

# Psychosocial Skills Training for Schizophrenia: Lessons From the Laboratory

by Robert K. Heinsen, Robert P. Liberman,  
and Alex Kopelowicz

## Abstract

A large body of research supports the efficacy of psychosocial treatments for schizophrenia, particularly learning-based therapies. The Schizophrenia Patient Outcomes Research Team recommended that cognitive-behavioral therapies be used in schizophrenia, and skills training was included in the practice guideline for treating patients with schizophrenia published by the American Psychiatric Association. This article provides an updated review of empirical studies of psychosocial skills training, showing its value in treating patients with schizophrenia as well as its broader clinical effectiveness. Data supporting the efficacy of psychosocial skills training continue to accumulate. Such programs should continue to be included in best practices guidelines and treatment recommendations for schizophrenia. Future clinical service research could be directed toward integration of skills training with other psychosocial treatment methods.

**Keywords:** Schizophrenia, psychosocial rehabilitation, skills training, social skills training, behavior therapy, cognitive disorders, cognitive techniques.

*Schizophrenia Bulletin*, 26(1):21-46, 2000.

Schizophrenia is an illness with many faces, affecting at various times an individual's capacity for thought, emotion, and social discourse. Although currently available treatments cannot cure this disorder, it is widely recognized that medical and psychosocial therapies can contribute to symptomatic and functional recovery. Psychotropic medications have the greatest effects on symptoms such as hallucinations and delusions, but have less impact on social and instrumental deficits. As a result, even individuals who respond well to pharmacotherapy are at risk for interpersonal distress, chronic unemployment, and a diminished quality of life (Anthony and Blanch 1987; Cresswell et al. 1992; Browne

et al. 1996; Shepherd et al. 1996). Psychosocial skills training, which targets problems of social adaptation and role functioning in schizophrenia, represents an essential ingredient in a coordinated, comprehensive, biobehavioral approach to treatment (Liberman et al. 1994a).

Skills training methods have evolved over the past three decades to address the social and instrumental impairments common among people with schizophrenia. The efficacy of behavioral interventions has been evaluated many times, with a general consensus that learning-based therapies provide benefits to schizophrenia patients beyond the benefits obtained through pharmacotherapy alone (Wallace et al. 1980; Benton and Schroeder 1990; Corrigan 1991; Halford and Hayes 1991; Bellack and Mueser 1993; Dilk and Bond 1996; Mueser et al. 1997). Without exception, reviewers have concluded that behavioral skills training is an effective method for teaching social and independent living skills to people with schizophrenia. After conducting an independent assessment of this literature, the Schizophrenia Patient Outcomes Research Team (PORT; Scott and Dixon 1995) recommended that skills training-based cognitive-behavioral therapies be included in the schizophrenia treatment armamentarium (Lehman et al. 1998).

Despite the trend of including psychosocial skills training in best practices treatment guidelines (Kopelowicz and Liberman 1995; American Psychiatric Association 1997; Lehman et al. 1998), many questions remain regarding the clinical significance of skills training, as well as its indications, adaptations, proper assignment, dosing, and maintenance strategies. Which schizophrenia patients, for example, are most likely to benefit from skills training? Are there contraindications to this approach? What are the appropriate timing, frequency, and duration of skills training inter-

---

Reprint requests should be sent to Dr. R.K. Heinsen, Adherence and Behavior Change Research Program, Division of Mental Disorders, Behavioral Research, and AIDS, National Institute of Mental Health, 6001 Executive Blvd., Rm. 6190, MSC 9615, Bethesda, MD 20892-9615; e-mail: rheinsse@mail.nih.gov.

ventions? Are different types of skills training appropriate for patients in different phases of the disorder? Do setting or format variables affect the acquisition and transfer of skills? To address these questions, we have extended the PORT analysis of psychosocial skills training for schizophrenia, reviewing studies published since 1993. The studies that we have evaluated include randomized clinical trials in addition to investigations adopting the methods of controlled studies in real-world clinical settings. We also discuss the link between skills training interventions and supportive treatments for schizophrenia that are environmentally based. We propose a model of prescriptive psychosocial skills training for schizophrenia that matches clients with specific cognitive and behavioral therapies, based on such variables as the client's phase of illness, cognitive processing capacity, and receptivity to change.

## Empirical Support for Psychosocial Skills Training

Psychosocial skills training procedures are rooted in operant conditioning and social learning theory (Bandura 1969; Liberman 1972) and represent a highly interactive, structured, systematic, and educational approach to therapy. Instructional methods vary considerably, depending on the content areas of the training program (e.g., conversational vs. symptom management skills), but most interventions emphasize an incremental approach to skills acquisition. Complex target behaviors are broken down into constituent elements, microbehaviors are organized into a hierarchy of responses, and components are introduced to patients in a graded manner. Skills trainers use active teaching methods such as didactic instruction, modeling, behavior rehearsal, coaching of desired responses, corrective feedback, contingent social reinforcement, and homework assignments to facilitate the acquisition of new competencies. To counteract schizophrenia patients' attentional, memory, and abstraction impairments, learning material is presented slowly and repetitively in small "chunks" that contain numerous reviews and positive reinforcement (Liberman et al. 1993). Patients are taught to perform component cognitive and behavioral responses sequentially, gradually combining simpler behaviors into more complex reactions. These methods have been applied in both individual and group formats to improve schizophrenia patients' self-care, social, and independent living skills in hospital, clinic, and residential settings. In addition, behavioral learning principles used in skills training—such as shaping, modeling, behavior rehearsal, prompting, reinforcement, and in vivo homework assignments—have

been used effectively in teaching communication and problem-solving skills to families of patients with schizophrenia or bipolar disorder. The application of skills training techniques to family therapy has been the most widely validated method of psychosocial intervention for reducing stress-related relapse (American Psychiatric Association 1997; Miklowitz and Goldstein 1997; Falloon et al., in press).

The 1995 PORT review of randomized clinical trials evaluated the impact of psychosocial skills training methods on schizophrenia patients' social functioning, psychiatric symptoms, and resistance to relapse (Scott and Dixon 1995). Two subsequent analyses of this literature—one narrative (Penn and Mueser 1996) and one meta-analytic (Dilk and Bond 1996)—have appeared since publication of the PORT findings. The conclusions derived from these three reviews are remarkably consistent and can be summarized as follows:

1. Patients with schizophrenia can be taught a wide range of social and instrumental competencies, ranging from simple behaviors, such as gazing and reciprocity during conversations, to more complex behaviors, such as assertiveness, conversational skills, and medication self-management.
2. Social skills training has a positive effect on patients' perceptions of themselves as more assertive and less socially anxious after treatment. Skills training has only a moderate impact, however, on psychiatric symptoms, relapse, and rehospitalization.
3. Skills training appears to result in a "gradient of generalization" (Curran et al. 1985, p. 232), with treatment effects generalizing well to measures and settings similar to training situations, but less consistently to novel environments.
4. Despite some evidence that trained skills can be maintained over time, relatively few studies have addressed the question of long-term treatment outcome (i.e., the durability of results beyond several months).

This article covers several recent areas of investigation, including how treatment setting, training format, client features, and illness characteristics may influence the results of skills training. Innovative programs that extend our knowledge of empirically derived but clinically meaningful training procedures are emphasized.

## Literature Update

Source documents for the current review were identified through a computerized search of the Medline bibliographical data base covering the years 1994–1999 and using the keywords "schizophrenia" and "psychosocial

# Psychosocial Skills Training for Schizophrenia: Lessons From the Laboratory

by Robert K. Heinssen, Robert P. Liberman,  
and Alex Kopelowicz

## Abstract

A large body of research supports the efficacy of psychosocial treatments for schizophrenia, particularly learning-based therapies. The Schizophrenia Patient Outcomes Research Team recommended that cognitive-behavioral therapies be used in schizophrenia, and skills training was included in the practice guideline for treating patients with schizophrenia published by the American Psychiatric Association. This article provides an updated review of empirical studies of psychosocial skills training, showing its value in treating patients with schizophrenia as well as its broader clinical effectiveness. Data supporting the efficacy of psychosocial skills training continue to accumulate. Such programs should continue to be included in best practices guidelines and treatment recommendations for schizophrenia. Future clinical service research could be directed toward integration of skills training with other psychosocial treatment methods.

**Keywords:** Schizophrenia, psychosocial rehabilitation, skills training, social skills training, behavior therapy, cognitive disorders, cognitive techniques.

*Schizophrenia Bulletin*, 26(1):21-46, 2000.

Schizophrenia is an illness with many faces, affecting at various times an individual's capacity for thought, emotion, and social discourse. Although currently available treatments cannot cure this disorder, it is widely recognized that medical and psychosocial therapies can contribute to symptomatic and functional recovery. Psychotropic medications have the greatest effects on symptoms such as hallucinations and delusions, but have less impact on social and instrumental deficits. As a result, even individuals who respond well to pharmacotherapy are at risk for interpersonal distress, chronic unemployment, and a diminished quality of life (Anthony and Blanch 1987; Cresswell et al. 1992; Browne

et al. 1996; Shepherd et al. 1996). Psychosocial skills training, which targets problems of social adaptation and role functioning in schizophrenia, represents an essential ingredient in a coordinated, comprehensive, biobehavioral approach to treatment (Liberman et al. 1994a).

Skills training methods have evolved over the past three decades to address the social and instrumental impairments common among people with schizophrenia. The efficacy of behavioral interventions has been evaluated many times, with a general consensus that learning-based therapies provide benefits to schizophrenia patients beyond the benefits obtained through pharmacotherapy alone (Wallace et al. 1980; Benton and Schroeder 1990; Corrigan 1991; Halford and Hayes 1991; Bellack and Mueser 1993; Dilk and Bond 1996; Mueser et al. 1997). Without exception, reviewers have concluded that behavioral skills training is an effective method for teaching social and independent living skills to people with schizophrenia. After conducting an independent assessment of this literature, the Schizophrenia Patient Outcomes Research Team (PORT; Scott and Dixon 1995) recommended that skills training-based cognitive-behavioral therapies be included in the schizophrenia treatment armamentarium (Lehman et al. 1998).

Despite the trend of including psychosocial skills training in best practices treatment guidelines (Kopelowicz and Liberman 1995; American Psychiatric Association 1997; Lehman et al. 1998), many questions remain regarding the clinical significance of skills training, as well as its indications, adaptations, proper assignment, dosing, and maintenance strategies. Which schizophrenia patients, for example, are most likely to benefit from skills training? Are there contraindications to this approach? What are the appropriate timing, frequency, and duration of skills training inter-

---

Reprint requests should be sent to Dr. R.K. Heinssen, Adherence and Behavior Change Research Program, Division of Mental Disorders, Behavioral Research, and AIDS, National Institute of Mental Health, 6001 Executive Blvd., Rm. 6190, MSC 9615, Bethesda, MD 20892-9615; e-mail: rheinsse@mail.nih.gov.

ventions? Are different types of skills training appropriate for patients in different phases of the disorder? Do setting or format variables affect the acquisition and transfer of skills? To address these questions, we have extended the PORT analysis of psychosocial skills training for schizophrenia, reviewing studies published since 1993. The studies that we have evaluated include randomized clinical trials in addition to investigations adopting the methods of controlled studies in real-world clinical settings. We also discuss the link between skills training interventions and supportive treatments for schizophrenia that are environmentally based. We propose a model of prescriptive psychosocial skills training for schizophrenia that matches clients with specific cognitive and behavioral therapies, based on such variables as the client's phase of illness, cognitive processing capacity, and receptivity to change.

## Empirical Support for Psychosocial Skills Training

Psychosocial skills training procedures are rooted in operant conditioning and social learning theory (Bandura 1969; Liberman 1972) and represent a highly interactive, structured, systematic, and educational approach to therapy. Instructional methods vary considerably, depending on the content areas of the training program (e.g., conversational vs. symptom management skills), but most interventions emphasize an incremental approach to skills acquisition. Complex target behaviors are broken down into constituent elements, microbehaviors are organized into a hierarchy of responses, and components are introduced to patients in a graded manner. Skills trainers use active teaching methods such as didactic instruction, modeling, behavior rehearsal, coaching of desired responses, corrective feedback, contingent social reinforcement, and homework assignments to facilitate the acquisition of new competencies. To counteract schizophrenia patients' attentional, memory, and abstraction impairments, learning material is presented slowly and repetitively in small "chunks" that contain numerous reviews and positive reinforcement (Liberman et al. 1993). Patients are taught to perform component cognitive and behavioral responses sequentially, gradually combining simpler behaviors into more complex reactions. These methods have been applied in both individual and group formats to improve schizophrenia patients' self-care, social, and independent living skills in hospital, clinic, and residential settings. In addition, behavioral learning principles used in skills training—such as shaping, modeling, behavior rehearsal, prompting, reinforcement, and in vivo homework assignments—have

been used effectively in teaching communication and problem-solving skills to families of patients with schizophrenia or bipolar disorder. The application of skills training techniques to family therapy has been the most widely validated method of psychosocial intervention for reducing stress-related relapse (American Psychiatric Association 1997; Miklowitz and Goldstein 1997; Falloon et al., in press).

The 1995 PORT review of randomized clinical trials evaluated the impact of psychosocial skills training methods on schizophrenia patients' social functioning, psychiatric symptoms, and resistance to relapse (Scott and Dixon 1995). Two subsequent analyses of this literature—one narrative (Penn and Mueser 1996) and one meta-analytic (Dilk and Bond 1996)—have appeared since publication of the PORT findings. The conclusions derived from these three reviews are remarkably consistent and can be summarized as follows:

1. Patients with schizophrenia can be taught a wide range of social and instrumental competencies, ranging from simple behaviors, such as gazing and reciprocity during conversations, to more complex behaviors, such as assertiveness, conversational skills, and medication self-management.
2. Social skills training has a positive effect on patients' perceptions of themselves as more assertive and less socially anxious after treatment. Skills training has only a moderate impact, however, on psychiatric symptoms, relapse, and rehospitalization.
3. Skills training appears to result in a "gradient of generalization" (Curran et al. 1985, p. 232), with treatment effects generalizing well to measures and settings similar to training situations, but less consistently to novel environments.
4. Despite some evidence that trained skills can be maintained over time, relatively few studies have addressed the question of long-term treatment outcome (i.e., the durability of results beyond several months).

