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Clinical Applications of Problem-Solving Research in Neuropsychological Rehabilitation: Addressing the Subjective Experience of Cognitive Deficits in Outpatients With Acquired Brain Injury

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Objective: The goal of this paper is to illustrate how the lessons learned in over 20 years of randomized clinical trials have advanced cognitive rehabilitation beyond traditional approaches to problem solving by more explicitly integrating subjective self-appraisal factors in routine clinical practice. ***Results:*** The concept of *problem orientation*, as proposed by cognitive–behavioral psychologists, provides a much-needed framework for conceptualizing interventions to address the impact of subjective experience on cognitive functioning, within the context of cognitive remediation. By explicitly focusing on the beliefs, assumptions, and expectations that individuals with acquired brain injury have about their own cognitive functioning, the concept of problem orientation allows rehabilitation psychologists to add an element to interventions, not systematically addressed in standard approaches to cognitive remediation. Targeting objective deficits in cognitive remediation is necessary, but not sufficient: For optimal benefit, remedial interventions must address objective cognitive deficits and the patient's subjective experience of such deficits in tandem. ***Conclusion:*** Contemporary evidence-based treatment recommendations now typically include incorporating interventions to address motivational, attitudinal, and affective factors in cognitive remediation. Further research is needed to directly compare the effectiveness of cognitive rehabilitative interventions that systematically address subjective factors with those that do not.

Keywords: brain injury, cognitive remediation, metacognition, problem solving, self-appraisal

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A major target of neuropsychological rehabilitation is the remediation of functional problem-solving deficits (Cicerone et al., 2000), a significant obstacle to the community integration of individuals with acquired brain injury (ABI; Ben–Yishay & Prigatano, 1990). Conceptualized as the most complex of all intellectual functions (Goldstein & Levin, 1987), *problem solving* is a higher-order cognitive activity that arises in situations for which no response is immediately apparent or available (Luria & Tsvetkova, 1990; Sohlberg & Mateer, 2001). Requiring the modulation and control of more routine or fundamental cognitive abilities (McCarthy & Warrington, 1990), intact problem-solving skills are necessary to resolve the types of daily interpersonal conflicts (e.g., you want to see a movie, but your significant other wants you to help mow the lawn), everyday intrapersonal problems (e.g., you get a flat tire on the way to the airport and miss your flight), and decision points (e.g., figuring out what to wear for an important job interview) inherent in maintaining a home, functioning in the community, or returning to work.

Neuropsychologists since Luria (1963), although typically acknowledging the importance of attitudinal and motivational factors in problem solving, traditionally have focused on the cognitive skills or steps involved in critical thinking and reasoning (e.g., realization and statement of an objective, analysis of the situation, actual behavior, and feedback and self-correction (Goldstein & Levin, 1987; see also Ben–Yishay & Diller, 1983; Lezak, 1995). Traditional approaches to conceptualizing problem-solving deficits therefore stand in contrast to a growing consensus that, in order to be maximally effective, neuropsychological rehabilitation must address both objective cognitive deficits and subjective attitudinal,

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motivational, and emotional factors (e.g., self-efficacy, confidence, self-esteem) in tandem (e.g., Ben–Yishay & Diller, 2011; Cicerone et al., 2005, 2011; Cicerone & Azulay, 2007; Gordon, Cantor, Ashman, & Brown, 2006; Mateer, Sira, & O'Connell, 2005; Montgomery, 1995; Prigatano, 2003; Schutz & Trainor, 2007; Wilson, 2005).

Consistent with Bandura's (1989) proposition that self-efficacy influences not only initiation of behavior, but also persistence in problematic situations, empirical research supports the notion that the beliefs, assumptions, and expectations that individuals with brain injury have about their own cognitive functioning are crucial targets for cognitive remediation. Relevant findings include:

- Perception of performance (self-ratings of cognitive functioning) was better than actual performance (neuropsychological test scores) at predicting eventual job placement (Montgomery, Kern, Lund, & Patterson, 1999).
- Confidence in cognitive abilities, but not objective test performance, was directly related to level of community integration (Rath, Hennessy, & Diller, 2003).
- Satisfaction with cognitive functioning was more important than neuropsychological test scores in predicting functional outcome after cognitive rehabilitation (Cicerone, Mott, Azulay, & Friel, 2004).

