Whither Cognitive-Behavioral Therapy for Schizophrenia?

by Robert Paul Liberman and Michael Foster Green

Abstract

Clinical studies of cognitive therapy and rehabilitation for persons with schizophrenia have generated promising findings of improvments in patients' cognitive and clinical status. However, the results do not appear to be specific to a particular form of intervention, and long-term evaluations of cognitive therapy, as an element in a comprehensive system of care, need to be conducted for clinical validation. Rehabilitation efforts should be congruent with laboratory findings of specific cognitive deficits, including those that are "vulnerability indicators" and endure beyond symptomatic episodes. With the demonstration that chronic schizophrenic patients can learn a variety of cognitive and behavioral skills through Integrated Psychological Therapy and other psychosocial treatments, the future appears bright for a profusion of new modalities aimed at cognitive-behavioral rehabilitation, especially those that emerge from what is known about information-processing deficits in schizophrenia.

Advances in therapeutics are often preceded by the availability of empirical knowledge of pathophysiology and mechanisms underlying symptoms and signs of disorders. Certainly it has been so for infectious diseases, cardiovascular disorders, and renal diseases. The complexity and inaccessibility of the brain for study has made empirically based advances in psychiatric treatment difficult to achieve; indeed, the most dramatic drug treatments for major mental disorders were discovered serendipitously. However, with new technology to image the living brain and laboratory techniques for examining the information-processing deficits long noted in schizophrenia, prospects have improved for designing treatments based on our knowledge of the mechanisms that determine the onset and course of schizophrenia.

In particular, cognitive psychologists have identified several specific dysfunctions in the processing of information by persons suffering from schizophrenia. Selective attention (Oltmanns and Neale 1975); vigilance (Nuechterlein 1977); early, iconic, visual processing (Asarnow and MacCrimmon 1978; Saccuzzo and Braff 1981); recall memory (Koh 1978); and executive functions (Weinberger et al. 1986) have been documented as deficient in schizophrenia. That some of these deficits (e.g., vigilance and early visual processing) have been demonstrated during periods of remission as well as symptomatic periods suggests they may be relatively enduring vulnerability indicators. Putative cognitive vulnerability indicators have been uncovered with several laboratory-based measures including the Continuous Performance Test (CPT; Rosvold et al. 1956), the Span of Apprehension Task (Neale 1971), and some electrophysiologic measures (e.g., smooth-pursuit eye movements, evoked potentials). It has been hypothesized that when socioenvironmental stressors, demands, and task requirements exceed the available information-processing capacity of a person with these vulnerability factors, psychotic symptoms may develop and performance in life roles may be seriously compromised (Nuechterlein and Dawson 1984).

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Other investigations have established that schizophrenic patients show deficits in learning; for example, it has been documented that persons with schizophrenia tend to respond disproportionately to immediate stimuli in learning tasks and often fail to be guided in behavioral responses by more remote stimuli (Salzinger 1984). While simple tasks requiring the learning of motor or verbal responses appear to be within the capacity of schizophrenic patients, the learning of more complex, sequential, and higher order responses—especially when these responses are mediated by affective expression and abstract meanings—appears to be compromised (Cleghorn and Albert 1990).

It is apparent that both the psychotic symptoms (thought disorder, hallucinations, increased distractibility) and the deficit symptoms (emotional blunting, anhedonia, apathy, poor initiative, alogia) of schizophrenia present substantial obstacles for effective learning. Less obvious is the effect of lingering cognitive deficits when the patients are in remission. It is often assumed that cognitive vulnerability indicators in schizophrenia (1) leave the individual more susceptible to stressful events by reducing effective coping mechanisms and (2) interfere with the acquisition of new information and attainment of life skills. Despite a certain amount of face validity for these assumptions, direct empirical support is limited. Regarding the first assumption, it is logically possible (although perhaps unlikely) that the cognitive vulnerability indicator covaries with some etiological factor but does not contribute to onset and relapse. Regarding the second assumption, there are general findings that indicate that intellectually brighter patients function better than those with lower intelligence (Heaton and Pendleton 1981). However, little is known about which specific information-processing deficits eventually become "rate-limiting factors" for effective social and occupational functioning.

