance often arise (Foxy, Martella, & Marchand-Martella, 1989). Behavioral assessment, as well as goal setting, should take into consideration patients' environments of subsequent functioning (Levin, et al., 1982). The behavioral requirements as well as the naturally occurring discriminative stimuli and consequences of living in patients' post-rehabilitation setting should be evaluated. Patients should be assessed in the post-treatment environment, if possible, prior to as well as subsequent to treatment. Behavioral goals as well as therapy itself should reflect the requirements of the ultimate environment, and not focus exclusively on making the patient a compliant treatment resident (Goldstein, et al., 1983).

It is important to translate behavioral goals in to behavioral objectives that clearly specify the: (a) conditions under which behavior should occur, (b) operationally defined behavior, (c) criterion for success. Too often nonbehavioral clinicians working with head injured patients write goals in vague subjective terms (e.g., "improvement in judgement," "maximize rehabilitation potential," ad nauseum). Lynch and Mauss (1981), based upon their experience on a brain injury unit, observed that, "vague problems lead to vague statements and...objective determination of efficiency of treatment was virtually impossible" (p.224). Lynch and Mauss adopted a "Standard Problems List" in which they devised operational definitions for each problem, specified the treatment, and the outcome measure. These authors noted that, "such uniformity conveys to the staff and to the patient and his/her family that the rehabilitation effort is a coordinated one. It is much easier to monitor current status, extent of progress and attainment of goals..." (p.226).

Treatment Program Issues:

Horton and Howe (1981) noted that: "a blend of neuropsychology and behavior therapy could produce an effective treatment paradigm for a certain percentage of brain-damaged patients" (p.349). In keeping with Horton and Howe's original assertions, pertinent training issues are elucidated. Prior to developing behavioral treatment programs, advantages of adaptive or prosthetic devices and environmental rearrangements for patients should be considered. For example, adaptations of eating utensils have been developed to facilitate physically handicapped patients grasping utensils and cutting food. The vast majority of structural changes necessary for accommodation can be carried out by the rehabilitation facility's environmental engineers (Wesolowski, & Zencius, 1994).

In addition to using adaptive devices, head injured patients could participate in certain activities under modified rules or standards. Physically handicapped patients, for example, could engage in certain leisure or sport activities under modified rules. Cuvo, & Davis (1983) found increased treatment compliance under conditions of increased patient mobility and social opportunity.

Shaping, chaining, and response practice are important behavioral techniques with head injured patients. Shaping has been successful in retraining cognitive and perceptual-motor skills of head injured patients (Goldstein, & Ruthven, 1983). Task analysis has been a helpful instructional technique to teach community living skills (Cuvo, & Davis, 1983). Clients with memory problems may have the behavioral components of a response chain in their repertoires but need training on chaining them. Teaching vocational (e.g., copy machine operation, data entry, etc.) and daily living (e.g., cooking) skills are illustrations where task analysis and response practice can be helpful. Additionally, a variety of discriminative stimuli can be used to help occasion appropriate behavior. Task analyzed recipes, shopping lists, checklists of activities to perform, and timers are examples of visual and auditory prompts that can be helpful in occasioning daily living skills. Use of mnemonic techniques such as rehearsal, organization of text, and visual imagery have been employed to remediate memory problems in brain damaged patients (Glascow, Zeiss, Barrera, & Lewinsohn, 1977). Self-recording as a prompt of heterosexual conversational behavior, initially with a mechanic counter, was employed to increase compliments and questions asked and decrease self-disclosure statements by head trauma youth (Brotherton, Thomas, Wisotzek, Milan, 1988).

Often, response contingent feedback alone has served as a reinforcer (e.g., Turner, Green, & Braunling-McMorrow, 1990; Crane, & Joyce, 1991). As an example, a Differential Reinforcement of Other Behavior (DRO) procedure was employed to reduce four maladaptive behaviors (i.e., foul language, biting, hitting, and kicking staff members) of a traumatically head injured male (Horton, et al., 1981). A report card was used by hospital staff to record his behavior. Response contingent feedback was provided as well as consumable or other reinforcers. Token reinforcement and response cost also can be employed in individual behavior therapy programs (Goldstein, et al., 1983).

