

# Behavioral and Social Interventions for Individuals with Traumatic Brain Injury: A Summary of the Research with Clinical Implications

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## ABSTRACT

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Specialists in communication disorders who work with individuals who have traumatic brain injury (TBI) often focus their rehabilitative efforts on the cognitive, social, and behavioral dimensions of disability. These domains of functioning are included in the scope of practice of the American Speech-Language and Hearing Association because of their close associations with communication effectiveness. This article summarizes relevant research findings and clinical perspectives in the areas of intervention for disorders of behavioral self-regulation and social-interactive competence after TBI. This clinical summary is associated with a systematic evidence review sponsored by the TBI Practice Guidelines Group of the Academy of Neurologic Communication Disorders and Sciences (ANCDS).

**KEYWORDS:** Acquired brain injury, social skills training, positive behavior supports, evidence-based practice

**Learning Outcomes:** Upon completion of this article, the reader will be able to (1) summarize the current evidence for social and behavioral intervention after traumatic brain injury; (2) describe relevant evidence from related populations, such as individuals with developmental disabilities; and (3) differentiate between the two main approaches to behavioral intervention, applied behavior analysis and positive behavior supports.

Personality changes, including increases in challenging behavior, are common after severe traumatic brain injury (TBI) in both children and adults (see the review by Ylvisaker

et al<sup>1</sup>). Estimates of new persisting behavior disorders (i.e., those not predating the injury) among children and adolescents with severe TBI range from about 35%<sup>2</sup> to a high of

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70%.<sup>3</sup> This sobering picture is worsened by the frequent finding that *preexisting* behavior problems are common among both children and adults with TBI, predisposing them to injury,<sup>1</sup> although not all outcome studies have confirmed this.<sup>4,5</sup> The intensity of behavior disorders has been associated in some studies with the severity of injury.<sup>6</sup>

Behavioral and social changes are often judged by family members, teachers, employers, friends, and others to be the most problematic consequences of the injury.<sup>7,8</sup> Poorly controlled behavior and problematic social interaction have been linked to difficulty in family reintegration and educational, vocational, social, and avocational pursuits.<sup>9-11</sup>

Factors that may contribute to ineffective social reintegration include preinjury behavioral and communication problems, impairments tied directly and indirectly to the injury, the hard-to-predict evolution of postinjury reactions, and the effectiveness of ongoing management and support.<sup>12</sup> Preinjury contributors have been highlighted since the early studies of Lishman,<sup>13</sup> a theme captured in the often-repeated generalization, "It is not only the kind of injury that matters, but the kind of head."<sup>4</sup> Frequently linked *directly* to the injury are the two classical frontolimbic behavior syndromes: the so-called pseudopsychopathic and pseudodepressed personalities or variations on these.<sup>14</sup> These syndromes are of special concern following closed head injury because of the relatively high frequency of prefrontal lesions.<sup>15</sup> Often associated with ventral frontal lesions or frontal-limbic disconnection is some combination of transient or persistent disinhibition, impulsiveness, lability, reduced anger control, aggressiveness, sexual acting out, perseveration, inefficient learning from consequences, and generally poor social judgment. The pseudodepressed personality, associated with dorsal prefrontal lesions, may be characterized by some combination of reduced initiation, apathy, lack of drive, loss of interest, lethargy, slowness, inattentiveness, reduced spontaneity, unconcern, lack of emotional reactivity, dullness, poor grooming, and perseveration.