The above studies concluded that a focus on objective cognitive deficits alone is insufficient in neuropsychological rehabilitation: For optimal outcome, subjective factors such as self-esteem, self-efficacy, and confidence in the ability to manage cognitive deficits and symptoms also must be addressed. Such conclusions highlight "the importance of exploring and addressing self-appraisals in traumatic brain injury (TBI) rehabilitation research and treatment more systematically" (Tsaousides et al., 2009; pp 303–304). Diller (2005) further suggested that, by incorporating the subjective experience of people with brain injuries into the frame of reference for conceptualizing, delivering, and evaluating rehabilitative interventions, rehabilitation psychologists "raise the bar for rehabilitation" (p. 1075). Nonetheless, it has been noted that there is a dearth of treatment approaches explicitly specifying interventions for addressing the impact of subjective factors on cognitive functioning, within the context of neuropsychological rehabilitation (cf. Mateer et al., 2005; Prigatano, 2003; Wilson, 1997).

In the current paper, we discuss how the lessons learned in over 20 years of randomized clinical trials (RCTs) have advanced cognitive rehabilitation beyond traditional approaches to problem solving by more explicitly integrating subjective factors in routine clinical practice (cf. Rath & Elliott, in press). Two related areas relevant to the subjective experience of individuals with ABI are addressed: (a) self-appraisal of problem-solving deficits and (b) interventions to address maladaptive beliefs, assumptions, and expectations regarding such deficits. To provide necessary background, findings from two key RCTs targeting problem-solving deficits are reviewed.

Key RCTs Targeting Problem-Solving Deficits

In a systematic review and meta-analysis of the literature on interventions for executive dysfunction, Kennedy et al. (2008) identified two Class I RCTs specifically targeting problem-solving deficits, conducted by von Cramon and colleagues (von Cramon, Matthes–von Cramon, & Mai, 1991) and Diller and colleagues (Rath, Simon, Langenbahn, Sherr, & Diller, 2003). Both RCTs incorporated a framework, proposed by cognitive–behavioral psychologists (D'Zurilla & Goldfried, 1971; D'Zurilla & Nezu, 2001), in which everyday functional problem solving is conceptualized as comprising two interacting components: problem-solving skills and problem orientation. *Problem-solving skills* are the goal-directed cognitive steps that, if successfully implemented, enable a person to resolve a particular problem successfully. In contrast, *problem orientation* encompasses an individual's immediate attitudinal—affective reactions when first confronted with a problem. These orienting responses to the onset of problems comprise a set of relatively stable beliefs, assumptions, and expectations concerning daily problems and one's ability to solve them (D'Zurilla & Nezu, 2001).

Problem orientation can be either positive (i.e., enhancing or facilitating cognitive activity) or negative (i.e., inhibiting or impeding cognitive activity). This model posits that negative problem orientation may lead to affective reactions (e.g., feeling overwhelmed) and maladaptive thoughts (e.g., "Oh no, I'll never be able to do this") that can distract focus and attention from the task at hand. These internal distractions, in turn, may impede or inhibit implementation of objective cognitive skills, leading to impulsive responses or avoidance in everyday functional activities. With direct relevance for cognitive rehabilitation, the concept of problem orientation extends the domain of problem solving beyond objective skills to incorporate motivational, attitudinal, and affective factors. These subjective factors have the capacity to disrupt goal-directed focus and intent, and thereby interfere with effective implementation and control of more basic cognitive abilities.

Empirical research has shown that even in uninjured persons with intact cognitive skills, a negative problem orientation can disrupt the ability to perform complex problem-solving tasks (Shewchuk, Johnson, & Elliott, 2000). Although a negative orientation toward problematic situations can disrupt cognitive performance in anyone, the cognitive abilities of individuals with brain injury are especially vulnerable to such disruption: Individuals with ABI often are subject to higher-than-baseline levels of emotionality (sadness over physical and cognitive losses, anger over injury, anxiety over future, etc.), whereas their capacity for attentional and emotional control typically is reduced due to damaged brain structures and connections (cf. Tate, 1999). This heightened level of affective arousal, coupled with decreased self-regulatory resources, is a perfect set up for emotional flooding and impulsive reactions when presented with challenging everyday problems and decisions. Conversely, if avoidance mechanisms develop to forestall anxiety, frustration, and flooding, this may lead to premature withdrawal from demanding, but potentially beneficial, functional activities (Rath et al., 2004; Simon, 2001).