Another major treatment consideration with head injured patients is generalization and maintenance of treatment effects. Two generalizations of specific importance to head injured populations are: (a) generalization across settings, and (b) generalization across time (i.e., response maintenance). Generalization is an important issue for head trauma patients because most frequently their treatment takes place in a service facility and not their home environment. Training in artificial or simulated settings too often does not generalize to patients' environments of ultimate functioning (Foxy, et al., 1989). As mentioned above, patients in a residential program that learn daily living skills (e.g., home living, mobility around the community, etc.) in that sheltered environment often do not emit those behaviors when they return to their homes in another community.

General case programming is one strategy for facilitating generalization (Stokes, & Baer, 1977). The logic of general case programming is to build into original training task

exemplars that sample the range of discriminative stimuli and response requirements in the response set. By sampling variation in the response set, patients should generalize to task exemplars that have not been trained. General case programming capitalizes on techniques to promote generalization such as training sufficient exemplars, and programming stimuli that are salient in the generalization setting.

In addition to general case programming, clinicians working with head injured patients should employ transfer of stimulus control strategies. Patients frequently are brought under stimulus or instructional control in a rehabilitation facility, and transfer of that control to natural environments must be programmed. Training and hoping that generalization will occur too often has been futile (Stokes, et al., 1977). Fading and time delay are two of the most useful transfer of stimulus control techniques (Striefel, & Owens, 1980), and could be applied to brain injured patients. In the speech training of head injured patients, fading techniques may be particularly useful. The intensity of spoken words could be faded from loud to normal levels (Striefel, et al., 1980). Shape fading could be used with head injured patients with visual-spatial deficits, particularly to teach shape or form discrimination (Wesolowski, et al., 1994).

The time delay technique initially pairs a controlling stimulus with a second stimulus to which control is to be transferred. A progressively longer delay is inserted between the presentation of the new stimulus (e.g., task request) and the controlling stimulus. Time delay has been employed to teach disabled patients instruction following, sign language, verbal object labeling, and other discrimination and language behavior (Foxy, et al., 1989).

In one of the few published studies involving the use of behavioral techniques for memory remediation in head trauma persons, the use of mnemonic techniques and visual imagery was investigated by Glasgow, et al. (1977). Of particular interest in their two case studies was the programming of generalization. In the first study the patient was assigned to use a mnemonic technique in her daily life. The mnemonic device was a rule which enabled the patient to apply it to novel situations outside of the therapy setting. In the second study, it was discovered that while visual imagery facilitated the memory of names in the laboratory, imagery was not useful in the subject's daily life, where names tended to be more complex.

The final issue to be raised is the need to evaluate treatment procedures in as rigorous a manner as feasible. Although there is a relative paucity of controlled behavioral research with traumatically head injured patients, there is a vast majority of published studies in the field of behavioral neuropsychology that have been uncontrolled case studies (e.g., Glasgow, et al., 1977; Horton, et al., 1981; Turner, et al., 1990; Crane, et al., 1991). Behavioral techniques can be used successfully with brain injured patients if modified to accommodate the patient's specific cognitive deficits. In order to individualize behavior programs, a comprehensive, on-going assessment of the patient's cognitive abilities must accompany behavioral treatment (Lewis, Burke, & Carrillo, 1987). Neuropsychological tests, well validated for sensitivity to location and extent of brain tissue damage, are not well validated in predicting specific deficits in social behavior or self-management in a

given social context. Neuropsychological testing should be supplemented with behavioral observation of the patient, ideally within the social context to which the client is hoping to return (Levin, et al., 1982).

Training with brain injured patients should proceed systematically from discrimination training and teaching simple response components, through teaching response sequences and integrated behaviors, to reinforcing the cognitive representation of integrated behaviors and reinforcing accurate predictions of task-specific self-efficacy and of behavioral outcomes. The level at which the patient enters this process is determined by his/her level of cognitive impairment and/or physical limitations. Some patients may be able to learn behaviors at the level of an integrated, sequential response. Too, often, however, psychological or psychiatric treatment of the brain injured patient places expectations on the patient that overestimates his/her cognitive abilities. When neuropsychology is “married” with behavioral principles, the behavioral neuropsychologist can form a productive formulation of rehabilitative program milieu that incorporates information concerning specific target behaviors with the various techniques and strategies that have developed within behavior therapy, and were alluded to and described in this paper.

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