Given the laboratory findings mentioned here, clinicians have begun to devise treatment techniques that attempt to compensate for patients' learning disabilities while teaching them cognitive and social skills that may confer protection from the noxious effects of stress superimposed on vulnerability (Liberman et al. 1982; Spaulding et al. 1986; Brenner et al. 1990; Spaulding and Sullivan 1991). The articles by Spring and Ravdin (1992, this issue) and Brenner and colleagues (1992, this issue) point clinicians in new directions for cognitive-behavioral treatment development in schizophrenia. In the present article, we shall appraise the current state of cognitive-behavioral therapy for schizophrenia and outline alternative strategies for advancing the therapeutic endeavor.

Integrated Psychological Therapy

The work of Brenner and colleagues in developing and testing a hierarchical program of cognitive-behavioral therapy for schizophrenic patients has proceeded through several stages during the past decade. By connecting specific cognitive and social training subprograms to the cognitive and social deficits manifested by persons with schizophrenia, Brenner's group has provided hypothesis-driven methods for the field and has brought new enthusiasm to practitioners and researchers alike who know that pharmacotherapy alone is inadequate to meet the comprehensive needs of individuals with schizophrenia. What is the evidence for the value of Integrated Psychological Therapy (IPT), and to what extent does this mode of therapy build on what is currently known about the information-processing and neuropsychological deficits of schizophrenic patients?

The Brenner group has reported data that suggest that the IPT subprograms for training in cognitive differentiation and social perception do strengthen certain of patients' cognitive capacities. Far less convincing, however, is the generalizability of IPT to either basic attentional processes or higher order cognitive or social skills beyond the specific targeted responses built into the subprograms. Since IPT has been articulated in a written treatment manual, it is possible for other investigators, independent of the Brenner group, to replicate and evaluate the IPT modality.

In fact, one group at a German psychiatric hospital conducted a controlled study of the Cognitive Differentiation subprogram of IPT, comparing it with social skills training and a placebo-attention condition (Hubmann et al. 1989). They found evidence for improved performance in concept attainment and classification of verbal material by patients participating in both social skills training and the Cognitive Differentiation subprogram. Because the IPT was limited to the Cognitive Differentiation subprogram, it was not surprising that only the patients in the social skills training condition achieved improvements in measures of social competence. Significant improvements were noted in negative symptoms in both active treatment conditions, and the placebo-attention condition resulted in worsening of psychopathology.

Another study, conducted at the Rehabilitation Center of the Psychiatric Clinic of the Technical University of Munich, randomly assigned schizophrenic patients to 3 to 4 months of social skills training versus the IPT subprograms Cognitive Differentiation, Social Perception, and Interpersonal Problem Solving. As in the hospital study, patients in both the social skills training and IPT subprograms showed significant improvements in several elementary cognitive measures—word recognition, reaction time, number cancellation, and concentration. At the end of this study, patients receiving IPT self-reported less social anxiety than their counterparts receiving social skills training, but the latter reported better levels of activation and less social isolation. Improvements in psychopathology were modest and statistically nonsignificiant for the total Brief Psychiatric Rating Scale (Overall and Gorham 1962) for both treatment conditions (Kraemer 1991). The therapeutic impact of IPT and other psychosocial therapies may be promoted by the external, natural environment; thus, social skills and social anxiety may be improved more in ambulatory patients than in those who are hospitalized.

The findings from studies to date on IPT raise more questions than they answer. While IPT's subprograms aimed at remediating cognitive impairments do indeed appear to have effects on certain cognitive skills, it is not clear that such improvements are specific to the cognitive techniques used in IPT, since similar improvements have been noted with social skills training. The benefits of social skills training on basic cognition are not unexpected, since recent advances in this modality have emphasized procedures to improve the "receiving," "processing," and "sending" skills of schizophrenic patients (Wallace and Boone 1984). Moreover, there is a need for longer term controlled clinical trials of IPT to document its impact on delaying or preventing relapse and improving social functioning, outcomes that would be more rigorous tests of IPT's underlying hierarchical conceptual basis.