Von Cramon et al. (1991), the first to apply D'Zurilla and Goldfried's (1971) framework to cognitive rehabilitation, focused on the problem-solving skills component of the model: (a) problem definition and formulation (identifying the conditions and constraints of problematic situations and setting realistic goals); (b) generation of alternatives (brainstorming a range of possible solutions); (c) decision making (examining potential consequences of options and selecting an optimal one, given the conditions and constraints of the problem); and (d) solution implementation and verification (enacting a solution, monitoring its effectiveness, and making modifications as necessary). These skill-based steps, very

similar to those traditionally specified by neuropsychologists (e.g., Goldstein & Levin, 1987), were used to teach individuals with ABI a systematic template for addressing problems in a step-by-step manner. Attention to problem orientation was cursory, with problem perception (i.e., recognizing that you are at a decision-making point or have a problem with no obvious solution) being the only target explicitly addressed.

A key, but often overlooked, finding was that, despite overall improvements, some patients' performance on problem-solving tasks declined following treatment, with patients reporting feeling overwhelmed by "all these things to consider" (von Cramon et al., 1991, p. 61). As von Cramon et al. (1991) explained, ". . . increased awareness of the complexity of a problem-solving task may have impaired their performance . . ." (p. 61). This finding has profound implications for cognitive-remediation interventions that neglect to address potentially disruptive emotional, attitudinal, and motivational factors. Unless patients are taught strategies for self-monitoring and managing overreactions to problems, they are apt to become overwhelmed and flooded when confronted with challenging situations and may fail to implement the cognitive skills and compensatory strategies that they have learned.

In contrast to von Cramon et al. (1991), Diller and colleagues (Rath, Simon et al., 2003) utilized a two-component cognitive rehabilitation approach (Sherr, Langenbahn, Simon, Rath, & Diller, 2001a, 2001b; see online supplemental materials at the link at the beginning of this article): In addition to remediating objective problem-solving deficits, Diller incorporated emotional self-regulation strategies that systematically addressed patients' maladaptive beliefs, assumptions, and expectations about their own cognitive deficits. This treatment model was based on the premise that emotional self-regulation is a prerequisite for a positive problem orientation: Without good emotional self-regulation skills, individuals with brain injury cannot maintain a positive problem orientation. And as von Cramon et al. observed, without a positive orientation toward problems, the capacity to implement the necessary cognitive problem-solving skills may be disrupted.

Diller's emotional self-regulation interventions (Sherr et al., 2001a) in effect emphasized the problem-orientation component of problem solving that was only touched upon by von Cramon. These interventions incorporated (a) identifying and counteracting impediments to sustained, goal-directed focus and attention on target tasks (e.g., emotional overreactions, cognitive distortions, misattributions); (b) facilitating the individual's motivation to apply problem-solving skills to problematic situations; and (c) teaching the person to feel self-efficacious in so doing. After treatment, participants improved on a variety of problem-solving measures, including an executive-function test, performance on roleplayed interpersonal problem-solving scenarios, and self-appraisals, with a problem-solving self-appraisal measure showing the most robust gains (Rath, Simon, et al., 2003). The significance of self-appraised problem-solving deficits for neuropsychological rehabilitation is discussed in the following section.

Self-Appraisal of Problem-Solving Deficits

In Diller's RCT (Rath, Simon, et al., 2003), self-appraisal of problem-solving deficits was accomplished using the Problem Solving Inventory (PSI; Heppner, 1988), a 32-item scale with a ninth-grade reading level, in which respondents are asked to agree or disagree with statements describing their own problem-solving skills and attitudes. In over a decade of clinical research (Rath, 2009; Rath et al., 1999, 2004; Rath, Hennessy, et al., 2003; Rath, Simon, et al., 2003; Rath, Simon, Langenbahn, Sherr, & Diller, 2000), the PSI successfully has been used to elicit meaningful self-appraisals from individuals with ABI. More recently, a parallel form with a fourth-grade reading level (Heppner, Manley, Perez, & Dixon, 1994) has proven useful, especially in individuals with more severe cognitive deficits (Kim, 2011; Rath, 2009). Although the PSI also elicits self-evaluations of specific problem-solving skills, it primarily focuses on global beliefs, assumptions, and expectations about everyday problems and one's own ability to solve them. For example:

- "When I can't solve a problem right away, I question if I can solve it at all."
- "If I spend enough time and effort, I can solve most of my problems" (Heppner et al., 1994).