This article covers several recent areas of investigation, including how treatment setting, training format, client features, and illness characteristics may influence the results of skills training. Innovative programs that extend our knowledge of empirically derived but clinically meaningful training procedures are emphasized.

## Literature Update

Source documents for the current review were identified through a computerized search of the Medline bibliographical data base covering the years 1994–1999 and using the keywords "schizophrenia" and "psychosocial

rehabilitation," "skills training," "social skills training," and "cognitive techniques." This search produced 171 citations. Seven additional studies were recommended for consideration by experts in the field, who identified relevant data not yet published. After articles that did not have cognitive-behavioral skills training as their primary focus were eliminated, studies with either a between-group or within-group pretest/posttest design were selected for review (table 1). Several older studies were included in our analysis because of their relevance to clinical effectiveness. These studies included evidence of skills generalization to the patients' everyday lives and were carried out in ordinary (vs. academic) clinical settings, with training of representative samples of patients by line-level staff (Mueser et al. 1990; Eckman et al. 1992; Wallace et al. 1992). The total sample of 27 studies extends the existing empirical data base for psychosocial skills training in several important ways relating to "effectiveness": skills training interventions are tested in a broader range of treatment settings, for longer periods of time, in combination with other psychosocial services, and in novel skill domains. In addition, new data are available regarding the cognitive and symptom variables that mediate the acquisition, expression, and maintenance of social and instrumental competencies.

The studies listed in table 1 introduce several practice innovations to clinicians working with schizophrenia patients. Novel treatment methods described in the table include (1) selection of staff members not normally involved in behavior therapy to serve as skills trainers (Wallace et al. 1992; Smith et al. 1996; Kopelowicz et al. 1998; Liberman et al. 1998), (2) individualization of training procedures for refractory patients (Eckman et al. 1992; Kopelowicz et al. 1997), (3) contingent reinforcement and shaping to improve patients' responsiveness to skills training (Bellus et al. 1999; Silverstein et al. 1999a, 1999b), (4) environmental and personnel interventions to increase generalization of skills (Hayes et al. 1995; Liberman et al. 1998; Blair et al., in press), (5) compliance-enhancing strategies to strengthen patients' participation in treatment (Katz et al. 1996; Weinhardt et al. 1997; Ziedonis and George 1997; Liberman et al. 1998), and (6) motivational techniques to bolster patients' investment in behavior change (Halford et al. 1995; Dobson 1996; Kelly et al. 1997; Ziedonis and George 1997; Addington et al. 1998). These innovations considerably broaden the set of techniques available to clinicians for introducing and tailoring learning-based therapies to patients with serious and persistent mental illness and for sustaining their compliance with treatment.

## Studies Conducted in Contemporary Treatment Settings

Approximately two-thirds of the studies included in Dilk and Bond's meta-analytic review (1996) were conducted in hospital settings, many of which were treatment facilities with long-stay patient cohorts. We questioned whether psychosocial skills training programs developed in such institutions translate to contemporary inpatient environments, which emphasize brief hospitalizations, mixed diagnostic groups, and rapid transition to less intensive levels of care (Sederer 1992). Three recent investigations illustrate how skills training procedures may be modified for short-term inpatient units (Mueser et al. 1990; Smith et al. 1996; Kopelowicz et al. 1998). In each instance, investigators specified reasonable treatment targets for brief training programs, adapted well-tested training procedures for contemporary hospital practice, and trained existing inpatient staff to apply behavioral methods competently.

Mueser et al. (1990) demonstrated that groups of acutely ill, mixed-diagnosis inpatients ( $n = 115$ ) could learn several conflict resolution skills during a 2-week, six-session training program. Compromise and negotiation skills were featured during one week, and appropriate expression of affect was featured the next. Patients were allowed to enter the training program at the beginning of either week, which was an important external validity consideration for rapid-turnover units. After treatment, patients' performance of social skills, as assessed by therapists' ratings after each training session, improved significantly. Schizophrenia patients improved less quickly than individuals with affective disorders but nevertheless achieved gains in targeted social skills that were maintained at 1-month followup (Mueser et al. 1991).

A different approach to short-term inpatient skills training features the community reentry program, a skills training module in the Social and Independent Living Skills Program, developed at the Intervention Research Center for Psychosis at the University of California, Los Angeles (UCLA) (Liberman et al. 1993; Liberman 1994). This manualized program consists of 16 training sessions that teach the skills necessary for symptom identification, medication management, collaborative treatment planning, and follow-through with community aftercare. Program goals are to facilitate rapid discharge from the hospital and linkage with community aftercare resources and to minimize the risk of postdischarge relapse.

Smith et al. (1996) introduced the community reentry program to inpatients with refractory psychotic disorders, teaching eight staff members to lead behavioral training groups with the aid of manuals, videotapes, patient workbooks, and weekly trainers' meetings. Knowledge for

Table 1. Innovations in skills training therapies for schizophrenia

Study	Participants	Design	Skills training Innovation	Results
<b>Contemporary treatment settings</b>				
Mueser et al. 1990	115 acutely ill inpatients with DSM-III-R schizophrenia spectrum or major affective disorder diagnoses	Within-group, pretest/posttest	Standard SST procedures were modified for use on a rapid-turnover acute care inpatient unit.	Compromise, negotiation, and affect expression skills improved significantly after brief social skills therapy (mean: 4.2 sessions). Participants who engaged in $\geq 5$ role-play exercises demonstrated greatest improvement.
Smith et al. 1996	44 acutely ill inpatients with DSM-IV schizophrenia spectrum or other psychotic condition diagnoses	Within-group, pretest/posttest	A brief, manualized training module teaching community reentry and outpatient treatment compliance skills was introduced on a long-term care unit for patients with chronic psychotic disorders.	Knowledge of skills taught in the community reentry and treatment compliance module increased significantly after training (mean: 11.6 sessions). At 2-wk postdischarge followup, 70% of program participants exhibited compliance with outpatient aftercare recommendations.
Kopelowicz et al. 1998	59 acutely ill inpatients with DSM-IV schizophrenia spectrum diagnoses	Random assignment to community reentry ( $n = 28$ ) or occupational therapy ( $n = 31$ ) conditions	A brief, manualized training module teaching community reentry and outpatient treatment compliance skills was introduced on a rapid-turnover acute care inpatient unit.	Only participants in the community reentry and treatment compliance module demonstrated increased knowledge and performance of community adjustment skills after therapy (mean: 6.8 sessions). These subjects were significantly more likely to attend the first outpatient aftercare appointment.
Wallace et al. 1992	108 chronically ill patients with DSM-III-R schizophrenia spectrum diagnoses	Random assignment at selected sites to skills training ( $n = 37$ ) or waiting-list control ( $n = 31$ ) conditions; within-group, pretest/posttest design for patients in smaller treatment programs ( $n = 40$ )	UCLA social and instrumental skills training modules were introduced to State hospital/day treatment, and long-term residential care programs. Trainers included nurses, recreational therapists, mental health counselors, and owner/operators of residential care facilities, each of whom received 2 days of formal training in skills training techniques.	In general, skills trainers implemented instructional techniques with great fidelity, despite minimal training and supervision. When therapists' interventions matched those specified in training manuals, patients' medication management, grooming, and recreation skills improved significantly after treatment (range: 26-40 sessions). These gains were maintained at 1-yr followup.



**Duration of treatment and coordination of care**

Eckman et al. 1992	41 stable DSM-III-R schizophrenia outpatients with only moderate levels of psychopathology	Random assignment to skills training or group psychotherapy conditions	UCLA medication and symptom self-management modules were presented in twice-weekly training sessions over a 6-mo period. Training continued within each module until all patients achieved mastery criterion. After the intensive training period, skills training subjects participated in weekly SST groups for 12 mos.	Patients who received modular skills training displayed a marked increase in knowledge and skills after treatment, with little erosion of skill levels over the 12-mo followup period. Significant symptom improvements were observed in both skills training and group psychotherapy conditions.
Halford et al. 1995	38 subacute DSM-III-R schizophrenia outpatients	Within-group, pretest/posttest	Five skills training modules (illness education and medication management, symptom coping, conversational skills and problem solving, community living skills, accessing recreational resources) were offered sequentially over 70 consecutive wks. All study participants received weekly individual case management to set rehabilitation goals, review progress, and obtain personal support.	Subjects who completed the comprehensive psychoeducational program experienced significantly reduced psychopathology and negative symptoms, and improved quality of life. Approximately half of the subjects' scores changed more than 1 SD after treatment.
Hayes et al. 1995	63 subacute DSM-III-R schizophrenia outpatients	Random assignment to social skills or discussion group conditions	SST sessions were offered twice weekly for 18 wks. Nine booster sessions were conducted at increasing intervals over a 6-mo followup period. Behavioral trapping techniques were used to enhance the generalization and maintenance of social skills.	Subjects who completed SST showed greater increases in targeted social skills than subjects completing the discussion group. Both groups improved similarly on measures of community functioning, quality of life, and positive symptoms. Relapse rates did not differ between the two treatment conditions.
Jerrill and Ridgely 1995	132 dually diagnosed patients with schizophrenia	Assignment to behavioral skills training, 12-step recovery, or case management service approaches	Modules from the UCLA Social and Independent Living Skills Program were adapted to meet the needs of individuals with severe mental illness and concurrent substance abuse disorders. Patients' psychosocial outcomes, psychiatric symptoms, and substance abuse were tracked for 24 mos.	Compared with comparison subjects, skills training recipients demonstrated the most positive and significant changes in psychosocial functioning, symptomatology, and drug/alcohol abuse after therapy, with lower overall treatment costs.
Marder et al. 1996	80 DSM-III-R schizophrenia outpatients stabilized on low dosages	Random assignment to SST (n = 43) or supportive group therapy (n = 37);	SST sessions (UCLA medication and symptom self-management modules) were conducted twice weekly for 6 mos,	SST participants achieved significantly better outcomes on measures of overall social adjustment. For patients who

Table 1. Innovations in skills training therapies for schizophrenia—Continued

Study	Participants	Design	Skills training innovation	Results
	of fluphenazine decanoate	random assignment of patients who experienced a prodrome ( $n = 36$ ) to supplemental oral fluphenazine or placebo	then weekly (social problem-solving and independent living skills modules) for an additional 18 mos. Patients were rated weekly over a 2-yr period for idiosyncratic prodromal symptoms.	experienced a prodrome, the combined strategy of consistent skills training and active drug supplementation resulted in the best social outcomes. Among patients who received SST, those who were younger (< 24 yrs old) at illness onset had the best overall social outcome.
Dobson et al. 1995	33 subacute outpatients with DSM-III-R schizophrenia	Random assignment to social skills ( $n = 18$ ) or social milieu ( $n = 15$ ) treatments	A long-term open-ended social skills support group (60 min/wk) was developed for patients who completed a structured 9-wk SST program at a day hospital. Standard behavioral training procedures provided continuity from the intensive short-term treatment program. The support group emphasized sequential personal goals, patient-initiated topics, and leadership opportunities for group participants.	SST participants showed greater improvements in social functioning and overall psychiatric symptoms after 9 wks of intensive treatment (mean: 27.7 sessions). These effects gradually declined once skills training ended.
Dobson 1996	60 subacute DSM-III-R schizophrenia outpatients, including 30 alumni of the short-term SST group	Followup of up to 2 yrs: 30 alumni of the short-term SST group vs. 30 nonrandomized comparison subjects	See above.	Social support (mean: 34.2 therapy sessions) and comparison subjects had similar rates of rehospitalization, but patients in the social support group spent significantly fewer days in the hospital during the 2-yr followup period.
Liberman et al. 1998	84 outpatients with "persistent and unremitting" forms of schizophrenia	Random assignment to SST ( $n = 42$ ) or occupational therapy conditions ( $n = 42$ )	UCLA conversation, recreation, medication, and symptom management modules were conducted by three paraprofessionals and one occupational therapist. Intensive clinic-based treatment (12 hrs/wk for 6 mos) preceded 18 mos of assertive case management (crisis intervention, service coordination, prompting of learned skills). Subjects' treatment compliance was increased by the availability of van transportation, lunches, and a "drop-in" socialization center.	During a 2-yr followup period, SST subjects demonstrated significantly greater knowledge and performance of skills related to SST modules, showed greater improvement in independent living skills (including areas unrelated to module content), and reported less personal distress. These results are noteworthy given the persistence of patients' positive symptoms during treatment and followup periods. Community case managers played a key role in encouraging patients to use the learned skills in everyday, community life.