Indirectly linked to success in social integration are commonly occurring cognitive<sup>16</sup>

and executive function impairments (in domains of attention, memory, organization, planning, flexible problem solving, self-awareness, and the like).<sup>17</sup> Weakness in these areas negatively affects performance in nonroutine social interaction and indirectly reduces social effectiveness and behavioral self-regulation by contributing to failure and resulting frustration that may increase over time. Theory of mind deficits (i.e., generally impaired ability to interpret others' behavior as motivated by unobservable thoughts, desires, and feelings that can be inferred from their behavior) have been linked to frontal lobe damage<sup>18</sup> and have been identified as a potential source of social impairments in TBI.<sup>19</sup> Impaired social perception, including weak recognition of emotional signals from others, can interfere with social reintegration as the individual misinterprets the behavior of others and responds accordingly.<sup>20,21</sup> These impairments have been linked to right hemisphere frontal lobe and limbic lesions,<sup>22,23</sup> specifically a ventral system that includes the amygdala, ventral prefrontal structures, and anterior cingulate gyrus, commonly injured in closed head injury.<sup>21</sup>

The long-term evolution of psychosocial adjustment is difficult to predict in individual cases. Many people with TBI enjoy a successful social reintegration, often resulting in part from their effort and natural resilience and in part from the understanding and accommodations of everyday people in their social environments. In contrast, those referred for behavioral services may have experienced a systematic downward social spiral, as social, academic, and vocational failures create negative reactions, which in turn exacerbate the challenges tied directly to the injury and intensify their social, academic, and vocational failures (see review by Kendall and Terry<sup>12</sup>). Iatrogenic behavior problems are also common, particularly those caused by overly restrictive or punitive environments that encourage a downward behavioral spiral caused by power battles.<sup>1</sup> Children and adolescents with TBI face future developmental challenges with disrupted neural systems and associated deficits in learning and self-regulation. Therefore, delayed onset or exacerbation of symptoms, including behavioral symptoms, is common in this group, especially

in the presence of frontal lobe injury (see review in Feeny and Ylvisaker<sup>24</sup>).

### BEHAVIORAL INTERVENTIONS

Over the past 20 years, the field of applied behavior analysis (ABA) has evolved into two overlapping but distinguishable approaches to assessment and intervention. These are referred to here as traditional ABA and positive behavior supports (PBS). Traditional ABA has a much longer history of theory construction, procedure development, and efficacy research than PBS. It is supported by an extensive research literature with a variety of clinical populations and emphasizes the management of behavior by deliberately manipulating consequences (i.e., contingency management). This approach is based on the fundamental principle that behaviors increase or decrease in frequency as a result of positive or negative consequences. By contrast, the PBS approach is based on the principle that behavior is best managed and modified by organizing immediate and remote antecedent supports so that individuals are likely to behave successfully and, with practice, acquire repertoires of behavior that enable them to succeed in their social contexts. Table 1 outlines the major themes and critical differences between traditional ABA and PBS approaches. The table lists specific procedures within both frameworks that have been studied as interventions for individuals with TBI.

The potential success of the traditional ABA framework with adults with TBI has been demonstrated by several single-subject studies conducted in England<sup>25,26</sup> and elsewhere. Similarly, PBS procedures have been shown to be effective in managing behavior problems in children and adults with TBI. In a series of single-subject experiments, Feeny and Ylvisaker described PBS procedures and showed them to be effective.<sup>24,27-29</sup> Two class I randomized controlled examinations of behavior management procedures have appeared in the TBI literature, both using PBS procedures (see later). Although specific behavior management procedures are often studied in isolation to measure their individual contribution to outcome, combinations of

intervention strategies (whether traditional ABA or PBS) have been shown to increase the effect size in studies of many clinical populations.<sup>30</sup>

Support-oriented behavioral procedures have often been combined with support-oriented cognitive, communication, and executive function procedures. For example, Feeny and Ylvisaker<sup>24</sup> combined the following procedures in a multicomponent intervention that proved to be successful in two pediatric TBI single-subject experiments, with positive results at an 8-year follow-up:

- **Daily Routine: Negotiation and choice.** Daily routines were analyzed collaboratively by the instructional staff and students, followed by modifications in the support provided, amount of work to be accomplished, and plans for achieving the goals.
- **Positive Momentum.** Staff ensured that the plan included relatively easy tasks with a guaranteed high level of success before difficult work was introduced, and, if possible, a student-preferred activity preceded every mandated activity.
- **Reduction of Errors.** In addition to eliminating time demands and negotiating the amount of work to be completed, instructional staff were trained to provide sufficient modeling and assistance so that the students would experience few errors (which historically evoked negative behavior and interfered with learning).
- **Escape Communication.** Because the functional behavior assessment indicated that most occurrences of challenging behavior served to communicate a need to escape a task or place, the students were taught positive communication alternatives (e.g., "I need a break" or "I'm finished"). Staff members were trained to encourage these alternatives at natural transition times and when the students began to appear anxious or upset and to reward the students' use of positive escape communication.
- **Adult Communication Style.** Instructional assistants were trained to (1) increase their frequency of supportive and reinforcing interactions with the students, (2) anticipate students' difficulties and offer assistance or

**Table 1** Contrasting Themes: Traditional Applied Behavior Analysis and Positive Behavior Supports

Traditional Applied Behavior Analysis	Positive Behavior Supports
<b>Focus and Goals</b>	
Focus on specific behaviors, with the goal of increasing the frequency of positive and decreasing the frequency of negative behaviors. Focus on external control of behavior via systematic manipulation of consequences.	Primary focus on lifestyle change satisfactory to the individual and important others in that life. Secondary focus on specific behaviors. Focus on internal control of behavior and behavior change via manipulation of antecedents, including both remote and internal antecedents to behavior. Often combined with cognitive, communication, and executive system intervention.
<b>Assessment</b>	
Functional behavior assessment (correlational and experimental), ideally conducted by behavior specialists in analogue (i.e., experimentally controllable) environments.	Functional behavior assessment, ideally conducted in natural environments and involving collaboration among staff, family, and the individual. Assessment includes exploration of background setting events (including general lifestyle, internal states of the person, remote antecedents, and environmental facilitators and barriers).
<b>Intervention Modalities and Methods</b>	
Primary use of <i>contingency management</i> (i.e., systematic and planned manipulation of <i>consequences</i> ), designed to increase (positive and negative reinforcement) or decrease (extinction or punishment) specific behaviors. Procedures include differential reinforcement of targeted positive behaviors or of alternative behaviors or of low rates of targeted negative behaviors, token economy procedures (e.g., receiving a token for positive behavior that can be traded for a reward later), extinction procedures (e.g., ignoring negative behaviors, time-out from reinforcement), response-cost procedures (e.g., losing points for negative behavior), redirection, contingent restraint, behavioral contracts, prompting, and cuing. Less focus on antecedents, typically immediate antecedents (e.g., specific provocation, environmental conditions, instructions, demands). Often primary use of extrinsic reinforcers (e.g., food, stickers, tokens) not logically and naturally related to the targeted behavior.	Primary focus on <i>control of antecedents</i> , including both remote (e.g., negative events at an earlier time) and internal (e.g., sense of loneliness, perceived failure, physical pain) setting events, with the goal of making background setting events as positive as possible. Procedures include assurance of adequate amount of choice and control, engagement in personally meaningful activities, building positive momentum before difficult tasks (e.g., with preferred activities or guaranteed success), positive communication from communication partners, teaching positive communication alternatives to negative behavior, provision of positive roles and scripts, and natural and logical rewards for positive behavior.
<b>Organization of Intervention</b>	
Specific behaviors often taught in a sequential manner: acquisition then stabilization/fluency, then transfer to novel contexts.	Specific behaviors often targeted in natural settings and in the context of natural activities from the outset (with support); thus, generalization is facilitated from the outset.

Table 1 (continued)

Traditional Applied Behavior Analysis	Positive Behavior Supports
<b>Setting, Providers</b>	
Intervention often provided in "behavior management" settings (e.g., segregated classroom, clinic, residential center). Intervention largely delivered, at least in the acquisition stage, by behavior specialists.	Intervention ideally provided in natural (home, work, school) community settings, with primary providers being the people who are natural communication partners in those settings (e.g., family members, work or school staff, peers), supported by specialists.