From an intervention standpoint, the virtue of problem-solving self-appraisal is that it elicits the individual's acknowledgment of relevant difficulties within a model that provides a framework for guiding remedial efforts. The success of the PSI in eliciting clinically meaningful acknowledgment of functional deficits is notable, especially given expected issues of unawareness in those with more significant cognitive limitations. For example, outpatients with relatively mild cognitive impairments reported having significant problem-solving deficits, with 75% rating themselves below the mean of matched controls (Rath et al., 1999, 2004); whereas, in outpatients with moderate-to-severe cognitive deficits, 91% rated themselves significantly below the mean of controls (Rath, 2009). These self-appraised problem-solving deficits were corroborated by significant agreement with clinicians' and family members' global ratings of emotional self-regulation and functional problem solving (Rath, 2009). Furthermore, in community-dwelling outpatients, problem-solving self-ratings accounted for a significant proportion of the variance in community-integration level, over and above that accounted for by objective problem-solving measures (Rath, Hennessy, et al., 2003). Such findings regarding the ability of individuals with ABI to self-appraise their cognitive deficits in a valid, clinically meaningful way are consistent with work by Fasotti and colleagues (Boelen, Spikman, Rietveld, & Fasotti, 2009), who similarly found accurate self-ratings of executive dysfunction in chronic ABI patients referred for outpatient rehabilitation.

Self-appraisals of problem-solving deficits have the potential to facilitate delivery of targeted interventions for specific subgroups of outpatients with ABI: Recent evidence suggests that individuals with less severe functional impairments primarily endorse limitations related to problem orientation (e.g., confidence and self-efficacy), whereas those with more significant functional impairments tend to endorse greater limitations in cognitive problem-solving skills per se (Kim, 2011). Specifically, all subgroups that were assessed (i.e., relatively high functioning, low functioning, and chronically low functioning individuals with ABI) self-appraised significant problem-solving deficits in general. However, when PSI subscales identified by Elliott, Sherwin, Harkins, and Marmarosh (1995) were examined, the following results were obtained: Chronically low functioning day treatment program outpatients self-appraised greater difficulties related to problem-solving skills (i.e., problem orientation was less of an immediate

issue), endorsing items such as: "When I have a problem, I don't try to get information to help me understand the problem." In contrast, relatively high functioning outpatients self-appraised greater deficits related to problem orientation (i.e., problem-solving skills were relatively intact), endorsing items such as: "Sometimes I get so upset, I can't think of ways to solve my problems" (Kim, 2011).

Self-appraised problem-solving deficits also have utility for identifying outpatients likely to drop out of neuropsychological rehabilitation. In unpublished data from the RCT described above (Rath, Simon, et al., 2003), there was a statistically significant difference between self-appraisal scores of those who completed treatment and those who dropped out. Those participants who self-appraised better problem-solving ability at pretest were more likely to discontinue treatment prematurely. This finding is consistent with work by Herrick and Elliott (2001) who found that, among individuals who completed an inpatient substance-abuse treatment program, those who self-appraised better problem-solving abilities were less likely to follow-up on recommendations for outpatient treatment. Individuals who self-appraise fewer deficits are less likely to follow through on treatment.

Self-appraised problem-solving deficits have significant correlations with neuropsychological measures loading on processing speed (Rath et al., 2004), suggesting that patients' maladaptive beliefs, assumptions, and expectations regarding their own slowed processing may have played a role in self-appraisal. This interpretation is consistent with the work of Fasotti and colleagues (Winkens, Van Heugten, Wade, & Fasotti, 2009), who described the subjective experience of slowed information processing as "an internal feeling of slowness . . . that one can no longer keep up with cognitive demands being made by external events . . ." (pp. 79–80) which can lead to frustration and agitation when attempting to resolve challenging problems.