Blair et al., in press.	80 stabilized DSM-III-R schizophrenia outpatients	Random assignment to in-clinic SST or in-clinic + IVAST	In IVAST, a trainer worked directly with patients in their natural community settings to apply skills learned during clinic-based SST sessions.	IVAST patients learned problem-solving skills more quickly and demonstrated significantly better social adjustment after therapy.
Ho et al., in press	4 cohorts of ≥ 40 stimulant-abusing outpatients with schizophrenia	Cohort analysis with repeated-measures time-series methods to evaluate treatment effects	Skills training (4 hrs/day) was embedded in a partial hospital program for individuals with severe mental illness and concurrent substance abuse disorder. Attendance, rehospitalization, and urine toxicology were assessed every 6 mos.	Significantly better outcomes accrued as each successive cohort received more skills training and other interventions.
<b>Patient characteristics related to outcome</b>				
Velligan et al. 1996	40 chronically ill inpatients with DSM-III-R schizophrenia diagnoses	Comparison of 20 individuals assigned to CAT with a nonrandomized sample given standard psychosocial programming	CAT emphasizes environmental adaptations to compensate for patients' underlying impairments in executive cognitive functioning. Environmental interventions included removing irrelevant and distracting stimuli and enhancing external cues for the completion of activities of daily living.	CAT subjects showed significantly greater improvement on measures of everyday functioning than did patients in the standard treatment group. Both positive and negative symptoms of schizophrenia improved over the 9 wks of treatment irrespective of treatment condition.
Kopelowicz et al. 1997	6 DSM-IV schizophrenia outpatients with prominent negative symptoms	Comparison of patients meeting deficit syndrome criteria (n = 3) with nondéficit, negative symptom counterparts (n = 3)	SST consisted of two 60-min sessions each week for 12 wks. Treatment was offered on a one-to-one basis with a structured behavioral approach. Targeted skills were eye contact, duration of speech, meshing of conversation, and affective responsivity.	Nondéficit syndrome patients improved significantly on trained behaviors following treatment and remained improved 6 mos later. Deficit syndrome patients did not show any meaningful change in behavioral skills either after training or at followup.
Bellus et al. 1999	14 low-functioning schizophrenia inpatients	Within-group, pretest/posttest	Shaping classes (6-8/wk) aimed at improving patients' self-care, social functioning, academic performance, and on-ward behavior were offered for 29 mos.	Significant improvements were noted in patients' self-care, reading, and math skills, and the number of on-ward problem behaviors was reduced.
Silverstein et al. 1999a	11 debilitated and chronic schizophrenia inpatients	Within-group, pretest/posttest	Shaping techniques (tokens and social praise contingent on increased correct responses to instructions and questions) were used to improve rehabilitation readiness of regressed and treatment-refractory schizophrenia patients.	Although symptoms did not change, 8 of 11 patients increased their attention from < 5 min to 40-50 min, permitting them to participate and benefit from academic classes and SST
Silverstein et al. 1999b	6 highly symptomatic and distractible schizophrenia inpatients	Within-group, pretest/posttest	Patients enrolled in a basic conversational skills module were exposed to shaping procedures to improve attentiveness over a 3-mo period. Contingent reinforcement	All 6 patients substantially increased their attentiveness and conversational skills.

Table 1. Innovations in skills training therapies for schizophrenia—Continued

Study	Participants	Design	Skills training innovation	Results
Smith et al. 1999	32 DSM-III-R schizophrenia spectrum inpatients recovering from acute psychotic exacerbations	Random assignment to community reentry skills training or supportive group psychotherapy	(tokens and social praise) was used to improve patients' responsiveness to SST techniques. Repeated and longitudinal assessment of neurocognition and symptoms permitted prediction of skills learning in the community reentry module.	Skills training was prepotent over verbal memory deficits and negative symptoms.
Spaulding et al. 1999	90 chronically and severely ill psychiatric inpatients with DSM-III-R schizophrenia spectrum (87%) and other assorted diagnoses	Random assignment to ITP or supportive group therapy	All subjects participated in an enriched inpatient behavioral rehabilitation program over a 6-mo period. ITP subjects received concurrent treatment in three areas of cognitive ability (cognitive differentiation, social cue perception, and verbal communication). SST using the UCLA medication management, leisure skills, and interpersonal problem-solving modules was introduced 3 mos after cognitive process training had commenced. SST concluded at the same time as the cognitive treatment.	ITP participants demonstrated superior improvement, compared with control subjects, on measures of social competence, medication and symptom management, attention, and executive cognitive functioning. Regarding social competence, cognitive treatment nearly doubled the effect size obtained by comprehensive psychiatric rehabilitation without concurrent cognitive therapy.
<b>Smoking cessation and HIV risk reduction</b>				
Kalichman et al. 1995	52 chronically mentally ill adult outpatients (DSM-III-R schizophrenia spectrum and affective disorder diagnoses) at risk for HIV infection	Random assignment to skills-focused AIDS prevention program or waiting-list control group	Participants attended a cognitive-behavioral HIV risk reduction group consisting of four 90-minute training sessions. Sessions emphasized risk education, self-monitoring, sexual assertiveness, condom use, risk-related behavioral self-management, problem solving, role-playing exercises, and homework assignments.	Compared with the waiting-list control group, participants in the prevention program demonstrated significant gains in AIDS-related knowledge and intentions to change risk behaviors. The prevention program significantly reduced rates of unprotected sexual intercourse and increased the use of condoms over a 1-mo followup period.
Katz et al. 1996	27 chronically mentally ill adult outpatients (DSM-III-R schizophrenia or bipolar disorder)	Random assignment to skills-focused AIDS prevention program or no-treatment control group	Skills training was conducted during four 2-hr group meetings over 4 days. Subjects in the treatment condition received HIV risk education, instruction on condom use, and coping skills training for high-risk situations.	Only skills training participants showed significant improvements in knowledge about AIDS, confidence to deal with high-risk situations, and behavioral coping skills. Treatment gains were maintained over a 2-wk followup period.

Kelly et al. 1997	104 chronically mentally ill adult outpatients at risk for HIV infection	Random assignment to single-session AIDS education group, seven-session HIV risk reduction program, or seven-session cognitive-behavioral advocacy training group	A comprehensive HIV prevention intervention was developed to teach risk reduction skills to adults with severe mental illness. Subjects' capacity to change their own HIV risk behavior was strengthened when they were trained to act as risk-reduction advocates with friends.	All study participants exhibited some change in risk-related characteristics and behaviors at 3-mo followup. Subjects who received the combined cognitive-behavioral advocacy training intervention reported significantly greater reductions in rates of unprotected sex and had fewer sexual partners at followup.
Weinhardt et al. 1997	17 seriously mentally ill adult outpatients (DSM-III-R schizophrenia spectrum and affective disorder diagnoses)	Within-group, pretest/posttest design	Participants attended a 6-session HIV risk reduction group based on an information-motivation-behavioral skills model of treatment. Sessions emphasized risk education and assessment, screening of sexual partners, condom use, sexual assertiveness, and role-playing exercises.	Participants' HIV-related knowledge increased significantly following treatment, with information gains maintained at 1-mo followup. Significant gains were obtained in appropriate refusal of unsafe sexual behaviors. There was a systematic relationship between the number of sessions attended and participants' improvement.
Ziedonis and George 1997	24 DSM-IV schizophrenia spectrum outpatients with concurrent nicotine dependence	Within-group, pretest/posttest	The 10-wk smoking cessation program featured nicotine replacement, behavioral group therapy, and individual motivational enhancement therapy. Skills training interventions included self-monitoring, development of adaptive coping skills, goal setting, and reinforcement of efforts to change.	Only 50% of the patients completed the smoking cessation program. During treatment, 30% of participants showed no change in smoking habits, 40% decreased by half the number of cigarettes smoked daily, and 13% remained completely abstinent for at least 6 mos after completing the program.
Addington et al. 1998	50 schizophrenia outpatients with concurrent nicotine dependence	Within-group, pretest/posttest	The 7-wk smoking cessation program featured nicotine replacement, motivational techniques, fading, positive reinforcement, behavioral contracting, practicing alternate behaviors and coping skills, and anxiety reduction strategies. Environmental conditions were modified to accommodate subjects' cognitive impairments.	Significant changes were observed in participants' smoking habits: 42% had stopped smoking at the end of the group sessions, 16% remained abstinent at 3-mo followup, and 12% remained abstinent at 6-mo followup.

Note.—CAT = cognitive adaptation training; HIV = human immunodeficiency virus; ITP = Integrated Psychological Therapy; IVAST = In Vivo Amplified Skills Training; SD = standard deviation; SST = social skills training; UCLA = University of California, Los Angeles.

skills taught in the module, assessed during structured interview sessions, increased significantly for the 44 adults who completed the 3-week program, with concurrent reductions in both positive and negative symptoms. Among the 33 patients for whom 2-week followup data were available, 70 percent were classified as "community adjusters" based on compliance with aftercare recommendations. These results are noteworthy given that participants continued to exhibit psychotic symptoms throughout the treatment period and most had a history of noncompliance.

The studies conducted by Mueser et al. (1990) and Smith et al. (1996) illustrate that short-term social-learning approaches can be integrated into hospital programs to serve acutely disturbed inpatients. Because both investigations were uncontrolled clinical trials, however, they suffer from the internal validity restrictions common to quasi-experimental studies. Kopelowicz et al. (1998) provided a more rigorous test of short-term inpatient skills training in a study that featured random assignment to either a skills training group or an occupational therapy control group. Those researchers modified the community reentry program for use in a rapid-turnover acute care inpatient facility, and patients were offered eight training sessions over a 1-week period (two sessions per day). Members of the multidisciplinary inpatient treatment team were taught to lead therapy groups in a manner consistent with the module's treatment manual. This briefer version of the reentry module emphasized illness education, stress management, and discharge planning skills. Compared with the control subjects, individuals in the reentry module exhibited significantly greater knowledge and better performance of targeted skills after treatment and were more likely to attend their first community aftercare appointment. Patients who began the program "in mid-stream" achieved similar outcomes to those who followed the manual's prescribed sequence. The importance of this result is clear to those clinicians who must provide inpatient services according to a patient's idiosyncratic timetable of crisis, hospitalization, and recovery, as opposed to fulfilling the design requirements of an experimental investigation.

Wallace et al. (1992) tested the usefulness of skills training methods outside of the acute care setting, offering several UCLA social and self-care modules to 126 patients in State hospital, day treatment, and residential care facilities. A random-assignment experimental design was used to assess treatment efficacy in the State hospital and two large residential care programs (skills training vs. waiting-list control); a pretest/posttest nonexperimental design was used in three smaller residential facilities. Clinical personnel—nursing staff in the inpatient program, owners and operators in the residential care facili-

ties, and recreational therapists and mental health counselors in the day treatment program—attended a 2-day workshop to learn the rationale and procedures of three skills training programs. The majority of trainers implemented the instructional programs accurately over extended periods with only minimal consultation from the research team. Results from group comparisons and within-group analyses indicated that patients' medication management, grooming, and recreational skills, as assessed by role-play testing, improved significantly after treatment regardless of training site but only when therapists' interventions matched those specified in training manuals. The module's effects ranged from moderate to substantial, suggesting that the structure, detail, and procedures presented in the treatment manuals adequately compensated for differences in trainers' educational and professional backgrounds. Followup testing of study participants who remained at the facilities 1 year later indicated that treatment gains were maintained.

Collectively, the studies reviewed here reflect the spectrum of contemporary settings in which schizophrenia is likely to be treated. Although the investigations draw from a common set of social learning principles, they illustrate how training procedures can be adapted to the unique goals, tasks, and resources of particular treatment environments. The community reentry program, for example, targets competencies that reflect the aims of acute care hospitals (i.e., rapid and successful discharge to outpatient therapy). The module focuses solely on the social and instrumental skills that facilitate a patient's smooth transition to community-based care, emphasizing acquisition of a limited set of planning, problem-solving, and self-management abilities. Once the patient reenters the community, relapse prevention, self-care, and interpersonal competencies become paramount. Wallace et al. (1992) suggest that these issues can be addressed effectively in day treatment and residential care settings by harnessing the efforts of on-site clinicians through manualized skills training programs. We next consider how longer term outpatient treatment initiatives may be coordinated to form an effective rehabilitation system for schizophrenia patients who require continuing care in the community.

## Studies Evaluating Long-Term Treatment and Coordination of Care

Dilk and Bond (1996) obtained data on the duration of skills training for 62 of the 68 studies included in their meta-analysis. Training periods were brief in most studies, with mean values of 6.2 weeks of training for between-group experiments and 13.0 weeks of training

for within-group investigations. Dilk and Bond reported that weeks of training correlated significantly with effect size, suggesting a possible relationship between treatment "dose" and clinical outcome. Penn and Mueser (1996) juxtaposed results from several short- and long-term investigations of social skills training, concluding that treatment must be provided over an extended period of time, such as 1 year or longer, for positive results to accrue. Both sets of reviewers recommended further studies to determine the impact of long-term, intensively applied treatment on schizophrenia patients' social functioning.

Seven articles that have appeared since 1992 report the results of intensive, longer term skills training projects. Each investigation provided a period of intensive social skills therapy to schizophrenia outpatients (range: 150–720 minutes of training each week) followed by a longer interval of less intensive follow-along service (range: 60–90 minutes of training each week). The duration of intensive treatment varied across studies (mean: 28.2 weeks; range: 9–70 weeks), as did the length of the follow-along period (mean: 69.6 weeks; range: 24–104 weeks). In all cases, however, the length of the complete treatment experience exceeded that of studies analyzed in the Dilk and Bond review (1996).

The findings from studies reported in table 1 are consistent with those from the previous literature regarding the impact of social skills training on symptoms and relapse. In general, patients who received social skills training exhibited improvements on illness measures similar to those achieved by control subjects, with social skills training having no differential effects on psychopathology (Eckman et al. 1992; Dobson et al. 1995; Hayes et al. 1995; Marder et al. 1996; Liberman et al. 1998). In the four studies in which rehospitalization or symptom exacerbation data, or both, were collected, relapse rates of social skills and control subjects did not differ significantly (Dobson et al. 1995; Hayes et al. 1995; Dobson 1996) except in one case of interaction between drug therapy and psychosocial treatment (Marder et al. 1996).