- model escape utterances, and (3) avoid "nagging" (as perceived by the students).
- **Graphic Advance Organizers.** Because of significant organizational impairment, the students were provided with photograph cues as a support for organizationally demanding tasks.
  - **Goal-Plan-Do-Review Routine.** The students were given a graphic "map" that represented the general sequence of activities from an executive function perspective: Goal (i.e., "What are you trying to accomplish?"); Identification of difficulty level (i.e., "Is this going to be hard or easy?"); Plan: (i.e., "How do you plan to get this done? What do you need? What are the steps? How long will this take?); and Review (i.e., "What were you trying to accomplish? How'd it work out? What worked for you? What didn't work? What was easy? Difficult?"). These interactions with staff were brief and collaborative (versus a performance-oriented quiz).

Multicomponent interventions of this sort confound research by making it difficult to identify the relative contributions of each component to the outcome. They are, however, respectful of dynamic interactions among the behavioral, cognitive, communication, and executive function dimensions of human activity.

### **SUMMARY OF THE EVIDENCE: INTERVENTIONS FOR BEHAVIORAL DISORDERS**

In an evidence review sponsored by Academy of Neurologic Communication Disorders and Sciences (ANCDs), Ylvisaker and colleagues

(article in preparation) identified 59 studies in which behavioral (nonpharmacologic) interventions were provided to individuals with problematic behavior after TBI. These studies included 194 participants. Two studies were classified as class I (randomized controlled trials [RCTs]), 2 as class II (uncontrolled group studies), 34 as class III (single-subject experiments or series of experiments), and 20 as class IV (uncontrolled case studies or series of case studies).

All but one of the reports documented improvement in the participants who received the intervention. The exception was a series of single-subject designs in which stress inoculation training procedures (relaxation, self-instruction, coping skills) were used in a residential setting.<sup>31</sup> The documented success in the remaining 58 reports, including two RCTs, supports the conclusion that behavioral interventions have a reasonably strong evidence base in their application to individuals with TBI. Because a wide variety of intervention procedures were used, *specific* standards or guidelines for clinical practice cannot be derived from this body of evidence. However, the strength of the evidence supports a conservative conclusion that behavioral interventions, understood generically, should be considered at least a practice guideline for clinicians.

Both RCTs used PBS procedures. Wade and colleagues<sup>32</sup> trained parents of children with TBI to use antecedent support-oriented procedures to manage challenging behavior. Children in the experimental group ( $n = 16$ ) showed greater improvements in internalizing symptoms (anxiety, depression, withdrawal of child) than those in the control group ( $n = 16$ ).

Children and parents in the experimental group reportedly liked the program and improved on measures of knowledge, skills, and relationships within the family. Relatively greater behavioral improvements were noted in the older and less severely impaired children with better-educated parents. Medd and Tate<sup>33</sup> used TBI education, self-awareness training, and anger management strategies with an experimental group of adults with TBI ( $n=8$ ) while a control group ( $n=8$ ) received only anger monitoring training. Both groups improved on measures of anger, with the experimental group showing greater improvement.

In addition to the fact that only two of the studies yielded class I evidence, the literature is fraught with methodological problems. Notably, relatively few of the studies provide compelling evidence that the intervention resulted in improvements that transferred to personally meaningful functional contexts and were maintained over extended periods of time.

**INTERVENTION TRENDS OVER THE PAST 30 YEARS**

As an organized intervention approach supported by a coherent theory, PBS is relatively new and, compared with ABA, is therefore associated with a smaller research base across clinical populations. However, a review of the literature suggests a marked evolution from consistent reliance on traditional ABA procedures in the 1980s to a striking dominance of PBS approaches since 2000, as shown in Table 2.