Congruence of IPT With Schizophrenic Cognitive Deficits

In general, the fields of experimental psychology and psychiatric rehabilitation have moved along nonintersecting trajectories. The reluctance to incorporate cognitive rehabilitation techniques with schizophrenic patients is discussed by Spring and Ravdin (1992, this issue). Brenner and colleagues have developed an impressive program that attempts to incorporate multiple cognitive levels into their rehabilitation program. How consistent are the methods and procedures of IPT with what is currently known about the cognitive dysfunctions of schizophrenic patients? The answer to this question depends on which model of cognitive functioning is adopted.

Studies of information processing in schizophrenia have been frequently viewed from two separate, but overlapping, frameworks: *capacity models* and *stage models* (Nuechterlein and Asarnow 1989). Capacity models emphasize the overall processing capacity of an individual (Kahneman 1973). Processing capacity is viewed as a limited resource that can be drawn upon for performing cognitive tasks. The amount of the resource is not constant and can vary with levels of arousal. Within a capacity model, cognitive deficits in schizophrenia are attributed to decreases in the total amount of the processing resource (possibly due to abnormal levels of arousal), or to inefficient allocation of the available processing resources (Nuechterlein and Dawson 1984). In contrast to capacity models, stage models of information processing emphasize a sequential series of processing stages in which the output from one stage is fed to a subsequent stage for further processing. The information becomes transformed or elaborated with each step. When considered in the context of schizophrenia, a stage model leads to a search for the earliest dysfunctional stage of processing. An assumption of a stage model is that a defect in an early stage can disrupt processing in later stages because of a rate-limiting, cascading effect (Saccuzzo and Braff 1981).

Although the two models overlap considerably, the emphases of the models are very different. Capacity models lead to a search for measures of overall capacity and allocation strategies. Stage models lead to a search for dysfunctional stages of processing. Both models have received substantial empirical support and it might not be helpful to choose between them. Certain experimental paradigms differentially lend themselves to interpretation within one or another of the two models. For example, dual-task paradigms in which subjects divide their attention between two competing tasks are usually interpreted within a capacity model. Alternatively, the backward masking paradigm in which subjects identify a briefly presented stimulus is usually viewed within a stage model.

IPT can be viewed within the capacity model. If cognitive deficits in schizophrenia result from a reduction in available processing capacity, therapeutic efforts should be directed

at increasing capacity. One way to increase the available capacity is to take effortful activities (those that require considerable processing resources) and make them more automatic. When an activity becomes automatic, it draws less of the processing resources and frees up the remaining resources for other activities. The IPT subprograms could be viewed as exercises to help make effortful tasks (social perception, problem solving, verbal communication) more automatic. As a subject becomes an "expert" on these tasks through practice, the resource requirements of the tasks would be expected to diminish. Another way to increase available capacity is to modulate arousal from suboptimal levels (either too low or too high) to more efficient levels. The IPT subprograms also could be viewed as exercises aimed at moderating social stimulation. The Social Perception and Verbal Communication subprograms might serve the dual purpose of drawing out socially withdrawn patients and reducing arousal in patients who find social situations confusing and overarousing.

In the context of the stage models, IPT appears to miss the mark. The cognitive processes that are addressed in the first subprogram (Cognitive Differentiation) are already very complex. While sorting cards according to attributes and playing 20 questions might seem simple compared with deciphering meanings of social situations, these activities are still highly complex. The earliest stages in information processing typically involve sensory registration and perceptual processes that occur immediately after stimulus presentation. Processes such as feature extraction, cognitive representation, transformation, and categorization of information are required before abstract concepts can be attained and manipulated as in the first IPT subprogram. Brenner and colleagues have intentionally chosen to begin intervention at the level of problem solving. Their decision is reasonable if intervention at this level improves more elementary cognitive functioning. However, within a stage model, a dysfunction in an earlier stage of information processing would cause a cascading disruption in subsequent stages and the IPT would be intervening downstream from the source of the problem.