In the study conducted by Marder et al. (1996), outpatients were given low-dose fluphenazine decanoate (5 mg intramuscularly every 2 weeks) supplemented by either oral fluphenazine (5–10 mg/day) or placebo, randomly assigned, at times of incipient relapse. In addition, patients were randomly assigned to supportive group therapy or social skills training, using the modules in the UCLA Social and Independent Living Skills Program. Patients who received skills training plus placebo had as few relapses as did those who received supportive group therapy plus fluphenazine at times of prodromal emergence of psychosis. This finding suggests that social skills training may have substitutive, protective value against

relapse that is similar to that of antipsychotic medication; in other words, patients who receive social skills training may be protected from stress-related relapse with lower doses of antipsychotic medication. This same finding has been reported in a study of skills training adapted for family intervention (Falloon 1985), in which patients receiving skills-oriented family therapy had fewer than half the number of relapses of their counterparts who received supportive, individual therapy, even though they required substantially less antipsychotic medication.

Treatment research in schizophrenia has generally revealed treatment-specific outcomes, with pharmacotherapy yielding stronger effects on symptoms and relapse rates and with psychosocial interventions producing more robust effects on behavioral and social outcomes (Liberman et al. 1994a). This principle has been reflected by the generally positive results documented from longer term investigations of psychosocial skills training in outpatient settings. Hayes et al. (1995) reported that the conversational skills of schizophrenia patients enrolled in an 18-week social skills training program improved significantly after treatment, more so than the skills of patients assigned to a discussion control group. These skills, assessed during behavioral role-play tests, were maintained over a 6-month followup period, even though treatment during this interval was limited to only nine booster sessions. Eckman et al. (1992) found that a sample of moderately ill schizophrenia outpatients could learn the complex information and skills presented in the UCLA symptom and medication management modules. Individuals who participated in the 6-month training program displayed a marked increase in skills related to symptom monitoring and coping, obtaining information about antipsychotic medication, and negotiating medication issues with health care providers. Subjects in a group therapy control condition did not improve on any of these dimensions, as measured by behavioral performance on role-play exercises. Little erosion of knowledge and skills levels occurred over a 12-month followup period, indicating that treatment gains for skills training subjects were quite durable. Only a single booster session was required during this interval to maintain patients' performance at their posttraining levels.

Two recent studies from the UCLA psychiatric rehabilitation research group (Marder et al. 1996; Liberman et al. 1998) illustrate the effects of extended skills training experiences on schizophrenia patients' community functioning. Marder et al. (1996) provided 2 years of either social skills training or supportive group therapy to 80 men with chronic schizophrenia who were stabilized on low doses of fluphenazine decanoate. Social skills therapy included an intensive phase of medication and symptom management training (twice-weekly sessions for 6

months) followed by less intensive training in social problem-solving and independent living skills (once-weekly sessions for 18 months). Patients who received social skills training reported significantly better social role adjustment during semistructured assessment interviews (Social Adjustment Scale II; Schooler et al. 1979) than those who received supportive group therapy.

Social skills participants also fared better during periods of symptom exacerbation. Under conditions of active drug supplementation, social skills patients scored significantly higher on self-report measures of interpersonal functioning and personal well-being. The benefits of social skills training were greatest among patients who were younger than 24 years old at illness onset. This finding is interesting because it suggests that focused training approaches may be most relevant to individuals whose social role development is interrupted at an early stage.

Liberman et al. (1998) evaluated the effects of a comprehensive 2-year program of skills training on a sample of persistently psychotic schizophrenia outpatients. This sample was made up of 84 considerably disabled men who were randomly assigned to either social skills training or occupational therapy. Each group received 6 months of intensive clinic-based treatment (12 hours/week of group therapy) followed by 18 months of assertive community case management. Social skills training consisted of four modules from the UCLA Social and Independent Living Skills Program: basic conversation, recreation for leisure, medication management, and symptom management. Training was conducted by an occupational therapist and three paraprofessionals who performed instructional procedures with accuracy. To promote the use of skills in the community, case managers routinely encouraged subjects to use the competencies they had learned in everyday situations.

Results were positive for the integrated social skills treatment program: Compared with the subjects treated with occupational therapy, the social skills recipients demonstrated a greater capacity to acquire, maintain, and generalize skills related to independent community functioning. During the 2-year study period, social skills subjects displayed significantly greater knowledge and performance of skills related to the four modules on role-play tests. In addition, on a living skills survey, they reported greater improvement in functional areas unrelated to module content (e.g., management of money and personal possessions, food preparation), and they described less personal distress on self-report questionnaires. In addition, only social skills subjects reported significant improvements in the areas of health maintenance, use of transportation, job seeking, and job maintenance. These results suggest that given sufficient time, practice, and prompting, even treatment-refractory patients can learn

complex social and instrumental skills related to community adjustment, can maintain these skills over time, and can apply them flexibly in everyday environments.

Similarly encouraging findings were reported in a quasi-experimental investigation by Halford et al. (1995), who evaluated the impact of an integrated long-term psychoeducational rehabilitation program on the community functioning of 22 chronic schizophrenia outpatients. Program elements included five 14-week skills training modules (illness education and medication management, symptom coping, conversational skills and problem solving, community living skills, and accessing recreational resources), which were presented in twice-weekly sessions. Case management services were integrated into the skills training program, with participants attending weekly individual meetings to negotiate rehabilitation goals, review progress in the modules, and obtain personal support. Subjects who completed the comprehensive psychosocial training program exhibited significantly less psychopathology and negative symptoms after treatment and reported a significant increase in quality of life. The authors noted, however, that despite the powerful treatment effects, many patients still displayed clear deficits at the end of the program.

The four experimental studies of longer term social skills training suggest that interpersonal and instrumental improvements are possible in schizophrenia, but that meaningful gains are acquired slowly and only under conditions of extended, coordinated treatment. As the results of Marder et al. (1996) and Liberman et al. (1998) attest, considerable improvement in community adjustment is possible when psychosocial skills training is combined with ongoing monitoring of symptoms, responsive pharmacotherapy, and assertive case management. This finding is clearly significant to community clinicians: better psychosocial outcomes may be possible for patients with chronic schizophrenia when existing outpatient services (i.e., provision and monitoring of psychotropic medications, assertive case management) are augmented with ongoing psychosocial skills training.

The methods of the controlled investigations reviewed here suggest a framework for providing coordinated outpatient psychosocial treatment. For example, with only a modicum of training and supervision, paraprofessional staff could serve as social skills instructors to provide competent social learning therapy to schizophrenia outpatients (Wallace et al. 1992; Liberman et al. 1998). Psychiatric nurses, social workers, and psychiatrists could be trained in standardized measures of psychopathology to monitor patients' symptoms and medication responses over time, thereby assuring timely adjustment of pharmacotherapy regimens (Eckman et al. 1992; Marder et al. 1996). Finally, case managers could



serve as psychosocial treatment coordinators, helping patients to set meaningful rehabilitation goals, to monitor progress longitudinally, and to make concrete plans for skills generalization (Halford et al. 1995; Liberman et al. 1998).

As in the learning of any human knowledge or skill (e.g., foreign languages, skiing, use of computer programs), the retention and natural application of acquired competencies require (1) opportunities and encouragement to use the skills and (2) reinforcement for appropriate use of the skills. This principle has been tested in two recently completed formal research studies. In one of these projects, Partners in Autonomous Living (C.J. Wallace, personal communication, 1999), patients selected from their natural social support networks individuals in whom they had confidence and trust. Often, these chosen "partners" were friends, relatives, or nonprofessional care workers in board-and-care homes. The partners were given brief training by a psychologist in how to "run interference" for the patient as he or she put into practice the skills that had been learned in clinic-based training in several of the UCLA modules. The partner's role primarily amounted to helping the patient create opportunities, encouraging the patient, and providing reinforcement for using the skills in the natural environment. For example, partners served as advocates for patients in negotiating with home managers to grant patients more responsibility for medication self-management. Partners also assisted patients in carrying out assignments to find independent recreational opportunities and to engage in these activities to discover which were appealing and worth repeating. Patients who worked with partners showed significantly higher levels of social problem-solving skills and higher quality of life than those who received clinic-based skills training alone.

The second project uses In Vivo Amplified Skills Training (IVAST), an approach in which specialists in social skills training serve as case managers who accompany patients in their natural, everyday settings (Blair et al., in press). The specialist generates opportunities, encouragement, and reinforcement to promote generalization of skills learned in twice-weekly, clinic-based training of the UCLA modules—medication management, symptom management, and social problem solving. Patients were randomly assigned either to the specialist plus clinic-based skills training or to clinic-based skills training alone. Preliminary results of this study have revealed higher levels of social problem-solving skills and significantly greater social adjustment over a 2-year period for patients receiving the IVAST intervention.

The integration of case management and skills training functions raises new challenges to those charged with planning, implementing, and monitoring long-term psy-

chosocial skills therapy. Biobehavioral managers must confront a number of clinical questions regarding patient assignment, treatment format, and the proper sequencing of interventions. For whom is skills training indicated? Should therapy be delivered on an individual or group basis? How can skills training be integrated into patients' natural social support systems? Where along the cognitive-behavioral and symptom continuum should skills training begin? Few empirical studies address these questions directly, but several recent investigations provide clues to patient characteristics that may mediate response to skills training, as well as to novel training strategies that may compensate for enduring deficits caused by illness.

### Patient Characteristics Related to Skills Training Outcome

Dilk and Bond (1996) evaluated several patient variables potentially related to skills training response and reported nonsignificant relationships between effect size and such characteristics as patients' gender, age, number of psychiatric hospitalizations, and months of prior inpatient care. Other variables, such as patients' premorbid social competence, illness subtype, and comorbidity, have been largely unexplored in the psychosocial skills training literature, thus limiting our understanding of which patients do better or worse in instructional programs (Benton and Schroeder 1990; Scott and Dixon 1995). Nevertheless, recent models of interpersonal functioning in schizophrenia have suggested subtypes of social disability, postulating that subgroups of schizophrenia patients may respond differentially to skills training procedures (Heinssen and Glass 1990). Dimensions for subtyping considered in recent trials of social skills training include both positive and negative symptoms of schizophrenia and the degree of patients' cognitive processing impairments.

**Positive and Negative Symptoms.** Nine recent investigations have studied the relationship between patient symptomatology and the acquisition of behavioral competencies in skills training programs (Mueser et al. 1991, 1992; Eckman et al. 1992; Corrigan et al. 1994; Lysaker et al. 1995; Marder et al. 1996; Smith et al. 1996, 1999; McKee et al. 1997). Results from these studies suggest that positive and negative symptoms exert a minimal influence on schizophrenia patients' ability to benefit from skills training. Neither positive nor negative symptoms predict patients' level of participation in training activities (McKee et al. 1997), learning during instructional sessions (Corrigan et al. 1994), or overall response to skills training interventions (Mueser et al. 1991; Eckman et al.

1992; Lysaker et al. 1995; Marder et al. 1996; Smith et al. 1996, 1999). Acute symptoms do not seem to impede skills acquisition in brief training programs (Mueser et al. 1991; Smith et al. 1996; Kopelowicz et al. 1998), but enduring psychosis may negatively affect the retention of skills after short-term treatment (Mueser et al. 1992). Even persistently psychotic patients can maintain skills, however, when training is intensive, occurs over long periods, and includes interventions that prompt the use of skills in the natural environment (Lieberman et al. 1998). The prepotency of skills training over obstacles raised by psychotic symptoms was shown in two studies, in which schizophrenia patients effectively learned skills from the medication management, symptom management, and community reentry modules of the UCLA Social and Independent Living Skills Program, regardless of their level of psychotic symptomatology (Eckman et al. 1992; Smith et al. 1999). Thus, neither positive nor negative symptoms of schizophrenia appear to present insurmountable barriers to the learning of new behavioral competencies.

Kopelowicz et al. (1997) recently evaluated the efficacy of intensive behavioral social skills training for schizophrenia outpatients with deficit syndrome features, a putative subtype of negative symptoms that are prominent, primary, and enduring (Carpenter et al. 1988). One-to-one social skills training (60-minute sessions twice weekly for 3 months) was offered to three individuals who met deficit syndrome criteria (Kirkpatrick et al. 1989), as well as three patients who displayed nondeficit negative symptoms. Compared with deficit syndrome patients, nondeficit subjects displayed significantly better social and communication skills (e.g., eye contact and voice volume) on a behavioral role-play test immediately following training and at 6-month followup. Nondeficit patients improved significantly on each trained social skill, and their improvement remained 6 months later. Patients with the deficit syndrome did not show any meaningful change in behavioral skills either after training or at followup.

Kopelowicz et al. (1997) tentatively concluded that schizophrenia patients with nondeficit negative symptoms are amenable to intensive social skills training, whereas deficit syndrome patients may possess significant deficiencies in skills acquisition. Those authors speculated that the poorer treatment response observed for deficit syndrome individuals may be due to greater neuroanatomical, neurobiological, and neurocognitive impairment, all of which limit a patient's potential for learning new skills. This hypothesis is consistent with recent models of information processing in schizophrenia, which suggest that the severity of patients' cognitive dysfunction mediates response to skills training. A different approach to psy-

chosocial treatment may be required for cognitively disordered patients, such as interventions that directly address impairments in patients' information receiving, processing, and sending skills (Lieberman et al. 1993).

**Cognitive Deficits and Psychosocial Skills Training.** It is well documented that individuals with schizophrenia exhibit pervasive neurocognitive deficits including impairments of attention, memory, and concept formation (Gold and Harvey 1993; Nuechterlein and Dawson 1984; Green 1998). Cognitive processing difficulties are believed to restrict the schizophrenia patient's ability to learn new skills, to perform them reliably over time, and to generalize them to new settings (Corrigan and McCracken 1997). Several recent investigations have evaluated this hypothesis empirically, studying relationships among information processing measures and such outcome variables as patients' attendance and participation in skills training programs, skills learning, and performance of new behaviors after training (Mueser et al. 1991; Kern et al. 1992; Bowen et al. 1994; Corrigan et al. 1994; Lysaker et al. 1995; McKee et al. 1997; Silverstein et al. 1998; Smith et al. 1999).