The concept of problem orientation provides a much-needed framework for conceptualizing and delivering interventions to address patients' maladaptive assumptions, beliefs, and expectations (ABE) regarding their own cognitive deficits, within the context of routine cognitive-remediation services. The components of problem orientation are presented below, followed by key clinical interventions and case examples.

Interventions for Addressing Maladaptive ABE

Problem-Orientation Components

As defined by D'Zurilla and Nezu (2001), and discussed by Rath et al. (2004) in the context of ABI, problem orientation includes the following components relevant to cognitive remediation:

Problem attribution. A positive orientation toward everyday problems includes the belief that problems are normal, ordinary, and inevitable events in daily life. Individuals with ABI may tend to overattribute difficulties with everyday functional tasks as due exclusively to brain injury or think about functional difficulties as a "personal deficiency" that is perceived as a source of self-blame and guilt.

• **Maladaptive ABE example.** "I had trouble setting up my iPod because of my brain injury; it made it clear to me how stupid I am now.

• **Adaptive ABE example.** "I was never any good with electronics and the convoluted way that the instruction manual is written doesn't help matters."

Problem appraisal. A positive problem orientation includes the belief that problems can provide opportunities or potential benefits. In contrast, those with a negative problem orientation tend to see problems as a threat to their well-being, which either should be attacked immediately, without any plan, or avoided all together.

• **Maladaptive ABE example.** "If I try taking a computer class, I won't be able to do it, and everyone will see what a failure I've become."

• **Adaptive ABE example.** "If I start with a basic, introductory class, and look around for a tutor now, I'll be ready in case I have any difficulties."

Perceived control. Individuals with a positive problem orientation believe that problems are solvable and that they are capable of solving them effectively. Those with a negative problem orientation see problems as fixed or unchangeable, or something they are unable to resolve successfully.

• **Maladaptive ABE example.** "I never do anything right because of how screwed up I am now; I can't do anything about it, so I won't even try."

• **Adaptive ABE example.** "My memory problems make planning much more difficult than it used to be, but if I keep a list of the steps I need to take and cross them off one by one, I can keep track of the important details."

Time–effort commitment. Directly related to the subjective experience of slowed processing and Time Pressure Management strategies described by Fasotti, Kovacs, Eling, and Brouwer (2000), this aspect of problem orientation involves the willingness to devote the necessary time and effort to activities and/or compensatory strategies. A negative problem orientation includes the belief that competent people should be able to address problems quickly and without much effort.

• **Maladaptive ABE example.** "If I can't cook meals for my family as quickly as I used to, I can't do it at all."

• **Adaptive ABE example.** "I'll have to take my time and break the recipe down into steps, but I can still put a good meal on the table."

Key Intervention Methods

The goal of explicitly addressing maladaptive ABE in cognitive remediation is to enhance monitoring, modulation, and control of emotions, thoughts, and behavior, thereby interrupting the downward spiral of negative emotions and refocusing goal-directed attention on the task at hand. To this end, patients are taught to (a) monitor negative internal dialog, (b) challenge and dismantle irrational aspects of self-talk, (c) identify alternative ways of thinking, and (d) dispute maladaptive ABE and replace them with more adaptive perspectives (cf. Simon, 2001). The following interventions, systematically woven into the fabric of cognitive remediation, are used to help patients develop a more positive orientation toward problems:

Identify and counteract negative self-talk. Patients are provided with a vocabulary of terms such as *positive self-talk* and *negative self-talk* to raise awareness of maladaptive self-statements. This helps them see that negative self-talk is rooted in

beliefs that are not only maladaptive, but inaccurate. Patients are helped to articulate self-statements that are both positive and accurate as replacement self-talk. Using lists in their memory notebooks to make statements concrete, for every negative self-statement that patients identify, they are asked to articulate three statements to dispute and counteract it. Interventions targeting negative self-talk start with the therapist verbally guiding, then progressively encouraging the patient to do this verbal guidance out loud, then finally the patient replaces the negative self-talk as a wholly internal process (Miller, 1993).

