Cognitive Rehabilitation in Clinical Neuropsychology

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Within the broad discipline of psychology, clinical psychology has established a tradition of providing services in the assessment and treatment of behavioral disorders. More recently, clinical neuropsychology emerged in response to a need to describe neurocognitive impairment associated with brain damage and relate deficits to specific forms of brain dysfunction. As the field developed, interest in rehabilitation increased and programs aimed at directly improving basic cognitive function began to appear.

The most frequent complaints of patients with brain damage are memory...
loss and attentional problems, and so initial efforts by rehabilitation-oriented neuropsychologists were concerned mainly with training in these areas. Unfortunately, functional gains were too often task-specific and failed to generalize to situations encountered in normal life. However, a growing appreciation of the challenges, combined with increased knowledge of the injured brain’s capacity for recovery, led to more sophisticated programs (e.g., Prigiano, 1984; Ben-Yishay, 1987) and a readiness to incorporate new technologies (Glisky, 1995; Wilson, 1987).

While the new programs were encouraging, difficulties arose with respect to assessing their long-term benefits. Outcome studies were often hampered by one or more flaws, such as, lack of appropriate control groups, inadequate assessment measures, poor sampling techniques, and inappropriate statistical analyses (see Robertson, 1993). As well, there was widespread failure to consider potentially confounding variables such as preinjury history and status, time since injury, other treatments, and the psychosocial environment. Even the best studies seemed to have worrisome deficiencies (see Chestnut, 1998).

Apart from methodological weaknesses, rehabilitation programs often suffered from conceptual limitations that resulted in a mismatch between provided services and patients’ needs. To a degree, these limitations may be addressed by forging closer links between basic cognitive research and program development. As a central theme, we are advocating such an alliance. It is our view that an evidence-based approach that includes empirically supported theoretical formulations will better equip clinicians to devise programs that are suited for the target populations.

To illustrate the potential benefits of this approach, the following are a few examples of recent scientific advances from our group that, potentially, have important implications for cognitive rehabilitation:

1. **Sustained attention.** Failures of sustained attention and susceptibility to distraction are cardinal symptoms of frontal-lobe damage in patients with traumatic brain injury (TBI). There are numerous tests of attention but, as Robertson et al. (1997) pointed out, few have been shown to correlate with the patients’ attentional problems in everyday life. These deficits are most apparent when voluntary or strategic efforts are required, but most current tests assess automatic processing. Consequently, Robertson et al. (1997) developed the Sustained Attention Response Test (SART), a continuous performance test in which subjects must respond actively to frequently presented stimuli, but withhold responses to occasional targets. As predicted, TBI patients made more errors than a matched control group but, significantly, performance by both groups correlated with self- and informant-reported attentional failures in daily life. Also important was the finding that, within the TBI group, performance on the SART correlated significantly with severity of injury, as measured by the Glasgow Coma Scale, and duration of posttraumatic amnesia. Thus, the SART is a scientifically validated, easy-to-adminis-
ter test that offers a sensitive measure of treatment outcome and a reliable predictor of attentional failures in everyday life.

2. Goal management training (GMT). Maintaining intentions in goal-directed behavior (goal management) depends upon intact executive functions involving the frontal lobes (Duncan, 1986). While, for most people, goal management failures are infrequent and inconsequential, in brain-damaged individuals they are a regular occurrence that can result in severely disorganized behavior (Crepeau & Scherzer, 1993). To address the negative impact of goal-directed failures on patient’s day-to-day lives, Robertson (1996) developed GMT, a five-stage, interactive, rehabilitation protocol based on Duncan’s theory of goal neglect (1986). During training, individuals are taught, using paper-and-pencil versions of complex real-world activities, to identify specific goals, to organize those goals into sensible, more simplistic subgoals, to keep the subgoals in mind while carrying out the respective tasks, and to stay on task while avoiding distractions. In two studies involving a randomized group trial of TBI patients and a case study of a postencephalic patient, GMT improved performance on both paper-and-pencil and real-life versions of everyday tasks (Levine et al., submitted).

3. The psychosocial environment. We are learning that brain damage and cognitive impairment are not related in a linear fashion, and that health, personal, and lifestyle factors often interact with the effects of declining brain function to influence performance. Despite general awareness that psychosocial factors can affect recovery, few programs combine cognitive rehabilitation with psychosocial support training in a controlled way. The potential benefits of such an approach are indicated by the results of Winocur and Moscovitch’s recent longitudinal investigation of cognitive function in old people (see Dawson, Winocur, & Moscovitch, 1999). In that study, consistent relationships were reported between measures of psychological well-being (e.g., personal control, optimism, activity) and performance on various neuropsychological tests. Moreover, over a two-year period, changes in psychosocial status were accompanied by corresponding changes in cognitive performance, indicating a dynamic interplay between brain function and extraneous influences. This study focussed on the elderly, but brain-damaged patients also exhibit considerable variability in their cognitive abilities (Stuss, Pogue, Buckle, & Bondar, 1994) that is probably related to psychosocial problems. Since many of these problems are amenable to treatment, the inclusion of a formal psychosocial component to complement cognitive training could be a valuable asset to any comprehensive rehabilitation program.

In an attempt to address issues raised above and implement an evidence-based approach to cognitive rehabilitation, a group of scientists at the Rotman Research Institute, with support from the McDonnell Foundation, are currently working on a new protocol for use with TBI or stroke patients, as well as relatively normal older adults. Our approach is multidimensional and holistic in that it addresses the cognitive deficiencies of individuals in relation
to personal and social difficulties that contribute to their overall functional status. Cognitive skills training is offered in lab and real-world contexts to optimize attentional and memory processes, along with a special component directed at issues in the psychosocial domain. The program, which draws heavily on current theory and research findings from the scientific cognitive literature, includes assessment with a repeatable test battery and input from family members and relevant caregivers. Additional important features of this project are the inclusion of a nontreated control group, a crossover design that ensures equal treatment of all participants, and an opportunity to assess spontaneous recovery and long-term benefits. As a response to the challenge of advancing cognitive rehabilitation within clinical neuropsychology, our hope is that this program will lay the foundation for effective intervention, direct new investigations, and contribute to the development of effective rehabilitative techniques.

REFERENCES