McKee et al. (1997) assessed the neuropsychological functioning of 19 hospitalized chronic schizophrenia patients who participated in the UCLA community reentry training module. Deficits in sustained attention (Symbol Digit Modalities Test, WISC-III mazes), together with negative symptoms, predicted poor attendance at skills training groups. Selective attention (Stoop Color-Word Test) correlated positively with participation in learning activities. McKee et al. (1997) reported that patients susceptible to distraction were less active during skills training sessions than individuals able to maintain task focus. Kern et al. (1992) found a similar relationship between selective attention (Digit Span Distractibility Test) and on-task behavior for 16 psychotic inpatients enrolled in the UCLA symptom and medication management training modules. These authors reported that distractibility predicted poorer performance during learning activities, as did vulnerability to intrusions on a verbal learning task (Rey Auditory Verbal Learning Test).

Two recent investigations have explored relationships among cognitive processing variables and schizophrenia patients' performance during elemental skills training exercises. Bowen et al. (1994) assessed mediators of skills acquisition among 30 schizophrenia inpatients who participated in a single session of medication self-management training. Measures of sustained concentration (Continuous Performance Test) and distractibility (Digit Span Distractibility Test) predicted mastery of principles and behaviors associated with successful medication self-administration (Medication Management Test). In a sepa-

rate cross-sectional study of 30 schizophrenia inpatients, Corrigan et al. (1994) found that measures of distractibility (Digit Span Distractibility Test) and verbal memory (Rey Auditory Verbal Learning Test) correlated strongly with performance on the Medication Management Test.

Other studies have evaluated the impact of information processing deficits on schizophrenia patients' responsiveness to training interventions. Mueser et al. (1991) reported that verbal memory (Wechsler Memory Scale) was the strongest predictor of verbal communication and global assertiveness improvements among 55 schizophrenia patients who completed a 2-week social skills training program. Subjects with poor memory tended to have more pronounced skill deficits before treatment, and they acquired new competencies more slowly than less impaired individuals. Kern et al. (1992) found that verbal learning deficits (Rey Auditory Verbal Learning Test) predicted knowledge and behavioral skill acquisition for 16 psychotic inpatients enrolled in an 8-month module for either symptom or medication management. Lysaker et al. (1995) reported that bizarreness of thought, concrete thinking, and impaired concept formation (Gorham Proverbs Test, Wisconsin Card Sorting Test) predicted rates of improvement in workplace social skills in a sample of 53 schizophrenia patients who participated in a 26-week work rehabilitation study. Patients who displayed greater neuropsychological deficits before treatment achieved fewer gains in communication skills than patients who had greater cognitive functioning before training.

Silverstein et al. (1998) reported that pretreatment attention and verbal memory abilities mediated skills learning in a sample of 26 chronic schizophrenia inpatients. Successful performance of basic conversational skills after treatment was related to patients' attention, response inhibition, verbal learning ability, conceptual flexibility, verbal intelligence, inferential reasoning, and verbal fluency. Smith et al. (1999) found that verbal memory was highly predictive of skills acquisition in 32 hospitalized chronic psychotic patients who participated in up to 16 sessions of the community reentry module, whereas symptoms were not significantly predictive of outcome. It was interesting that participation in the community reentry module itself accounted for more of the outcome variance in acquisition of skills than did neurocognitive functioning, suggesting that the learning activities integral to the module could overcome the obstacles posed by neurocognitive deficits.

Results from the eight studies reported here are consistent with the hypothesis that cognitive processing impairments mediate the acquisition of behavioral competencies in schizophrenia. Difficulties in any number of areas, such as sustained and selective attention, verbal

memory and learning, and concept formation and reasoning, may limit a patient's capacity to learn, perform, and apply new response skills successfully. Several authors have suggested that remediation of basic information processing difficulties may improve skills training outcomes by removing obstacles to learning "upstream" (Spaulding et al. 1986, 1999; Silverstein et al. 1998), thereby increasing the patient's readiness for training activities. A novel shaping strategy for improving attentional capacity among distractible and thought-disordered schizophrenia inpatients illustrates this approach (Bellus et al. 1999; Silverstein et al. 1999a, 1999b). Shaping interventions are performed during skills training sessions by a cotherapist, who roams around the group training setting and systematically and contingently delivers tokens, credits, and social reinforcement to patients as they incrementally increase the duration of their attentiveness. At the end of the session, patients can exchange their tokens or credits for a variety of desired rewards, including consumables, privileges, and luxuries. Attentiveness has been measured and operationalized by such behaviors as "heads up," "eyes focused on group leader," making of comments that reflect accurate tracking of group training activities, and appropriate responses to instructions. Shaping interventions have been shown to increase the attentiveness of cognitively dysfunctional patients from less than 5 minutes to 45 minutes of sustained participation in a skills training class (Silverstein et al. 1999a, 1999b), a finding which illustrates the value of shaping procedures as an adjunct to standard skills training procedures.

Before 1999, controlled evaluation studies of cognitive remediation techniques had not been conducted (Scott and Dixon 1995; Penn and Mueser 1996). Spaulding et al. (1999) have addressed this gap in the empirical literature by evaluating a cognitive process targeting approach to social and living skills training in a mixed population of 90 adult inpatients with treatment-refractory schizophrenia (87%) or other chronic psychiatric disorders. The project was designed for rigorous testing of the hypothesis that cognitive process therapy enhances the acquisition of behaviors taught in standard social skills training programs. Subjects were randomly assigned to either cognitive process or supportive group therapy, each group receiving treatment three times per week (60-minute sessions) for 6 months. Cognitive process therapy consisted of three subprograms of a more comprehensive psychosocial treatment modality, Integrated Psychological Therapy (Brenner et al. 1992, 1994), which targets cognitive differentiation, social perception, and verbal communication skills (e.g., attention and short-term memory) as a preliminary step in the social skills training process. A 12-week course of social skills training (UCLA medication management, leisure

skills, and interpersonal problem-solving modules) was introduced to both cognitive and supportive therapy subjects after 3 months of experimental treatment. All patients participated in a structured inpatient psychosocial rehabilitation program throughout the study, which featured optimal pharmacotherapy, milieu-based behavioral treatment, patient and family psychoeducation, occupational therapy, and other social services.

Although subjects in both treatment groups demonstrated significant improvements in positive symptoms and social skills after intensive therapy, patients in the cognitive therapy group showed incrementally greater gains on measures of (1) information processing (span of apprehension, card sorting, Trails B), (2) knowledge and skills presented in the medication management module, and (3) social competence as measured by the Assessment of Interpersonal Problem-Solving Skills task (Donahoe et al. 1990). The social competence scores that showed the greatest cognitive treatment effect were the ones involved with apprehending details of social situations, incorporating the details into a more complete understanding of the problem situation, and matching a solution to the situation. Cognitive treatment effects on these measures nearly doubled the effect size of the standard inpatient rehabilitation program. These results support the hypothesis that therapy procedures that target impaired cognition enhance improvement in social competence during comprehensive psychiatric rehabilitation of severely disabled psychiatric patients. Further empirical study is needed to determine whether improvements observed in patients' social functioning endure over time and whether they generalize to community settings.

An alternate approach to cognitive rehabilitation in schizophrenia involves milieu-based interventions, in which characteristics of the treatment setting are adjusted to compensate for patients' difficulties with information processing. Heinssen (1996) proposed that behavioral skills training programs could be made more effective if environmental conditions were arranged to compensate for deficits in patients' attention, concentration, and memory and to provide opportunities, encouragement, and reinforcement for improved functioning. A recent investigation by Velligan et al. (1996) tested this strategy on an inpatient unit for chronic schizophrenia patients. Twenty individuals received cognitive adaptation training (CAT), a treatment approach designed to alter the physical environment to compensate for patients' underlying impairments in executive functioning. Nursing staff followed a CAT training manual and used a wide range of environmental manipulations, such as removal of distracting stimuli, extensive use of cueing devices (e.g., labels, signs, schedules, recorded messages), and rearrangement of physical objects. Patients also received "standard psy-

chosocial programming," which consisted of 20 hours each week of group psychotherapy, medication education, occupational therapy, socialization, and educational or work training.

Measures of positive symptoms, negative symptoms, and behavioral adaptation (i.e., ratings of the ability to perform everyday tasks such as personal hygiene, laundry, care of living quarters, shopping, and money management) were collected for CAT participants before and after 9 weeks of treatment on the inpatient unit. Change scores for these individuals were compared with those of a comparison sample of 20 schizophrenia patients who had been treated on the unit immediately before the CAT program was introduced. The comparison sample had received an equivalent dose of standard psychosocial programming and had been hospitalized for a comparable period. Results indicated that during the inpatient treatment, both groups improved significantly on measures of positive and negative symptoms, as well as on behavioral self-care. Patients in the CAT group, however, showed significantly greater improvement in behavioral functioning than control patients, which suggests a differential treatment effect for the environmental intervention. Given the quasi-experimental nature of the study, the influence of other factors on patients' hospital functioning, such as historical artifacts or staff members' enthusiasm during the CAT intervention, could not be ruled out. Nevertheless, Velligan et al. (1996) noted that the behavior changes observed in CAT patients were meaningful in clinical terms, because these patients demonstrated noticeably greater independence in performing self-care tasks after therapy. Clinicians working on chronic schizophrenia units recognize the importance of this outcome not only for the patients receiving inpatient treatment but also for staff members responsible for providing intensive care over long periods.

The studies conducted by Kopelowicz et al. (1997), Silverstein et al. (1999a, 1999b), Spaulding et al. (1999), and Velligan et al. (1996) evaluated individual, group, and environmental therapies designed to improve outcomes for treatment-refractory schizophrenia patients, specifically those with deficit symptoms, established chronicity, or pervasive cognitive impairment. Such patients often have the steepest gradient to climb to attain or even approximate normal social roles (Lieberman et al. 1998). Standard psychosocial skills training approaches may not apply to this subgroup of schizophrenia patients, which suggests the need for such alternative strategies as behavioral shaping, intensive one-to-one skills training, cognitive rehabilitation, or environmental engineering to overcome motivational and learning deficits. The findings reported by Spaulding et al. (1999) suggest that a period of intensive cognitive process group therapy, delivered in the context

of a social learning milieu rich in discriminative stimuli, corrective feedback, and contingent reinforcement, improves illness management and social functioning among treatment-refractory patients. Whether similar results can be attained in less structured community treatment settings remains to be seen. In the interim, clinicians in both hospital and clinic settings can implement widely available technologies, such as those described by Kopelowicz et al. (1997), Silverstein et al. (1999a, 1999b), and Velligan et al. (1996), to create learning environments that compensate for patients' difficulties in attention, memory, and executive functioning. Guidelines for coordinating individual skills training and environmental engineering approaches for schizophrenia patients are available (Heinssen and Victor 1994; Heinssen 1996). The additive effects of combining pharmacological, skills training, and environmental interventions with treatment-refractory schizophrenia patients were shown in a controlled study of systematic haloperidol reduction and wardwide skills training provided in the context of a comprehensive token economy (Lieberman et al. 1994b). When patients' plasma levels were brought into the therapeutic range, they showed optimal improvements in symptoms and side effects. On the other hand, when the optimal haloperidol drug dose was kept constant, subsequent introduction of intensive and focused behavior therapy and skills training yielded significant additional benefits in psychosocial functioning and behavioral problems that had been preventing patients' return to community life.

Cognitively impaired, treatment-refractory patients represent only one subgroup of interest to practitioners of skills training. Recent investigations have explored the efficacy of skills training programs for other cohorts of schizophrenia patients, specifically those presenting with concurrent problems such as alcohol or substance abuse, nicotine dependence, and high-risk sexual behavior. Empirically validated approaches to substance abuse treatment are reviewed by Drake and Muesser in this issue of the *Schizophrenia Bulletin* and are not evaluated in this discussion. We next consider a small set of studies that examine the efficacy of skills training interventions for reducing smoking and human immunodeficiency virus (HIV) risk behaviors in schizophrenia outpatients.

## Smoking Cessation and HIV Risk Reduction Programs

**Smoking Cessation Programs.** Only two empirical studies of smoking cessation interventions for schizophrenia have appeared in the literature since 1994 (Ziedonis and George 1997; Addington et al. 1998). Ziedonis and George (1997) reported results from an uncontrolled pilot study of 24 smokers with schizophrenia who were treated

for 10 weeks in a smoking cessation program within a community mental health center. All participants met *DSM-IV* criteria for nicotine dependence. Approximately three-fourths of the participants presented in the contemplation stage of the Prochaska and DiClemente (1983) readiness for change model (i.e., they admitted that smoking is a problem but probably did not want to quit in the next 6 months). Treatment included nicotine replacement and weekly behavioral group therapy or weekly individual motivational enhancement therapy or both (Miller and Rollnick 1991). Behavior therapy focused on identifying personal triggers for using substances and developing coping strategies for managing those triggers. Motivational enhancement interventions included (1) eliciting and reinforcing the patient's self-motivational statements, (2) helping the patient consider the advantages and disadvantages of continued smoking versus smoking cessation, (3) developing a change plan collaboratively with the patient, and (4) using followup letters and phone calls to foster program attendance.