Facilitate patient's motivation to use positive self-statements in cognitive exercises. Provide structured and delineated tasks in session. Identify maladaptive attitudes, cognitive distortions (see Uomoto & Fann, 2004), and self-defeating beliefs as they occur in session. Watch for visceral responses to cognitive challenges (e.g., recoiling from the presented task) or negative self-statements muttered aloud. Coach patients to identify when they are engaging in negative and distorted self-talk and to interrupt it themselves. Model adaptive beliefs/self-talk in session.

Teach patients to feel self-efficacious in real-life functional tasks. Self-reinforcement is inherent in successful performance: "I feel good that I prevented/solved/managed/ compensated for this problem." Self-efficacy beliefs and cognitive skills interact, so that beliefs influence skills and vice versa. Success in everyday functional tasks may improve patients' confidence; whereas improved confidence may increase initiation and persistence, in turn increasing the likelihood of success (cf. Bandura, 1989).

Case Example I: Group Cognitive Remediation

Group members were outpatients with ABI due to a variety of etiologies, grouped together according to their moderate-to-severe levels of functional cognitive impairments, rather than severity of injury per se (Bertisch, Rath, Langenbahn, Sherr, & Diller, 2011).

Group exercise/cognitive stimulus. Complex visual task involving use of letter/number coordinates to identify correct boxes to shade on an empty grid, in order to create a picture. Patients tended to overestimate the demands of the exercise and underestimate their ability to solve the problem. Typical reactions to the exercise included feeling overwhelmed by the task's perceived complexity, with assertions such as, "I can't do this."

It was clear that the task was perceived as a cognitive and emotional challenge to the group members. Although addressing the cognitive skills needed to complete the task was necessary, it was not sufficient. Group leaders responded with dual interventions targeting both cognitive skills and the problem-orientation issues that were present.

Cognitive-skills intervention. Task was broken down into a succession of smaller component tasks and these smaller tasks were approached in order of increasing difficulty, using an errorless learning approach (see Litke & Peery, 2007).

Problem-orientation intervention. Working within the problem-orientation framework, group leaders incorporated the interventions methods described above to help patients replace maladaptive ABE with more accurate and adaptive ABE:

Problem attribution. Many patients attributed difficulties with the task solely to their brain injuries. Had she not been injured, one patient reported, "It would have been easy to do the stupid puzzle, but now it's impossible for me!" Group leaders normalized the difficulty, assuring group members that the task was designed to be a difficult, but productive, training exercise. The cognitive challenge was reframed (i.e., reattributed) as "the point" of the task, rather than evidence of a shameful shortcoming. Group leaders helped raise patients' awareness of their maladaptive ABE and offered more adaptive self-statements with which to replace them.

- **Maladaptive ABE.** "I used be able to do things like this so easily, but now I can't do anything right."
- **Adaptive ABE.** "Of course it's difficult; this puzzle was designed to be a challenge. Let me figure out how I should start."

Problem appraisal. Patients became anxious when they saw the task stimulus, deeming it to be threatening and toxic. In their appraisals, they had imbued the task with the power to hurt their self-esteem. Group leaders helped group members reframe the task as an opportunity to learn something new and strengthen their cognitive skills.

- **Maladaptive ABE.** "This puzzle is yet another example of one more thing I can't do. I look at this sheet, and all I want to do is run away."
- **Adaptive ABE.** "This exercise might be harder for me now, but I already have learned lots of strategies that might help. I might learn some new strategies, too."

Perceived control. When patients' negative emotions became activated, they lost sight of the fact that they had all made considerable progress in using strategies to address these kinds of tasks. In fact, they were well armed with cognitive strategies provided in previous sessions, directly applicable to the task at hand. The belief that the task was unsolvable was a distortion, corrected through more accurate and adaptive self-talk to provide a greater sense of mastery.

- **Maladaptive ABE.** "I always mess up stuff like this since my brain injury; I'll never be able to do it."
- **Adaptive ABE.** "It may be difficult, but I succeeded with exercises like this before when I used the right strategies."