The question of the appropriate level of cognitive intervention remains unanswered. Spring and Ravdin's assertion that cognitive intervention should range from microlevel to macrolevel seems eminently reasonable, but it remains largely untested. Kraemer (1991) found that the IPT Cognitive Differentiation subprogram improved elementary cognitive functioning indexed by reaction time, a version of the CPT, and a version of the Span of Apprehension Task. However, the effects were nonspecific because a social skills training program resulted in similar improvements. Olbrich and Mussgay (1990) used a training procedure that involved practicing tasks of medium complexity (similar to the level of the Cognitive Differentiation subprogram; e.g., reasoning and concept formation, verbal and visual recall). Training on these tasks improved performance on complex cognitive tasks (embedded figures test, letter cancellation) but not on elementary cognitive tasks. To address effectively the question of the level (or stage) of intervention requires a design in which the IPT is compared with an intervention specifically directed at elementary functions. To our knowledge, no such comparison has been conducted.

A related concern with cognitive intervention studies is the disparity between the findings of the vulnerability studies and the methods used in rehabilitation procedures. It might seem reasonable for a cognitive rehabilitation program (one designed to increase social and occupational functioning) to selectively target those cognitive deficits that exist in the remitted state (i.e., a vulnerability indicator). After all, if a deficit disappears with the end of an episode, the best cognitive rehabilitation would be symptom management. Most of the measures that have been implicated as vulnerability indicators have used extremely brief tachistoscopic presentations (the CPT span of apprehension, backward masking), or have evaluated electrophysiological responses to stimuli (evoked potential procedures). However, cognitive rehabilitation efforts rarely target the early perceptual and registration processes that, based on empirical findings, seem most likely to be present during remission. In addition to an empirical rationale from vulnerability studies, cognitive rehabilitation should be more feasible during periods of relative or complete remission because psychotic symptoms would be less likely to intrude on learning the rehabilitation procedures (Anthony and Liberman 1986).

Cost-effectiveness will be a consideration that affects the ultimate utility of conducting cognitive-behavioral therapy for schizophrenia if efficacy studies provide convincing outcome data. After all, modifying the cognitive processes of schizophrenic patients is time-consuming and labor-intensive. In one recent report of an attention-focusing method of restoring conversational skills to thought-disordered schizophrenic patients, each session

required two clinicians to conduct the treatment with a single patient (Massel et al. 1991). However, the introduction of other innovations in psychiatric rehabilitation—such as behavioral family management—have been followed by demonstrations of their cost-effectiveness, since they reduce rehospitalization and increase employment (Liberman et al. 1987*a*).

Strategies for Cognitive Therapy of Schizophrenic Patients

In addition to IPT, there are other promising strategies worth pursuing in the cognitive treatment and rehabilitation of persons with schizophrenia. Also predicated on the hypothesis that direct training of basic cognitive skills will generalize to broader measures of social performance and clinical improvement, Spaulding and Sullivan (1991) have gathered pilot data suggesting that a variety of laboratory or analog tasks requiring cognitive skills may be learned by schizophrenic patients with generalization to clinical progress, at least in some patients. In one such task, termed "continuous work performance," patients were encouraged to maintain a focus of concentration while performing paper manipulation tasks such as folding, cutting, stapling, and sorting. These investigators also have met with some success in improving the cognitive and clinical status of patients by means of reducing arousal and psychophysiological levels (Spaulding et al. 1986).

Generalization from the training of elementary cognitive processes to improved clinical and social functioning may be enhanced by identifying the cognitive processes that mediate learning of more molar, adaptational skills and then targeting those mediators for training before or during a broader psychiatric rehabilitation program. For example, recent studies have noted that both short-term verbal memory and sustained vigilance performance significantly predict how well a schizophrenic person will learn from a social skills training program (Bowen et al. 1989, 1990; Kern et al. 1990; Corrigan et al. 1991; Mueser et al. 1991). Cognitive deficits in schizophrenia do not have to be "true" biobehavioral markers of the underlying disorder to serve as useful clinical targets for improving the functional status of patients, as long as they mediate functional capacity or the ability to learn from a rehabilitation program.