Only half of the patients completed the smoking cessation program. Of the sample as a whole, 30 percent of the subjects did not change their smoking patterns over the course of treatment, 40 percent decreased by half the baseline number of cigarettes smoked daily, and 13 percent remained completely abstinent (as verified by carbon monoxide monitoring) for at least 6 months after completing the program. The remaining patients (17%) had several episodes of weekly abstinence and reported plans to make another serious attempt to quit in the next 6 months. Ziedonis and George (1997) reported that patients seemed to benefit most when behavioral and motivational interventions were delivered in concert.

Addington et al. (1998) assessed the efficacy of a smoking cessation group modified to meet the needs of cognitively impaired individuals. The seven-session program featured nicotine replacement, motivational techniques, and various behavior modification interventions, such as fading, positive reinforcement, behavioral contracting, rehearsal of alternate behaviors and coping skills, and anxiety reduction strategies. Environmental conditions were adjusted in the treatment setting to offset patients' limitations in processing information in the areas of attention, memory, vigilance, and poor executive functioning. Environmental interventions included supportive reminder cues, external memory devices, posting the correct sequence of task behaviors, and adjusting the pace of sessions to match patients' slower processing speed.

Of 65 schizophrenia patients with long histories of heavy smoking who entered the smoking cessation program by self-referral, 50 (77%) completed the uncontrolled clinical trial. Assessments of patients' smoking and psychiatric symptoms were made immediately before and after treatment, and at 3- and 6-month followup evalua-



tions. Smoking cessation status was validated biochemically by determination of urinary cotinine levels. Positive and negative symptoms of schizophrenia were unchanged after treatment, but 42 percent of the subjects had stopped smoking by the end of the program ( $p < 0.001$ ). Relapse, however, was frequent among patients who completed the program: only 12 percent remained abstinent at 6-month followup. This finding suggests that brief smoking cessation programs for schizophrenia may require some form of "booster" intervention to sustain patients' long-term motivation for quitting.

**HIV Risk Reduction Programs.** Four recent investigations have tested the efficacy of behavioral skills training for decreasing high-risk sexual behavior among schizophrenia outpatients (Kalichman et al. 1995; Katz et al. 1996; Kelly et al. 1997; Weinhardt et al. 1997). Each study provided brief therapy (four to seven sessions) and evaluated treatment effects over short followup periods (2 weeks to 3 months). Of the three experimental investigations, two used no-treatment control conditions (Kalichman et al. 1995; Katz et al. 1996) and one used a single-session AIDS education group (Kelly et al. 1997) to evaluate the impact of skills training on risk-related behaviors. Behavioral skills training techniques common to the four studies included HIV and AIDS education, coping skills training for high-risk situations, role-play exercises to strengthen sexual assertiveness (i.e., the ability to resist potentially dangerous drug-related and sexual activities), and instruction on the proper use of condoms. Two programs used financial or other incentives to encourage patients' attendance at group meetings (Katz et al. 1996; Weinhardt et al. 1997).

Results from the four investigations were consistent and can be summarized as follows: Brief behavioral skills training programs result in significant improvements in (1) AIDS-related knowledge (Kalichman et al. 1995; Katz et al. 1996; Weinhardt et al. 1997); (2) sexual assertiveness, as assessed by behavioral role-play test (Katz et al. 1996), written responses to role-play probes (Weinhardt et al. 1997) and questionnaire data (Kalichman et al. 1995); and (3) patients' self-report of safe sex practices (Kalichman et al. 1995; Kelly et al. 1997). Skills training effects were stable over such short periods as 1–3 months (Kalichman et al. 1995; Kelly et al. 1997; Weinhardt et al. 1997). Regarding potential moderator variables, Weinhardt et al. (1997) reported a systematic relationship between the number of sessions patients attended and the degree of observed improvement in high-risk behavior. Kelly et al. (1997) found that patients' capacity to change their own HIV risk behavior was strengthened when they were trained to act with friends as advocates of risk reduction.

Each of the six smoking cessation and HIV risk reduction programs reviewed here suffer from one or more design limitations common to first generation studies, including inadequate experimental controls, brief followup intervals, and an overreliance on patient self-reporting to evaluate behavior change. Future investigations of health risk reduction in schizophrenia will undoubtedly address these methodological shortcomings. Meanwhile, the six studies reviewed here illustrate how methods developed in social skills training programs for schizophrenia may be applied in psychosocial treatments for concurrent health and behavior problems. Future risk reduction initiatives for schizophrenia should take into account concepts and procedures already tested in the social skills literature, particularly strategies for maintaining clinical gains through long-term coordinated care. Conversely, the conventional skills training literature will benefit by adopting and evaluating the compliance- and motivation-enhancing strategies described by Ziedonis and George (1997), Addington et al. (1998), and Weinhardt et al. (1997). As we describe below, careful assessment of patients' receptivity to change and motivation for treatment may result in therapy prescriptions that both reduce attrition in skills training programs and increase long-term cooperation with treatment.

## Synthesis of Findings

The studies listed in table 1 illustrate the continuing evolution of psychosocial skills training approaches for schizophrenia. Recent investigations have addressed several of the questions posed by the Schizophrenia PORT, practice guidelines, and other reviews of the literature regarding the efficacy and effectiveness of learning-based therapies. Skills training programs are now validated across a broader range of treatment settings, over longer periods, and within subgroups of schizophrenia patients previously understudied. Various innovative training strategies have broadened the scope of potential treatment targets (e.g., discharge readiness, illness management, smoking cessation, HIV risk reduction, and social response skills), expanded the ranks of skills training practitioners (e.g., nursing personnel, recreational therapists, mental health counselors, residential managers, and paraprofessional staff in day treatment programs), and diversified the techniques used to promote and maintain behavior change (e.g., shaping, cognitive process therapy, mastery-oriented skills training, and motivation enhancement techniques).

Although results from these studies suggest that long periods of coordinated skills-based treatment are useful for subjects with chronic schizophrenia, many questions remain regarding the form and content of this treatment. For example, should skills training interventions be deliv-



ered intensively at first, followed by longer periods of less intensive therapy, or should intensity remain constant over an extended period? Should skills training unfold in a particular progression of activities (e.g., symptom management before conversational skills), or can patients be assigned to interventions without regard to sequence? Can social skills training be combined with other psychosocial treatments, such as vocational rehabilitation and supported housing initiatives, to increase community adaptation? Answers to these questions await further empirical study. In the meanwhile, we can use the findings from the 27 investigations evaluated here, combined with those covered in previous reviews, to make clinical recommendations regarding patient assignment, treatment selection, and generalization strategies in psychosocial training programs.

**Who Benefits From Psychosocial Skills Training?** The modal patient studied in schizophrenia skills training trials is a young white man whose history of mental illness spans a decade or longer. Usually, the patient is a high school graduate, an armed services veteran, and unemployed. He does not exhibit alcohol or substance abuse problems, because these would often be reasons to be excluded from skills training investigations. Usually, such an individual achieves modest clinical gains while in the social skills program. Beyond these general features, no patient characteristics other than cognitive processing impairments have been consistently associated with success or failure in skills training programs.

As illustrated by the studies included in this review, psychosocial skills training methods can be adapted to meet the needs of a diverse set of patients in a variety of treatment settings. In very different versions, behavioral skills training interventions have proved effective with acutely ill inpatients (Mueser et al. 1990; Smith et al. 1996, 1999; Kopelowicz et al. 1998), persistently psychotic outpatients (Lieberman et al. 1998), individuals in the subacute phase of illness (Eckman et al. 1992; Dobson et al. 1995; Halford et al. 1995; Hayes et al. 1995; Blair et al., in press) and those with severe and persistent forms of schizophrenia (Wallace et al. 1992; Lieberman et al. 1994b; Katz et al. 1996; Velligan et al. 1996; Kalichman et al. 1995; Kelly et al. 1997; Weinhardt et al. 1997; Bellus et al. 1999; Silverstein et al. 1999a, 1999b; Spaulding et al. 1999). Most schizophrenia patients seem able to learn new skills if the content, form, and duration of training is adjusted to match their stress tolerance or information processing limitations or both. Thus, the proper question is not "for whom is skills training appropriate?" Rather, clinicians should consider how general skills training procedures can be adapted to match a particular patient's profile of symptoms, skills deficits, learning impairments, and motivational characteristics. The study by Kopelowicz et al. (1997) suggests that such an

individualized approach to behavioral assessment and treatment yields benefits with negative-symptom patients, a group generally considered resistant to psychosocial intervention.

**Is There an Optimal Approach to Skills Training?** The efficacy of psychosocial skills training for improving behavior dysfunction in schizophrenia has been established in several meta-analytic and narrative reviews of the empirical literature (Benton and Schroeder 1990; Corrigan 1991; Halford and Hayes 1991; Bellack and Mueser 1993; Dilk and Bond 1996; Penn and Mueser 1996; Mueser et al. 1997). To date, no studies have evaluated simultaneously different approaches to skills training with schizophrenia patients, so there is no empirical basis for judging any existing approach as superior to another. It is generally recommended, however, that skills training procedures be modified to compensate for schizophrenia patients' poor learning capacities. Thus, programs that maximize patients' limited cognitive resources through procedural and environmental accommodations are preferred.

One strategy developed specifically to provide a favorable educational milieu for schizophrenia patients is the modular approach to social and independent living skills training created by Liberman et al. (1986) at UCLA. As previously described in this report, skills training modules have been developed in the areas of community reintegration, medication and symptom management, basic conversation, grooming, and recreation for leisure. The modular procedures are designed to compensate for cognitive and learning disabilities by emphasizing a highly structured format, frequent repetition of new material, auditory and visual presentation of information, and verbal reinforcement for attention and participation. Trainers use a combination of techniques, including focused instructions, video modeling of skills, behavior rehearsal with immediate positive feedback, overlearning, cognitive restructuring, and generalization planning, to overcome patients' apathy, distractibility, poor memory, and deficient problem-solving ability. Training in a skill area continues until each patient achieves the mastery criterion of 80 percent of the knowledge and skills presented in the lesson, as determined by behavioral role-play tests. The UCLA modules have been successfully used by a broad array of professionals and paraprofessionals in the United States, with mounting evidence of clinical efficacy.

Cross-national and cross-cultural replications of modular skills training for schizophrenia provide further validation for this modality. A number of such replications now exist from Australia, Canada, Europe, Japan, and China (Lieberman 1998). Schaub et al. (1998a, 1998b), for example, documented the efficacy of the medication and symptom management modules from the UCLA Social

and Independent Living Skills Program in German-speaking hospitals and clinics in Switzerland and Germany. Moreover, those authors documented a significant shift from "external" to "internal" locus of control after training in illness self-management, suggesting that patients gained greater mastery over the passivity and involuntariness that often accompanies schizophrenia (Schaub and Liberman, in press). Francophone translations of the modules, problem-solving training, and individualized approaches to skills training have been shown to be efficacious in Switzerland, Quebec, and France (Chambon and Marie-Cardine 1998; Lalonde and De Plaen 1998; Favrod et al. 1998).

A Polish translation of the Medication Management Module yielded significantly greater knowledge and skills related to reliable use of antipsychotic medication than unstructured educational groups or customary care (Meder et al. 1998). The Basic Conversation Skills Module has been successfully adapted and used in Sofia, Bulgaria, in a day hospital (Butorin and Liberman 1998). In a well-designed, randomized controlled trial with 72 persons with schizophrenia of the Chinese translation of the Medication Management Module, statistically significant superiority was noted for those who participated in the module over a control group for medication compliance, subjective satisfaction with medication, symptom improvement, and social functioning at a 6-month followup (Xu et al. 1999).

In a 6-month controlled project at a community mental health center, one group of unacculturated Latino patients with schizophrenia received training in the Spanish language versions of the Medication and Symptom Management modules during their participation at the mental health center. Their family members came to the mental health center separately and received the same training, adapted for family members, over the 6-month period. Followup evaluations conducted 1 year later found that the patients in the training program, in contrast with a control group that received "customary" treatment at the mental health center, had significantly fewer symptoms, better medication compliance, and greater knowledge and skill in managing their illnesses (Kopelowicz and Zarate 1998).

**Do Learned Skills Generalize to Natural Settings?** There is scant evidence that schizophrenia patients ever apply the social and instrumental skills taught in training programs to real-life situations (Halford and Hayes 1991; Scott and Dixon 1995; Dilk and Bond 1996). The results of Marder et al. (1996), Liberman et al. (1998), and Blair et al. (in press) suggest that patients can learn to implement acquired skills in natural settings when (1) treatment is provided over extended periods, (2) opportunities for using skills are created within the patient's environment, and (3) skill performance is prompted and reinforced by external agents.

Beyond these investigations, there are few data to support the efficacy of generalization strategies as they currently exist in skills training programs.

Findings from several of the studies listed in table 1 suggest an alternate approach to poor skills generalization in schizophrenia. The methods and results reported in the table suggest that schizophrenia patients are capable of acquiring knowledge and skills in a variety of domains when (1) training addresses a discrete set of competencies, (2) targeted skills are introduced in a graded fashion, and (3) therapy proceeds within a training-to-mastery framework. Under conditions such as these, patients show little difficulty in performing a variety of skills in the settings where they learn them. We surmise that the clinical effectiveness of skills training might improve if training exercises were conducted directly within patients' social, residential, or work environments, i.e., the settings where skills application is most relevant. We predict that changing the venue of skills training sessions would result in ecologically valid response skills that would integrate seamlessly into the patient's personal milieu. The ideal candidate to conduct in vivo treatment may be the biobehavioral manager, whose dual role as skills trainer and assertive case manager will provide the expertise, the mobility, and the context to complete this assignment.