Several possible reasons can be identified for the increasing use of PBS procedures in TBI rehabilitation:

1. Ventral frontal lobe injury, common in closed head injury, is associated with inhibition impairment.<sup>34</sup> It is well understood that the behavior of markedly disinhibited individuals (e.g., toddlers) is best managed by thoughtfully organizing the antecedents of behavior in an attempt to facilitate positive routines rather than simply reacting to the impulsive behaviors.
2. Ventral frontal lobe injury has also been associated with a dramatic inefficiency in learning from consequences.<sup>35</sup> Damasio’s somatic marker theory offers one possible explanation for this inefficiency.<sup>36</sup> Damasio hypothesized that lack of connection between somatic (feeling) states and memories (conscious or unconscious) of past behavior is a critical factor in this failure to learn from consequences.
3. Dorsal frontal lobe injury, less common in closed head injury, can result in initiation impairment, which also reduces the efficiency of contingency management. That is, even if a connection is made between behavior and its consequences, initiation impairment may result in failure to engage in the learned behavior.
4. Impaired social perception, mentioned earlier and also a common consequence of TBI, jeopardizes contingency management insofar as that approach assumes accurate perception and interpretation of social situations and social cues. Several investigators have linked social perception impairments to vulnerable frontolimbic structures.<sup>21,37-39</sup>
5. A history of failure and frustration, possibly combined with oppositionality (common among individuals with TBI), also reduces the effectiveness of contingency management.

**Table 2 Relative Emphasis of Traditional ABA and PBS Behavioral Intervention Studies in TBI Rehabilitation over the Past 25 Years, Demonstrating Systematically Increasing Use of PBS Procedures (N = 59)**

Intervention Type	1980–1989	1990–1999	2000–2005
Traditional ABA	6	15	1
Combined	2	12	5
Positive behavior supports	0	6	11
Unclassifiable	0	0	1

ABA, applied behavior analysis; PBS, positive behavior supports; TBI, traumatic brain injury.

6. Finally, studies of effectiveness of intervention have increasingly demonstrated the merits of PBS procedures.<sup>24,27</sup>

### **SOCIAL INTERACTIVE COMPETENCE: OUTCOME AND INTERVENTION**

Social skills include both general competencies and specific goal-directed, situationally appropriate, verbal and nonverbal behaviors. Individuals use such skills to affect the behavior of others, gain acceptance by peers and family members, establish friendships, and meet the demands of school, work, and community. Adequate social skills increase the likelihood of reciprocal friendships and a satisfying social life.

Although theoretically distinguishable, social skills and behavioral self-regulation overlap in practice. Individuals diagnosed with challenging behavior are often also described as socially unskilled. Generally, the diagnostic and rehabilitative focus is on the behavior disorder if the difficulty has little to do with reduced knowledge of the relevant social rules, roles, and routines and more to do with difficulty regulating behavior with that knowledge, possibly combined with oppositionality. Outcome literature, including studies supporting pathophysiological associations with specific deficits in social behavior, was cited earlier.

The relationships among social skills, peer acceptance (enabling the individual to have adequate opportunities for satisfying interaction), and friendship (i.e., symmetrical, emotionally committed relationships) are reciprocal. Individuals who behave awkwardly in social situations are likely to be rejected by peers and, in turn, often exhibit depression, loneliness, negative self-concept, anxiety, low academic achievement, and higher dropout rates, further reducing social interactive competence.<sup>40</sup> Children and adults with TBI predictably attempt to reconnect with their preinjury friends and peers. However, physical, cognitive, and personality changes often result in a gradual loss of friends and increasing isolation.<sup>41,42</sup> Reduced social opportunities may then further jeopardize social interactive success, leading to a downward social spiral.

Loneliness is often reported to be the dominant concern of individuals with TBI.<sup>43</sup>

### **INTERVENTION FOR IMPAIRED SOCIAL-INTERACTIVE COMPETENCE**

The tradition of social skills intervention, based on work with children and adults with developmental disabilities or psychiatric diagnoses, is based on the assumption that their social interaction problems are largely due to inadequately developed *knowledge* of relevant social rules, roles, and routines. Many training programs have been developed and organized around training groups within which the participants practice social behaviors considered relevant to their social success. Such training programs differ with respect to the degree to which they emphasize discrete trial training or social problem solving. However, the common thread is repeated practice in a socially decontextualized training setting.