At the Clinical Research Center for Schizophrenia at the University of California, Los Angeles (UCLA), research is proceeding inspired by a conceptual model of cognitive and behavioral variables related to social skills and social competence (Liberman et al. 1986*b*). In this model, both basic psychobiologic functions (e.g., memory, perception, affect, attention) and social cognitive processes (e.g., perspective taking, set and social-rule-governed behavior) are prerequisites of "social schemata" that, in turn, have reciprocal relationships with self-efficacy, coping, and social skills.

Members of the UCLA Clinical Research Center have begun to develop training methods for improving the performance of schizophrenic patients on measures of visual processing (e.g., the span of apprehension, distractibility, and serial recall) (Kern et al. 1991). Green and colleagues (1990), also at the UCLA Clinical Research Center, have employed instructions and reinforcement contingencies to improve patients' performance on the Wisconsin Card Sorting Test (Heaton 1981). This test requires subjects to attain, maintain, and switch concepts, and it is believed to be relatively sensitive to prefrontal cortex functioning. The results suggest that monetary reinforcement alone does not improve performance. However, when patients improve on this measure after receiving detailed instructions, reinforcement appears to consolidate the gains.

The rehabilitation approaches represented by IPT and the other strategies that have been noted, while effective, may prove to be relatively inefficient in bringing about more generalized social and clinical improvement in patients. For example, it has been found in the field of cognitive rehabilitation of those with brain injuries that training patients in requisite self-care and instrumental role skills is prepotent in achieving clinical gains over focal cognitive rehabilitation techniques. Thus, if it is important for a brain-injured person to learn how to use a wheelchair to navigate through traffic, it is more efficient to directly teach the person wheelchair driving through an actual traffic pattern than to use computer simulations for teaching the skills. If future research does not validate a hierarchical generalization model for direct cognitive training, then other more molar and practical forms of training might be used more efficiently.

A more clinically based effort, which derives from procedures found to be efficacious with persons having affective and anxiety disorders, is cognitive therapy as developed by A.T. Beck (1976). In a multidimensional treatment program including a host of other programmatic features, Perris has anecdotally demonstrated the value of cognitive therapy that relies on identifying cognitive

schemas, confrontation of distortions through "behavioral experiments," and rational discussions with delusional patients (Perris 1989).

In line with the positive impact of social skills training on delaying relapse in schizophrenic patients at high risk for relapse (Hogarty et al. 1986; Liberman et al. 1986*a*), another strategy for improving cognitive function is through a skills training methodology that incorporates elements aimed at fostering sustained attention, problem solving, and goal setting. This strategy is encompassed by the training modules in the UCLA Social and Independent Living Skills series (Wallace and Boone 1984; Wallace et al. 1985; Liberman et al. 1987*b*). Each module addresses a different domain of community adaptation skills (e.g., symptom self-management, grooming and self-care, job finding, recreation for leisure, basic conversation skills), and the curriculum is taught through a series of learning activities that incorporate the following techniques to enhance cognitive and behavioral performance:

- Engagement of patients in brief, assimilable dialogs to engage them in personalized goal setting and endorsement of training objectives.
- Video demonstrations of the skills to be learned, with Socratic questions and answers to promote vigilance in the video viewing.
- Role-play exercises in which the patients practice those skills previously observed in the video and during which abundant reinforcement, cuing, prompting, and coaching are provided.
- Problem-solving exercises in which the trainer leads the patients through a series of challenges or obstacles to the successful implementation of the skills in their natural environments, requiring the patients to inductively learn how to overcome these obstacles by using a problem-solving method.
- In vivo and homework exercises in which the trainer gradually fades back from the patients as they use the skills learned earlier in real-life situations.