**Recommendations for Administrators and Clinical Practitioners.** The studies reviewed in this report describe psychosocial skills training methods for schizophrenia that were introduced at several levels of psychiatric care, using training materials that allowed on-site clinicians to apply treatments accurately and clinical procedures that closely coordinated medical and psychosocial therapies. These methods will interest mental health system administrators as they suggest strategies for establishing a service continuum for schizophrenia integrated by treatment philosophy, therapeutic procedures, and clinical personnel. Standardization along these lines would improve the quality and responsiveness of care for schizophrenia patients at every level of the system, as each clinical team will understand not only its own mission, tasks, and responsibilities, but how these mesh with surrounding services. The common vocabulary of biobehavioral principles (Liberman et al. 1994a) would facilitate communication among levels of care, providing a seamless treatment experience for patients as they move across integrated training environments.

For clinicians, practical guidelines regarding psychosocial treatment planning and service delivery can be drawn from the studies reviewed here. Because the patient's functioning can only be understood within an environmental context, treatment planning requires answers to each of the following questions before skills training prescriptions can be rendered:

1. In which setting is the patient's behavior deficient?
2. What are the cognitive and behavioral competencies necessary for successful performance in that environment?
3. Which of these competencies does the patient currently lack?
4. What are the cognitive barriers to the patient's learning and performing of these competencies?
5. Do natural reinforcers operate to support and strengthen the patient's adaptive responses?
6. Is the patient motivated to learn targeted behaviors?

As discussed previously, the meager evidence for behavioral skills generalization in schizophrenia suggests that skills training should occur in settings where behavior is deficient, rather than a remote treatment location. Thus, the clinician's first task is to determine where and how the patient's behavior is lacking, integrating input from the patient, family members, and significant others. The clinician next identifies the components of effective functioning by performing a task analysis, where competent responses to situational demands are identified and deconstructed to determine the cognitive and behavioral hierarchies which constitute adaptive output (McFall 1982; Bellack 1983). The clinician then evaluates the patient's functioning within the environment of interest, noting strengths and deficits within the existing cognitive-behavioral repertoire. Skills deficiencies are cataloged through direct observation, and barriers to learning are discerned by noting the interplay of the patient's cognitive deficits with stimulus and feedback features of the performance setting. At the same time, the clinician examines the system of natural reinforcers that surround the patient's behavior. The goal here is to determine how the people and events that constitute the patient's milieu act to either strengthen or extinguish adaptive responses.

Current models of treatment adherence in schizophrenia stress the importance of assessing patients' expectations regarding therapy targets, goals, and outcomes (Corrigan et al. 1990; Heinssen et al. 1995; Fenton et al. 1997). Skills training prescriptions should consequently take into account patients' understanding of presenting problems, personal goals for behavioral adaptation, and beliefs about the change process. The ensuing treatment plan should reflect patients' aspirations for growth, specify training procedures matched to the individual's information processing capabilities, and regulate the difficulty of behavioral exercises to create "success momentum" (Heinssen and Victor 1994). Other compliance enhancement strategies, such as motivational interviewing (Miller and Rollnick 1991) or therapeutic con-

tracting (Heinssen et al. 1995), could be considered for patients who demonstrate variable commitment to skills-based therapy.

Should the patient agree that a problem exists and should he or she consent to treatment, skills training may proceed using the assessment and instructional strategies described in standard skills training manuals (Beidel et al. 1981; Liberman et al. 1989). Depending on the nature of the patient-environment interaction, it may be necessary to augment standard methods with other cognitive-behavioral strategies such as cognitive process therapy (Brenner et al. 1994), contingent reinforcement, or shaping of desired responses. If group treatment is recommended, and the patient's presenting problem corresponds to one of the program's content areas, assignment to module-based intervention is indicated. The UCLA modules provide highly structured curricula for teaching targeted skills, a trainer's manual, and a videotape that demonstrates skills to be learned. They are widely available and provide clinicians unfamiliar with skills training procedures powerful tools for introducing learning-based therapy for schizophrenia in a manner consistent with best practices guidelines.

## Conclusions

Data supporting the efficacy of psychosocial skills training continue to accumulate. Such programs should remain as elements of best practices guidelines and treatment recommendations for schizophrenia. Findings considered in this review expand our knowledge base concerning where, how, and by whom these interventions can be applied to improve the social and instrumental functioning of schizophrenia patients. Unanswered questions remain, but cautious optimism is warranted regarding the further development of clinically effective psychosocial skills training methods. Future directions for psychosocial skills training include integration of assertive case management with skills training interventions, combining skills training procedures with other psychosocial treatments such as vocational rehabilitation and supported housing, and using in vivo training in community settings, with natural caregivers, to create opportunities, encouragement, and reinforcement for the use of coping abilities in everyday life. It must be determined whether the cognitive process improvements noted by Spaulding et al. (1999) hold up over time, are maintained in environments outside of the inpatient treatment setting, and can be replicated by others. Finally, motivation and compliance-enhancing strategies deserve further study in psychosocial skills training investigations, particularly those interventions which emphasize collaborative partnerships between consumers of mental health services and those who serve them.

## References

- Addington, J.; el-Guebaly, N.; Campbell, W.; Hodgins, D.C.; Addington, D. Smoking cessation treatment for patients with schizophrenia. *American Journal of Psychiatry*, 155:974-976, 1998.
- American Psychiatric Association. Practice guideline for the treatment of patients with schizophrenia. *American Journal of Psychiatry*, 154:1-63, 1997.
- Anthony, W.A., and Blanch, A. Supported employment for persons who are psychiatrically disabled: An historical and conceptual perspective. *Psychosocial Rehabilitation Journal*, 11:5-23, 1987.
- Bandura, A. *Principles of Behavior Modification*. New York, NY: Holt, Reinhart and Winston, 1969.
- Beidel, D.C.; Bellack, A.S.; Turner, S.M.; Hersen, M.; and Lubner, R.F. *Social Skills Training for Chronic Psychiatric Patients: A Treatment Manual*. Pittsburgh, PA: Western Psychiatric Institute and Clinic, 1981.
- Bellack, A.S. Recurring problems in the behavioral assessment of social skill. *Behavior Research and Therapy*, 21:29-41, 1983.
- Bellack, A.S., and Mueser, K.T. Psychosocial treatment for schizophrenia. *Schizophrenia Bulletin*, 19(2):317-336, 1993.
- Bellus, S.; Kost, P.; Vergo, J.; Gramse, R.; and Weiss, K. The effects of shaping classes on academic skills, self-care skills, and on-ward behavior with persons who are cognitively impaired and chronic psychiatric inpatients. *Psychiatric Rehabilitation Skills*, 3:23-40, 1999.
- Benton, M.K., and Schroeder, H.E. Social skills training with schizophrenics: A meta-analytic evaluation. *Journal of Consulting and Clinical Psychology*, 58:741-747, 1990.
- Blair, K.E.; Glynn, S.M.; Liberman, R.P.; Ross, D.; and Marder, S.R. In vivo amplified skills training: Promoting generalization of independent living skills for clients with schizophrenia. *Psychiatry*, in press.
- Bowen, L.; Wallace, C.J.; Glynn, S.M.; Nuechterlein, K.H.; Lutzker, J.R.; and Kuehnel, T.G. Schizophrenic individuals' cognitive functioning and performance in interpersonal interactions and skills training procedures. *Journal of Psychiatric Research*, 28:289-301, 1994.
- Brenner, H.D.; Hodel, B.; Roder, V.; and Corrigan, P. Treatment of cognitive dysfunctions and behavioral deficits in schizophrenia. *Schizophrenia Bulletin*, 18(1):21-26, 1992.
- Brenner, H.D.; Roder, V.; Hodel, B.; Kienzle, N.; Reed, D.; and Liberman, R.P. *Integrated Psychological Therapy for Schizophrenic Patients*. Toronto, Canada: Hogrefe and Huber, 1994.
- Browne, S.; Roe, M.; Lane, A.; Gervin, M.; Morris, M.; Kinsella, A.; Larkin, C.; and Callaghan, E.O. Quality of life in schizophrenia: Relationship to sociodemographic factors, symptomatology, and tardive dyskinesia. *Acta Psychiatrica Scandinavica*, 94:118-24, 1996.
- Butorin, N., and Liberman, R.P. Adaptation and cross-cultural validation of the Basic Conversation Skills Module in Bulgaria. *International Review of Psychiatry*, 10:67-70, 1998.
- Carpenter, W.T.; Heinrichs, D.W.; and Wagman, A.M.I. Deficit and nondeficit forms of schizophrenia: The concept. *American Journal of Psychiatry*, 145:578-583, 1988.
- Chambon, O., and Marie-Cardine, M. An evaluation of social skills training modules with schizophrenia inpatients in France. *International Review of Psychiatry*, 10:26-29, 1998.
- Corrigan, P.W. Social skills training in adult psychiatric populations: A meta-analysis. *Journal of Behavior Therapy and Experimental Psychiatry*, 22:203-210, 1991.
- Corrigan, P.W., and McCracken, S. *Interactive Staff Training: Rehabilitation Teams that Work*. New York, NY: Plenum, 1997.
- Corrigan, P.W.; Liberman, R.P.; and Engel, J.D. From noncompliance to collaboration in treatment of schizophrenia: Strategies that facilitate collaboration between practitioner and patient. *Hospital and Community Psychiatry*, 41:1203-1211, 1990.
- Corrigan, P.W.; Wallace, C.J.; Schade, M.L.; and Green, M.F. Learning medication self-management skills in schizophrenia: Relationships with cognitive deficits and psychiatric symptoms. *Behavior Therapy*, 25:5-15, 1994.
- Cresswell, C.M.; Kupiers, L.; and Power, M.J. Social networks and support in long-term psychiatric patients. *Psychological Medicine*, 22:1019-1026, 1992.
- Curran, J.P.; Monti, P.M.; and Corriveau, D.P. Treatment of schizophrenia. In: Bellack, A.S.; Hersen, M.; and Kazdin, A., eds. *International Handbook of Behavior Modification and Therapy*. New York, NY: Plenum, 1985. pp. 209-242.
- Dilk, M.N., and Bond, G.R. Meta-analytic evaluation of skills training research for individuals with severe mental illness. *Journal of Consulting and Clinical Psychology*, 64:1337-1346, 1996.
- Dobson, D. Long-term support and social skills training for patients with schizophrenia. *Psychiatric Services*, 47:1195-1199, 1996.

- Dobson, D.J.G.; McDougall, G.; Busheikin, J.; and Aldous, J. Effects of social skills training and social milieu treatment on symptoms of schizophrenia. *Psychiatric Services*, 46:376–380, 1995.
- Donahoe, C.; Carter, M.; Bloem, W.; Hirsch, G.L.; Laasi, N.; and Wallace, C.J. Assessment of interpersonal problem-solving skills. *Psychiatry*, 53:329–339, 1990.
- Drake, R.E., and Mueser, K.T. Psychosocial approaches to dual diagnosis. *Schizophrenia Bulletin*, 26(1):105–118, 2000.
- Eckman, T.A.; Wirshing, W.C.; Marder, S.R.; Liberman, R.P.; Johnston-Cronk, K.; Zimmerman, K.; and Mintz, J. Technique for training schizophrenic patients in illness self-management: A controlled trial. *American Journal of Psychiatry*, 149:1549–1555, 1992.
- Falloon, I.R.H. *Family Management of Schizophrenia*. Baltimore, MD: Johns Hopkins University Press, 1985.
- Falloon, I.R.H.; Held, T.; Coverdale, J.H.; Roncone, R.; and Laidlaw, T.M. Family interventions for schizophrenia: A review of long-term benefits of international studies. *Psychiatric Rehabilitation Skills*, in press.
- Favrod, J.; McQuillan, A.; Pomini, V.; and Ferrero, F.P. Training in interpersonal problem-solving skills in French-speaking Switzerland. *International Review of Psychiatry*, 10:30–34, 1998.
- Fenton, W.S.; Blyler, C.R.; and Heinssen, R.K. Determinants of medication compliance in schizophrenia: Empirical and clinical findings. *Schizophrenia Bulletin*, 23(4):637–651, 1997.
- Gold, J.M., and Harvey, P.D. Cognitive deficits in schizophrenia. *Psychiatric Clinics of North America*, 16:295–312, 1993.
- Green, M.F. *Schizophrenia From a Neurocognitive Perspective*. Boston, MA: Allyn and Bacon, 1998.
- Halford, W.K., and Hayes, R. Psychological rehabilitation of chronic schizophrenic patients: Recent findings on social skills training and family psychoeducation. *Clinical Psychology Review*, 11:23–44, 1991.
- Halford, W.K.; Harrison, C.; Kalyansundaram, M.B.; Moutrey, C.; and Simpson, S. Preliminary results from a psychoeducational program to rehabilitate chronic patients. *Psychiatric Services*, 46:1189–1191, 1995.
- Hayes, R.L.; Halford, W.K.; and Varghese, F.T. Social skills training with chronic schizophrenic patients: Effects on negative symptoms and community functioning. *Behavior Therapy*, 26:433–449, 1995.
- Heinssen, R.K. The cognitive exoskeleton: Environmental interventions in cognitive rehabilitation. In: Corrigan, P.W., and Yudofsky, S.C., eds. *Cognitive Rehabilitation for Neuropsychiatric Disorders*. Washington, DC: American Psychiatric Press, 1996. pp. 395–423.
- Heinssen, R.K., and Glass, C.R. Social skills, social anxiety, and cognitive factors in schizophrenia. In: Leitenberg, H., ed. *Handbook of Social and Evaluation Anxiety*. New York, NY: Plenum, 1990. pp. 325–356.
- Heinssen, R.K., and Victor, B.J. Cognitive-behavioral treatments for schizophrenia: Evolving rehabilitation techniques. In: Spaulding, W., ed. *Cognitive Technology in Psychiatric Rehabilitation*. Lincoln, NE: University of Nebraska Press, 1994. pp. 159–181.
- Heinssen, R.K.; Levendusky, P.G.; and Hunter, R.H. Client as colleague: Therapeutic contracting with the seriously mentally ill. *American Psychologist*, 50:522–532, 1995.
- Ho, A.; Tsuang, J.; Liberman, R.P.; Mintz, J.; and Eckman, T.A. A cohort study of the incremental effectiveness of a dual diagnosis treatment program on stimulant-abusing schizophrenics. *American Journal of Psychiatry*, in press.
- Jerrell, J.M., and Ridgely, M.S. Comparative effectiveness of three approaches to serving people with severe mental illness and substance abuse disorders. *Journal of Nervous and Mental Disease*, 183:566–576, 1995.
- Kalichman, S.C.; Sikkema, K.J.; Kelly, J.A.; Bulto, M. Use of a brief behavioral skills intervention to prevent HIV infection among chronic mentally ill adults. *Psychiatric Services*, 46:275–280, 1995.
- Katz, R.C.; Westerman, C.; Beauchamp, K.; and Clay, C. Effects of AIDS counseling and risk reduction training on the chronically mentally ill. *AIDS Education and Prevention*, 8:457–463, 1996.
- Kelly, J.A.; McAuliffe, T.L.; Sikkema, K.J.; Murphy, D.A.; Somlai, A.M.; Mulry, G.; Miller, J.G.; Stevenson, L.Y.; Fernandez, M.I. Reduction in risk behavior among adults with severe mental illness who learn to advocate for HIV prevention. *Psychiatric Services*, 48:1283–1288, 1997.
- Kern, R.S.; Green, M.F.; and Satz, P. Neuropsychological predictors of skills training for chronic psychiatric patients. *Psychiatry Research*, 43:223–230, 1992.
- Kirkpatrick, B.; Buchanan, R.W.; Alphs, L.; McKinney, P.D.; and Carpenter, W.T. *The Schedule for the Deficit Syndrome*. Baltimore, MD: Maryland Psychiatric Research Center, 1989.
- Kopelowicz, A., and Liberman, R.P. Biobehavioral treatment and rehabilitation of schizophrenia. *Harvard Review of Psychiatry*, 3:55–64, 1995.
- Kopelowicz, A., and Zarate, R. "Teaching Illness Self-Management Skills to Latinos With Schizophrenia and Their Families." Paper presented at the International Conference on Hispanic Psychiatry, Havana, Cuba, November 1998.