Time–effort commitment. Patients reacted impulsively to the task. When a solution was not immediately apparent, their subjective evaluation was that they could not complete it successfully. Group leaders corrected this distortion by reinforcing the belief that an investment of time and effort would lead to improved performance. Acknowledging that impulsivity makes such an investment more difficult, group leaders provided cognitive strategies to help manage the impulsivity, while concurrently providing self-talk statements to revise expectations of how quickly a problem could be expected to be solved.

- **Maladaptive ABE.** "Figuring out this puzzle is too much work, and I'm still stuck at the beginning. I can't do it."
- **Adaptive ABE.** "This exercise might not be easy for me, but if I slow down, follow the directions, and keep breathing, I have a good shot at nailing this—even if it takes me a bit longer than I'd like."

Outcome. Clinical impressions suggest that combining cognitive-skills interventions (e.g., errorless learning progression of task complexity) with problem-orientation interventions (e.g., correcting maladaptive ABE) in group cognitive remediation was more effective than interventions targeting cognitive skills alone. Many group members reported generalizing the use of positive

self-statements to everyday functional tasks at home and in the community.

Case Example II: Individual Cognitive Remediation

Patient was a 59-year-old man, 1-year post-stroke. He held a Master of Public Administration degree and numerous high-level chief executive positions prior to the stroke (details changed to disguise patient's identity). Neuropsychological assessment revealed reduced visual/verbal memory and auditory attention, in the context of superior-to-very-superior fund of knowledge, abstract reasoning, and visual attention/construction.

Cognitive remediation focus. Goal was to improve follow through on completion of everyday functional tasks without significant prompting from adult children. Sessions focused on use of internal and external compensatory strategies, but there was minimal carryover to home. Memory strategies demonstrated in session were not used with any consistency between sessions.

Cognitive-skill intervention. Coached in use of calendar/daily planner to aid prospective memory and recall of activities on daily to-do list. Use of various assistive devices and strategies was taught.

Problem-orientation intervention. Incorporating the interventions described above, a problem-orientation framework was used to probe for, reveal, and dispute maladaptive ABE:

Problem attribution. The patient tended to define his self-worth in terms of cognitive abilities that were strengths prior to the stroke; his memory and organizational difficulties were perceived as a personal failure and embarrassment. As the therapist reflected back instances in which he linked his confidence and self-worth to his memory functioning, he became aware of this pattern and its impact on his ability to make functional gains.

• **Maladaptive ABE.** "I should have a strong memory despite my stroke, and if don't, I'm a complete failure as a businessman."

• **Adaptive ABE.** "It's not my fault that my memory is weaker after my stroke; it's okay for me to use as many memory aids and strategies as I need."

Problem appraisal. The patient reported that using a calendar and daily planner would mean that he was no longer the person he knew himself to be. As the awareness of his cognitive losses became less threatening to his well-being, he was better able to tolerate compensatory strategy use.

• **Maladaptive ABE.** "Keeping a notebook and a calendar is just a daily reminder of my disability."

• **Adaptive ABE.** "Even before my stroke, I used things like to-do lists and a daily planner, but just never thought of them as strategies. If I can get used to using them again, it will give me a chance to be more independent."

Perceived control. As the patient continued to be confronted by the impact of his memory problems, he began expressing a global feeling that he was having problems in all cognitive areas and that he could not effectively handle his daily activities.

• **Maladaptive ABE.** "If I can't remember what I need to do in the first place, I'll never be able to remember to use strategies effectively. So, why bother?"

• **Adaptive ABE.** "It's not easy, but if I stick to it, I'll eventually make a habit out of using a calendar and planner."

Time–effort commitment. Despite goals of increased independence and a return to volunteer work, the patient expressed doubts that consistent strategy use was worth the effort. The therapist highlighted the disconnect between stated goals and the level of effort he expected to put forth.

• **Maladaptive ABE.** "A good memory should come naturally to me; I shouldn't have to struggle with writing down every appointment and keeping everything so organized."

• **Adaptive ABE.** "It's a pain in the neck and an added burden, but if I use my calendar and planner consistently, I can better accomplish more of the things that I want to do."

Outcome. With repetition, structure, and cueing, patient was able to recognize that maladaptive ABE led to a downward spiral of negative emotions, which interfered with implementing strategies outside of session. After learning to replace these beliefs with more adaptive self-statements, he began using the strategies that he had been taught in session to plan and follow through on tasks at home and in the community. He reported better social functioning, confidence, and satisfaction with life, and eventually resumed volunteer positions on various boards of which he was a member.