Field trials of the modules have documented their efficacy in enabling schizophrenic patients to acquire skills with durability of the learning evident at 3- to 12-month followups (Eckman et al. 1990; Wallace et al., in press). Given the plasticity of the central nervous system, it is not unreasonable to hypothesize that the key cognitive deficits characteristic of schizophrenia could be remediated in either of two ways: either through direct training of the specific deficits themselves, or indirectly through engaging patients in social learning experiences that promote and reinforce accurate and efficient information processing. Almost a decade ago, Liberman and colleagues (1982) proposed practical training procedures that emphasized the clear input and feedback required to compensate for cognitive dysfunctions of persons with schizophrenia:

- Keep the training setting uncluttered and devoid of distracting stimuli.
- Post graphic charts for clear and simple visual cuing of the learning objectives; capitalize on dual-channel inputs, both auditory and visual.
- Use differential feedback, including mild social censure or disapproval as well as exuberant positive praise, for inappropriate and appropriate responsiveness to training steps.
- Use task analyses to break down knowledge and skills to be learned, so that learning can proceed incrementally with a shaping paradigm of reinforcing successive approximations.
- Employ overlearning and repetition and other generalization-promoting techniques for transfer of learning from training to real-life settings.

Given the promising findings from studies during the past decade that have applied cognitive-behavioral techniques to psychosocial treatment of schizophrenia (Falloon 1985; Liberman and Mueser 1989), the range of new procedures becoming available for the cognitive rehabilitation of persons suffering from schizophrenia should lead to further advances in therapeutics during the 1990's. Even more important, however, will be the harnessing of our increasing knowledge base regarding the nature of cognitive and information-processing dysfunctions in schizophrenia to emergent treatment technology.

Conclusions

Perhaps cognitive-behavioral therapy in schizophrenia is an idea whose time has arrived. In this article, we have briefly described a representative sampling of rehabilitation programs aimed at improving cognitive, social, and occupational functioning. The preceding articles by Spring and Ravdin, and Brenner and colleagues provided thoughtful and sophisticated formulations of the field. It should be clear from this trilogy of articles that the field is in its infancy. Basic questions remain unanswered. For example: What are the cognitive deficits that endure into remission? Which of these deficits actually restrict functioning? Are cognitive rehabilitation efforts worth pursuing? If so, should rehabiltation efforts be

directed at the microlevel (bottom up), at the macrolevel (top down), or at all levels? In one recent study of IPT, improvements in the cognitive, social, and clinical status of patients were as great for patients who began with social skills and then participated in the Cognitive Differentiation subprogram as vice versa (Bettina Hodel, personal communication September 15, 1991). How much are we missing by studying and training "cold cognition" in the absence of interpersonal stimulation, affect, and arousal?

Despite a general enthusiasm for the pursuit of these questions, future investigations will be hampered by the lack of a comprehensive conceptual model with which to integrate findings from studies of vulnerability, cognition, and rehabilitation. Two models of cognitive processing (stage and capacity) present the opportunity for initial formulations. However, the field of cognitive-behavioral rehabilitation in psychiatry is still striving to integrate basic components into the big picture.

Scientist-practitioners should not lose sight of the important role of psychotropic drugs in remediating information-processing deficits. The best efforts at cognitive remediation will be infused by a biobehavioral approach in which pharmacotherapy and cognitive-behavioral interventions will supplement each other. The two forms of treatment might have a syntonic effect; pharmacotherapy might initially reduce symptoms and make the patient more accessible to the cognitive interventions. In fact, chronic administration of neuroleptics may have direct beneficial effects on some cognitive measures such as the CPT; on the other hand, medications may impair performance on fine motor tasks (Cassens et al. 1990).

At first glance, one might wonder about the goals of an intervention such as cognitive-behavioral therapy that is delivered after the psychotic symptoms have largely remitted. It is important to distinguish between the immediate goal of symptom remission and the eventual goal of recovery of social and occupational functioning. For many patients, achieving symptom reduction is easier than maintaining employment. A testable hypothesis for future studies is that restrictions on employment and social functioning are based primarily on the cognitive limitations that endure into periods of symptom remission (Goldberg et al. 1990). With coordinated, multimodal, biopsychosocial interventions for the putative functional and structural abnormalities underlying the schizophrenic syndrome, we may be hopeful that the symptomatic and social recoveries of patients, documented in long-term followup studies, can be accelerated (Strauss 1986).

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