- Kopelowicz, A.; Liberman, R.P.; Mintz, J.; and Zarate, R. Comparison of efficacy of social skills training for deficit and nondeficit negative symptoms in schizophrenia. *American Journal of Psychiatry*, 154:424–425, 1997.
- Kopelowicz, A.; Wallace, C.J.; and Zarate, R. Teaching psychiatric inpatients to re-enter the community: A brief method of improving the continuity of care. *Psychiatric Services*, 49:1313–1316, 1998.
- Lalonde, P., and De Plaen, S. Evaluation of skills training at Montreal's Clinic for Young Adults. *International Review of Psychiatry*, 10:20–25, 1998.
- Lehman, A.F.; Steinwachs, D.M.; and the co-investigators of the PORT Project. Translating research into practice: The Schizophrenia Patient Outcomes Research Team (PORT) treatment recommendations. *Schizophrenia Bulletin*, 24(1):1–10, 1998.
- Liberman, R.P. *A Guide to Behavioral Analysis and Therapy*. New York, NY: Pergamon, 1972.
- Liberman, R.P. *Social and Independent Living Skills: The Community Re-Entry Program*. Camarillo, CA: Psychiatric Rehabilitation Consultants (PRC), 1994. (Available from PRC at Box 2867, Camarillo, CA 93011-2867, or call 805-484-5663.)
- Liberman, R.P. International perspectives on skills training for the mentally disabled. *International Review of Psychiatry*, 10:5–90, 1998.
- Liberman, R.P.; DeRisi, W.D.; and Mueser, K.T. *Social Skills Training for Psychiatric Patients*. Boston, MA: Allyn and Bacon, 1989.
- Liberman, R.P.; Kopelowicz, A.; and Young, A.S. Biobehavioral treatment and rehabilitation of schizophrenia. *Behavior Therapy*, 25:89–107, 1994a.
- Liberman, R.P.; Mueser, K.T.; Wallace, C.J.; Jacobs, H.E.; and Eckman, T.A. Training skills in the severely psychiatrically disabled: Learning coping and competence. *Schizophrenia Bulletin*, 12(4):631–647, 1986.
- Liberman, R.P.; Van Putten, T.; Marshall, B.D.; Mintz, J.; Bowen, L.; and Kuehnel, T.G. Optimal drug and behavior therapy for treatment refractory schizophrenic patients. *American Journal of Psychiatry*, 151:756–759, 1994b.
- Liberman, R.P.; Wallace, C.J.; Blackwell, G.; Eckman, T.A.; Vaccaro, J.V.; and Kuehnel, T.G. Innovations in skills training for the seriously mentally ill: The UCLA Social and Independent Living Skills modules. *Innovations and Research*, 2:43–60, 1993.
- Liberman, R.P.; Wallace, C.J.; Blackwell, G.; Kopelowicz, A.; Vaccaro, J.V.; and Mintz, J. Skills training versus psychosocial occupational therapy for persons with persistent schizophrenia. *American Journal of Psychiatry*, 155:1087–1091, 1998.
- Lysaker, P.H.; Bell, M.D.; Zito, W.S.; and Bioty, S.M. Social skills at work: Deficits and predictors of improvement in schizophrenia. *Journal of Nervous and Mental Disease*, 183:688–692, 1995.
- Marder, S.R.; Wirshing, W.C.; Mintz, J.; McKenzie, J.; Johnston, K.; Eckman, T.A.; Lebell, M.; Zimmerman, K.; and Liberman, R.P. Two-year outcome of social skills training and group psychotherapy for outpatients with schizophrenia. *American Journal of Psychiatry*, 153:1585–1592, 1996.
- McFall, R.M. A review and reformulation of the concept of social skills. *Behavioral Assessment*, 4:1–33, 1982.
- McKee, M.; Hull, J.W.; and Smith, T.E. Cognitive and symptom correlates of participation in social skills training groups. *Schizophrenia Research*, 23:223–229, 1997.
- Meder, J.; Morawiec, M.; and Sawicka, M. Evaluation of the Medication Management Module in Poland. *International Review of Psychiatry*, 10:62–66, 1998.
- Miklowitz, D.J., and Goldstein, M.J. *Bipolar Disorder: A Family-Focused Treatment Approach*. New York, NY: Guilford Publications, 1997.
- Miller, W.R., and Rollnick, S. *Motivational Interviewing: Preparing People To Change Addictive Behavior*. New York, NY: Guilford Press, 1991.
- Mueser, K.T.; Bellack, A.S.; Douglas, M.S.; and Wade, J.H. Prediction of social skill acquisition in schizophrenic and major affective disorder patients from memory and symptomatology. *Psychiatry Research*, 37:281–296, 1991.
- Mueser, K.T.; Drake, R.E.; and Bond, G.R. Recent advances in psychiatric rehabilitation for patients with severe mental illness. *Harvard Review of Psychiatry*, 5:123–137, 1997.
- Mueser, K.T.; Kosmidis, M.H.; and Sayers, M.D. Symptomatology and the prediction of social skills acquisition in schizophrenia. *Schizophrenia Research*, 8:59–68, 1992.
- Mueser, K.T.; Levine, S.; Bellack, A.S.; Douglas, M.S.; and Brady, E.U. Social skills training for acute psychiatric inpatients. *Hospital and Community Psychiatry*, 41:1249–1251, 1990.
- Nuechterlein, K.H., and Dawson, M.E. Information processing and attentional functioning in the developmental course of schizophrenic disorders. *Schizophrenia Bulletin*, 10(2):160–203, 1984.
- Penn, D.L., and Mueser, K.T. Research update on the psychosocial treatment of schizophrenia. *American Journal of Psychiatry*, 153:607–617, 1996.



- Prochaska, J.O., and DiClemente, C.C. Stages and process of self-change of smoking: Toward an integrative model of change. *Journal of Consulting and Clinical Psychology*, 51:390–395, 1983.
- Schaub, A.; Behrendt, B.; and Brenner, H.D. A multi-hospital evaluation of the Medication and Symptom Management modules in Germany and Switzerland. *International Review of Psychiatry*, 10:42–46, 1998a.
- Schaub, A.; Behrendt, B.; Mueser, K.; Brenner, H.D.; and Liberman, R.P. Training schizophrenic patients to manage their symptoms: Predictors of treatment response to the German version of the Symptom Management Module. *Schizophrenia Research*, 31:121–130, 1998b.
- Schaub, A., and Liberman, R.P. Training patients with schizophrenia to manage their illnesses: Experiences from Germany and Switzerland. *Psychiatric Rehabilitation Skills*, in press.
- Schooler, N.; Hogarty, G.; and Weissman, M. Social Adjustment Scale II (SAS II). In: Hargreaves, W.A., ed. *Materials for Community Mental Health Program Evaluators: Publication 79–328*. Washington, DC: U.S. Department of Health and Human Services, 1979. pp. 290–302.
- Scott, J.E., and Dixon, L.B. Psychological interventions for schizophrenia. *Schizophrenia Bulletin*, 21(4):621–630, 1995.
- Sederer, L. Brief hospitalization. *American Psychiatric Press Review of Psychiatry*, 11:518–534, 1992.
- Shepherd, G.; Muijen, M.; Dean, R.; Cooney, M. Residential care in hospital and in the community: Quality of care and quality of life. *British Journal of Psychiatry*, 168:448–456, 1996.
- Silverstein, S.; Menditto, A.; and Stuve, P. Shaping procedures as cognitive retraining techniques in individuals with severe and persistent mental illness. *Psychiatric Rehabilitation Skills*, 3:59–76, 1999a.
- Silverstein, S.; Valone, C.; Jewell, T.; Corry, R.; Nghiem, K.; Saytes, M.; and Potrude, S. Integrating shaping and skills training techniques in the treatment of chronic treatment refractory individuals with schizophrenia. *Psychiatric Rehabilitation Skills*, 3:41–58, 1999b.
- Silverstein, S.M.; Schenkel, L.S.; Valone, C.; and Nuernberger, S.W. Cognitive deficits and psychiatric rehabilitation outcomes in schizophrenia. *Psychiatric Quarterly*, 69:169–191, 1998.
- Smith, T.E.; Hull, J.W.; MacKain, S.J.; Wallace, C.J.; Rattenni, L.A.; Goodman, M.; Anthony, D.T.; and Kentros, M.K. Training hospitalized patients with schizophrenia in community reintegration skills. *Psychiatric Services*, 47:1099–1103, 1996.
- Smith, T.E.; Hull, J.W.; Romanelli, S.; Fertuck, E.; and Weiss, K.A. Symptoms and neurocognition as rate limiters in skills training for psychotic patients. *American Journal of Psychiatry*, 156:1817–1818, 1999.
- Spaulding, W.D.; Reed, D.R.; Sullivan, M.; Richardson, C.; and Weiler, M. Effects of cognitive treatment in psychiatric rehabilitation. *Schizophrenia Bulletin*, 25(4):657–676, 1999.
- Spaulding, W.D.; Storms, L.; Goodrich, V.; and Sullivan, M. Applications of experimental psychopathology in psychiatric rehabilitation. *Schizophrenia Bulletin*, 12(4):560–577, 1986.
- Velligan, D.I.; Mahurin, R.K.; True, J.E.; Lefton, R.S.; and Flores, C.V. Preliminary evaluation of cognitive adaptation training to compensate for cognitive deficits in schizophrenia. *Psychiatric Services*, 47:415–417, 1996.
- Wallace, C.J.; Liberman, R.P.; MacKain, S.J.; Blackwell, G.; and Eckman, T.E. Effectiveness and replicability of modules for teaching social and instrumental skills to the severely mentally ill. *American Journal of Psychiatry*, 149:654–658, 1992.
- Wallace, C.J.; Nelson, C.J.; Liberman, R.P.; Aitchison, R.A.; Lukoff, D.; Elder, J.P.; and Ferris, C. A review and critique of social skills training with schizophrenic patients. *Schizophrenia Bulletin*, 6(1):42–63, 1980.
- Weinhardt, L.S.; Carey, M.P.; and Carey, K.B. HIV risk reduction for the seriously mentally ill: Pilot investigation and call for research. *Journal of Behavior Therapy and Experimental Psychiatry*, 28:87–95, 1997.
- Xu, Z.; Weng, Y.; and Hou, Y. Efficacy and follow-up of research of medication management module training for schizophrenic patients in Beijing. *Chinese Journal of Psychiatry*, 32:96–99, 1999.
- Ziedonis, D.M., and George, T.P. Schizophrenia and nicotine use: Report of a pilot smoking cessation program and review of neurobiological and clinical issues. *Schizophrenia Bulletin*, 23(2):247–254, 1997.

## Acknowledgments

We thank Ruth Sterling, Katherine Dunbar, and Michael Koss for their assistance in preparing this article. The views expressed in this article are those of the authors and do not necessarily reflect the official views of the National Institute of Mental Health, the National Institutes of Health, or any other branch of the U.S. Department of Health and Human Services.

## The Authors

Robert K. Heijnen, Ph.D., is Chief of the Adherence and Behavior Change Research Program; Division of Mental Disorders, Behavioral Research, and AIDS; National Institute of Mental Health. Robert P. Liberman, M.D., is Director of the UCLA Center for Research on Treatment and Rehabilitation of Psychosis, and Professor of Psychiatry, Department of Psychiatry, UCLA. Alex Kopelowicz, M.D., is Medical Director of the San Fernando Mental Health Center and Assistant Professor of Psychiatry in Residence, at the UCLA School of Medicine.