Conclusion

There is a growing consensus that a focus on objective cognitive deficits alone is insufficient in neuropsychological rehabilitation: For optimal outcome, it also is crucial to assess and address subjective factors such as patients' self-appraisals regarding their ability to manage their cognitive deficits and symptoms. The goal of explicitly addressing such factors in routine clinical practice is to reduce emotional–motivational impediments to successful implementation of cognitive skills and compensatory strategies. Considered within the larger health care context, incorporating self-appraisals into clinical assessment and intervention is consistent with the goals of the National Institutes of Health Patient Reported Outcomes Measurement Information System (PROMIS; Cella et al., 2007), which emphasized that the best way that patients can judge the effectiveness of treatments often is by perceived changes in symptoms.

The concept of problem orientation provides a much-needed, theoretically grounded framework for conceptualizing, structuring, and delivering interventions to address the impact of subjective self-appraisal factors on cognitive functioning, within the context of cognitive remediation. By explicitly focusing on the beliefs, assumptions, and expectations that individuals with ABI have about their own cognitive functioning, the concept of problem orientation allows rehabilitation psychologists to add a crucial element to interventions not systematically addressed in standard approaches to cognitive remediation. Integrating both emotional (i.e., problem orientation) and cognitive (i.e., problem-solving skills) aspects of real-life functional problem-solving, cognitive rehabilitative interventions based on the two-component model have clear relevance for addressing the emotional and cognitive sequelae of conditions such as combat-related mild TBI (Helmick et al., 2010). However, it is important to note that further research is needed to directly compare the effectiveness of remedial interventions that address subjective problem-orientation factors with those that do not.

Rehabilitative interventions incorporating problem-orientation factors have parallels with the work of Fasotti et al. (2000), who in a Class I RCT (see Kennedy et al., 2008), taught patients time-pressure management (TPM) strategies to help manage the sub-

jective experience of slowed processing following ABI. The intervention was not directed at reducing mental slowness per se, but at compensating for it by teaching patients strategies for giving themselves enough time to deal with the task at hand. An integrated approach, combining TPM strategies with a cognitive-skills intervention designed to improve processing speed, might yield additional interesting results.

Gordon et al. (2006) described a comprehensive problem-solving treatment program that directly trained basic attentional skills, in addition to emotional self-regulation and problem-solving skills. As expected, improvements were found on objective and self-rating measures of attention following 5 weeks of attention training (Gordon, Ashman, Tsaousides, Cantor, & Dams-O'Connor, 2010). In this regard, preliminary outcome data from an ongoing RCT by Diller and colleagues (see Langenbahn et al., 2008; Sherr et al., 2008) are intriguing: Outpatients with moderate-to-severe cognitive impairments, who participated in emotional self-regulation and problem-solving interventions, made statistically significant gains on an objective measure of complex attention, despite no specific training in attentional skills (Rath, 2009). It appears that after emotional self-regulation training addressing problem-orientation factors, patients were less distracted by maladaptive internal reactions to the subjective experience of their own cognitive deficits and therefore better able to maintain focus and attention on target tasks.

Embedded within the broader context of theory and research emphasizing the role of metacognition and self-regulation in adjustment following ABI (e.g., Hart & Evans, 2006; Kennedy & Coelho, 2005; Ownsworth & Fleming, 2005; see also Schwarzer, Lippke, & Luszczynska, 2011), two decades of problem-solving research suggest that systematically addressing ABI patients' maladaptive beliefs, expectations, and assumptions about their cognitive abilities improves their approach to, and persistence in, everyday functional tasks. Informed by such research, contemporary evidence-based treatment recommendations now typically include incorporating interventions to address motivational, attitudinal, and affective factors in the delivery of cognitive-rehabilitation services (Cicerone et al., 2005, 2011; Kennedy et al., 2008; see also Cicerone, Levin, Malec, Stuss, & Whyte, 2006). Targeting objective deficits in cognitive remediation is necessary, but not sufficient: For maximal benefits, rehabilitative interventions must address objective cognitive deficits and the patient's subjective experience of such deficits in tandem.

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