The success of traditional social skills training (SST) groups (including pragmatics groups typically led by speech-language pathologists) assumes that the individuals (1) lack knowledge of relevant social rules, roles, and routines; (2) are motivated to change their social behavior; (3) possess the capacity to transfer skills acquired in a training setting to varied real-world application settings; and (4) are reasonably self-regulated. Unfortunately, the profile of many individuals with TBI is opposite to that suggested by these assumptions. With relatively damaged anterior brain structures and relatively preserved posterior structures, individuals with a common profile after TBI typically possess relevant declarative social knowledge<sup>44</sup> but are poorly regulated, have difficulty transferring social knowledge to daily living, or may lack the motivation to change, particularly if the injury has reduced their awareness of their interactive social competence and the effects of their behavior on others.

To be sure, individuals who lack declarative and procedural knowledge of relevant social skills or competencies need explicit instruction. However, even applied to those with congenital disability who presumably need such

instruction, the traditional model of SST has not been supported by evidence reviews. Gresham, Sugai, and Horner<sup>45</sup> reviewed narrative reviews and meta-analyses of the extensive social skills intervention research literature and concluded that “SST (social skills training) has not produced large, socially important, long-term, or generalized changes in the social competence of students with high-incidence disabilities” (p. 331). Specifically, they described two meta-analyses. The first included 99 studies of SST applied to students with emotional and behavioral disturbance, with a small mean effect size of 0.20. The second included 53 studies of SST applied to students with learning disabilities, with a similarly small mean effect size of 0.21. Barkley’s review of the literature on decontextualized SST similarly concluded that this approach has minimal demonstrated effectiveness with students who are impulsive as a result of attention deficit hyperactivity disorder.<sup>46</sup> In general, meta-analyses and narrative reviews of experiments with several populations using decontextualized social skills (or “pragmatics”) training suggest minimal effects on real-world behavior, peer social skills ratings, and maintenance of new social behaviors over extended periods of time.

### **SUMMARY OF THE EVIDENCE FOR INTERVENTIONS FOR DISORDERS OF SOCIAL INTERACTIVE COMPETENCE AFTER TRAUMATIC BRAIN INJURY**

Struchen’s recent review yielded 19 peer-reviewed studies that evaluated the effectiveness of social communication interventions for individuals with acquired brain injury.<sup>47</sup> Thirteen of these were case studies or case series, including single-subject experiments (a total of 19 participants with TBI); the remaining six were group studies (56 participants with acquired brain injury, mostly TBI). Commonly used intervention procedures included modeling, role-playing, feedback, self-monitoring, behavioral rehearsal, and social reinforcement.

Only 1 of the 19 studies was classified as providing class I evidence (i.e., from a randomized, controlled, clinical trial). In that study, Helffenstein and Wechsler<sup>48</sup> demonstrated the

effectiveness of 20 hours of interpersonal process recall (IPR) compared with 20 hours of nontherapeutic attention. IPR includes individualized videotaped interactions; structured review of the taped interactions with feedback provided by the conversation partner, a therapist, and the individual with TBI; development of alternative skills as needed; modeling; and guided rehearsal. Participants receiving the IPR treatment reported significantly reduced anxiety and improved self-concept. Furthermore, they were rated as having significantly greater improvement in specific interpersonal skills by both professional staff and independent observers, both of whom were unaware of group placement. Maintenance of improved interaction was confirmed at a 1-month follow-up. The obvious strengths of this study are tempered by the small sample size (eight participants per group) and study setting (inpatient rehabilitation).

Struchen cited the evidence review by Cicerone and colleagues<sup>49</sup> in which those authors conclude from the same body of evidence that social interaction intervention for individuals with TBI should be considered a practice standard. However, the many serious methodological weaknesses in the available studies, described in detail by Struchen, should caution against drawing such strong conclusions. Intervention in this domain can be considered evidence based; however, the state of the evidence is far from offering clinicians guidance in connecting specific intervention approaches or intensities with specific profiles of need or in supporting confident predictions of functional outcome following the intervention. It is worth noting that the only available class I study employed an intervention that is highly individualized, employs extensive video feedback, and is labor intensive. These features are often absent in standard social skills or pragmatics training groups.

### **AN EMERGING THEME: FOCUSING INTERVENTION EFFORTS ON COMMUNICATION PARTNERS**

Traditional SST assumes that the problem and its solution are located “in” the person with disability. In contrast, recently developed

intervention programs are sensitive to the impact of the understanding and competencies of communication partners on the success of social interaction. These developments are consistent with the current World Health Organization<sup>50</sup> emphasis on *context* (environmental and attitudinal) as a determinant in health and disability outcomes. Furthermore, specialists in communication and its disorders have long recognized the dynamic interactive effects of partner competencies in explaining communication effectiveness. Training of communication partners has been shown to have a positive effect on communication effectiveness and (re)acquisition of communication skills in toddlers and preschoolers with language disorders and developmental disabilities,<sup>51</sup> adults with aphasia,<sup>52</sup> adults with dementia,<sup>53</sup> and adults with TBI.<sup>54</sup>

### CLINICAL THEMES EMERGING FROM THE AVAILABLE EVIDENCE AND CLINICAL PRACTICE

The limited research evidence in the field of social skills intervention in TBI rehabilitation, combined with a wealth of evidence from related disability fields and the authors' experience with many children and adults with social interaction difficulties after brain injury, suggests that the following components of intervention and support may be particularly important:

- The facilitation of knowledge, understanding, and communication competence in everyday communication partners so that they can interact supportively and do not misinterpret or react punitively to awkward behaviors that result from the individual's impulsiveness, failure to initiate, misreading of social cues, anxiety, and the like.
- The selection of highly specific and personally important social interactive competencies for context-sensitive training.
- Extensive practice of social behaviors in the situations in which they are required, with satisfying natural and logical consequences for successful performance. This practice may be supplemented by video self-modeling for additional learning trials.
- Situational coaching that includes advance cues prior to potentially problematic interactions.
- Situational training that is specifically designed to improve social perception and the ability to interpret the behavior of others.
- Situational training that is specifically designed to improve self-monitoring of stress levels, so that individuals can remove themselves from stressful situations as needed.
- The application of a person-centered goal formulation framework, so that the individuals understand that the goal is their social success, not "social appropriateness" understood abstractly as an authority figure's goal.
- Counseling specifically designed to help the individual develop a personally compelling sense of self that includes positive social interaction strategies as a component.<sup>55</sup>

Applied to TBI, research on the effectiveness of social skills intervention is in its infancy. Considerable work needs to be done to identify the specific profiles of ability and impairment that lend themselves to specific intervention approaches. However, these investigations should be informed by the impressive bodies of evidence available in related disability fields. That evidence, combined with common characteristics of brain injury, such as difficulty transferring learned behaviors to untrained contexts, should caution against reliance on currently popular intervention options, such as social skills or pragmatics training groups. Rather, the available evidence seems to support approaches that are sensitive to the specific realities of the individual's communication context, integrate communication with cognitive and executive function interventions, and include situational coaching and training of communication partners.

### SUMMARY

Community reintegration after severe TBI is strongly influenced by social competence and behavioral self-regulation. These related domains of functioning are commonly impaired by TBI and constitute a primary rehabilitative focus for specialists in communication disorders. In both domains there is an evidence

base that supports intervention. However, guidelines linking specific profiles of ability, need, and available supports with specific intervention and support strategies await future investigations.

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